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## Cross-border bank flows and monetary policy: Implications for Canada

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# **Cross-Border Bank Flows and Monetary Policy: Implications for Canada**

by

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## Abstract

Using the Bank for International Settlements (BIS) Locational Banking Statistics data on bilateral bank claims from 1995 to 2014, we analyze the impact of monetary policy on cross-border bank flows. We find that monetary policy in a source country is an important determinant of cross-border bank flows. In addition, we find evidence in favor of a cross-border portfolio channel that works in parallel with the traditional bank lending channel. As tighter monetary conditions in source countries erode the net worth and collateral values of domestic borrowers, banks reallocate credit away from relatively risky domestic borrowers toward safer foreign counterparties. The cross-border reallocation of credit is more pronounced for source countries with weaker financial sectors that are likely more risk averse. Also, the reallocation is directed toward borrowers in advanced economies, or those in economies with investment-grade sovereign rating. In particular, source countries with tighter monetary policy increase cross-border credit to Canada. Our study highlights the spillovers of domestic monetary policy on foreign credit, which enhances the understanding of the international monetary transmission mechanism through global banks.

*Bank topics: Financial institutions; Monetary policy*  
*JEL codes: F34; F36; G01*

## Résumé

À partir des données sur les créances bancaires bilatérales tirées des statistiques bancaires territoriales de la Banque des Règlements Internationaux pour la période allant de 1995 à 2014, nous analysons l'incidence de la politique monétaire sur les flux bancaires transfrontières. Nous constatons que la politique monétaire d'un pays source est un déterminant important des flux bancaires transfrontières. De plus, nous notons des signes qui montrent que le canal transfrontière du rééquilibrage des portefeuilles fonctionne en parallèle avec le canal traditionnel des prêts bancaires. À mesure que le resserrement des conditions monétaires des pays sources fait diminuer la valeur nette des emprunteurs nationaux et la valeur de leurs garanties, les banques réaffectent leurs prêts au détriment des emprunteurs nationaux relativement risqués pour privilégier les contreparties étrangères plus sûres. Cette réaffectation transfrontière du crédit est plus prononcée pour les pays sources dotés d'un secteur financier faible et probablement plus réfractaire au risque. La réaffectation est en outre dirigée vers les emprunteurs des économies avancées ou ceux des économies émettrices de titres souverains de qualité. Plus particulièrement, le resserrement de la politique monétaire dans les pays sources accroît le crédit

transfrontière destiné au Canada. Notre étude fait ressortir les répercussions de la politique monétaire nationale sur le crédit étranger, ce qui améliore la compréhension du mécanisme international de transmission de la politique monétaire par l'intermédiaire des banques mondiales.

*Sujets : Institutions financières; Politique monétaire*

*Codes JEL : F34; F36; G01*

## Non-Technical Summary

International banking encompasses business conducted via bank affiliates in host countries as well as across borders. Since mid-2000, global banking has expanded substantially. A key implication of internationally active banks is that they create cross-border linkages, which affect the transmission of shocks from one location to another. For example, in downturns in the bank-headquarter country, the supply of foreign credit may decrease to the extent that it causes a credit crunch in the host country.

Given the economic significance of global banks, the specific question in this paper is: How does a change in a country's monetary policy affect foreign lending? Is there evidence that monetary policy in one country spills over abroad, thus giving rise to an international transmission of monetary policy? Most of the previous papers have focused on isolated country cases. For example, Cetorelli and Goldberg (2012) show that U.S. global banks actively use inter-office transfers from their foreign affiliates to support the headquarters when monetary policy is tight. In this paper, we use quarterly bilateral data on cross-border bank flows between sending and receiving country pairs over a long time span. This allows us to consider simultaneously bank lending from multiple countries to a given economy. In essence, we can separate the effect of monetary policy on the supply of foreign credit from the demand for foreign credit.

Our results convey that monetary policy tightening leads to lower domestic lending growth, consistent with the bank lending channel. However, banks increase their foreign lending, giving rise to a portfolio channel whereby domestic and foreign lending act as substitutes. Interestingly, when monetary policy is tight, banks increase lending to safer destinations, in an attempt to avoid relatively risky lending at home due to monetary policy tightening. In a case study, we show that Canada attracts more foreign credit from countries with tighter monetary policy. These findings hold above and beyond the role of global factors and global risk aversion. Overall, our study contributes to better understanding the international monetary policy transmission through global banks.

# 1 Introduction

The transmission of monetary policy through banks has received a great deal of attention in the literature (e.g., Bernanke and Gertler (1995), Kashyap and Stein (2000)), but there is less clarity about the role of global banks in the international transmission of monetary policy. Given the remarkable growth in cross-border bank flows in recent decades, it has become critical to understand how global banks adjust their cross-border credit supply in response to changes in monetary policy domestically and abroad.<sup>1</sup> Analyzing the determinants of cross-border bank flows will shed additional information on the potential spillovers that individual countries may impose on others through banks, which is useful to both monetary policymakers. In this paper, we examine whether domestic (source) monetary policy affects banks' supply of foreign credit and the composition of banks' global portfolios. The focus on Canada as a separate case study provides a closer look at the workings of the global banks' monetary policy channels and sheds new light on whether cross-border bank flows are driven by safe-haven motives.

The effect of monetary policy on bank lending has been analyzed through two channels: the bank lending channel and the portfolio channel. Under the bank lending channel, changes in the stance of monetary policy affect credit supply through their impact on the cost of banks' balance sheet liabilities (e.g., Bernanke and Gertler (1995)). Because of reduced funding, monetary policy tightening is expected to lower the supply of bank lending as in Kashyap et al. (1993). This channel predicts aggregate changes in banks' balance sheets as the monetary policy stance changes.

Under the portfolio channel, banks rebalance their portfolios as reference rates change, which shows their appetite for risk-taking. The theoretical literature suggests an ambiguous effect of monetary policy on banks' appetite for risk-taking. Some empirical studies on domestic bank lending find that a reduction in the policy rate is associated with an increase in the origination of riskier loans (Paligorova and Santos (2017), Dell' Ariccia and Suarez (2017)).

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<sup>1</sup>The stock of global claims to all sectors has increased from USD 10 trillion in 2000 to USD 27 trillion in 2016.



Similarly, Den Haan et al. (2007) show that during monetary tightening episodes, banks have been shown to rebalance their portfolios away from relatively risky loans, such as consumer and residential real estate loans, toward loans deemed to be relatively safer, such as commercial and industrial loans or commercial real estate mortgages. In general, the portfolio channel provides testable implications about the composition of banks' assets, while the bank lending channel provides testable implications about banks' overall size of assets due to a change in the liabilities.

Testing these channels in the context of global banks is a challenge, as most theoretical models are aimed at analyzing the domestic effect of monetary policy changes. This is particularly important for the portfolio channel, since domestic monetary policy affects the prices of domestic assets, but not necessarily those of foreign assets. Theoretical models show that as domestic riskless rates rise, investors substitute risky for safe assets (Fishburn and Porter (1976)), but most of these models assume that investors do not have the alternative of investing in foreign assets. Given that in the last two decades banks have expanded drastically their global activities, banks readjust their global portfolios in a response to domestic monetary policy. To check whether the portfolio channel holds at the country level, we select Canada as an investment-grade economy that is expected to attract cross-border bank flows from foreign countries with relatively tight monetary policies.

We assert that during episodes of monetary policy tightening, global banks rebalance their portfolios toward relatively safer loans not just domestically but also abroad, by increasing lending to relatively safer foreign borrowers likely to preserve net worth and capital base. In addition, global banks' shift in the composition of loan portfolios is likely accompanied by changes in funding sources driven by domestic monetary policy. For example, banks may avoid the effects of domestic monetary tightening by tapping cheaper funding sources abroad. In this case, global banks may not just change the composition of their portfolio toward relatively safer loans abroad, but may increase their cross-border lending in absolute terms as well.

Identifying the impact of domestic monetary policy on the supply of cross-border bank flows may prove challenging. Without adequate controls for demand, the supply-driven changes in cross-border lending attributed to domestic monetary policy actions in source countries may

be confounded with changes driven by credit demand in the recipient countries.<sup>2</sup> To isolate the supply effect of domestic monetary policy on cross-border flows, one needs to control for demand in recipient countries. We solve this identification problem by using data on bilateral cross-border bank claims from the BIS Locational Banking Statistics (LBS) database by residence. The bilateral structure of our dataset allows us to disentangle the supply from demand drivers of cross-border bank flows by using counterparty\*year-quarter fixed effects. We can thus control for unobserved time-variant factors that may affect the demand for credit in recipient countries. In this setup, the identification of supply effects of domestic monetary policy relies on the existence of bank flows from multiple source countries to a given recipient country in a year-quarter. This empirical setup, which is similar in nature to that applied to firms by Khwaja and Mian (2008), allows us to separate the factors affecting supply from those affecting the demand of cross-border flows. While the data are made public by the BIS at the aggregate level, the data on bilateral claims between reporting (source) and counterparty (recipient) countries at a quarterly frequency are available to reporting central banks. We use data for the interval between 1995:Q1 and 2014:Q1, which allows us to cover several monetary cycles for the 29 source countries and 77 recipient countries.

Our results are three-fold. First, domestic monetary tightening has a positive effect on the cross-border bank flows to foreign recipient economies. Specifically, one percentage-point increase in the monetary policy rate in reporting countries leads to 0.33 percent higher growth in cross-border claims. Second, in response to domestic monetary tightening, banks increase lending abroad while domestic credit declines. Third, we find evidence that banks undertake portfolio rebalancing toward relatively safer loans abroad. For example, Canada as an investment-grade counterparty attracts more foreign bank flows from countries with relatively tight monetary policy. Although the data do not provide decomposition of cross-border lending by loan types, the characteristics of source-recipient country pairs are indicative of the relative riskiness of domestic vs. foreign loans. Thus, we find that in response to domestic monetary tightening, the reallocation of credit toward foreign borrowers is more pronounced for source

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<sup>2</sup>We use the terms ‘reporting’ and ‘source’ country interchangeably; the same applies for ‘counterparty’ and ‘recipient’ country.

countries with weaker financial banking sectors. Also, the reallocation is more pronounced for non-bank borrowers in advanced foreign economies and/or with investment-grade sovereign rating. Our study provides evidence of the portfolio rebalancing channel in a cross-border context.

Our paper is related to an emerging stream of empirical literature that examines the role of global banks in the international transmission of monetary policy. Thus, Cetorelli and Goldberg (2012) show that U.S. global banks actively use fund transfers from foreign offices in response to monetary policy shocks in the U.S. Brauning and Ivashina (2016) focus on the hedging costs arising from currency mismatches between global banks funding and investment activities. As a result of these hedging costs, global banks react to domestic monetary policy easing by increasing foreign reserves and decreasing lending in foreign markets. In addition, Morais et al. (2015) document an international risk-taking channel of monetary policy, as foreign monetary policy loosening is associated with increased supply of credit by foreign banks to Mexican firms. Finally, Bruno and Shin (2015b) argue that an appreciation of foreign currencies relative to the U.S. dollar makes U.S. dollar funding cheaper, hence the increase in lending to foreign recipient countries.

Our paper also adds to the large literature on the push and pull determinants of cross-border bank flows. Although we highlight the role of monetary policies in reporting countries, we also account for typical macroeconomic factors at the reporting and counterparty country levels. Importantly, we show that emerging market economies are not an attractive destination for cross-border bank loans when monetary policy is tightened at home. Our paper is also broadly 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) and 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 and portfolio rebalancing. Section 6 focuses on Canada as a counterparty and Section 7 concludes.

## 2 Data Sources and Summary Statistics

### 2.1 Data sources

The Locational Banking Statistics (LBS) by residence, compiled by the BIS, is the main data source for this paper. The confidential dataset is provided 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 (source) countries relative to about 200 counterparty countries. 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. We normalize flows by the lagged outstanding claims, thus obtaining a measure equivalent to the growth of claims. One advantage of the BIS data, compared with the banking flows collected from balance of payments statistics, is the detailed breakdown of the reported series by counterparty countries, hence the dyadic structure of the data. In addition, the claims and liabilities on counterparty countries are further detailed by currency, instrument (loan and debt securities), and type of counterparty (bank or non-bank).<sup>3</sup>

The LBS dataset includes information dating back to 1977. However, some countries, especially emerging market economies, started reporting these data in the early 2000s. This factor, plus the availability of other data used in the empirical tests, limits our sample to the period between 1995:Q1 and 2014:Q2 for 29 reporting countries and 77 counterparty countries.<sup>4</sup> We also exclude from our sample the BIS reporting countries that serve as offshore centers.<sup>5</sup>

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<sup>3</sup>In the BIS definition, *loans* include all loans granted, working capital provided to branches/subsidiaries, and deposits with other banks, including those with their own affiliates (inter-office positions). This instrument category also includes repurchase transactions (repos), financial leases, promissory notes, non-negotiable debt securities (e.g. non-negotiable certificates of deposits), subordinated loans (including subordinated non-negotiable debt securities) and reporting banks' holdings of notes and coins that are in circulation. *Debt securities* are negotiable instruments other than loans and deposits, equity securities, investment fund shares or units, and financial derivatives. *Non-banks* include non-financial sectors (government sector, non-financial corporations and households) and non-bank financial institutions (special purpose vehicles, hedge funds, securities brokers, money market funds, pension funds, insurance companies, financial leasing corporations, central clearing counterparties, unit trusts, other financial auxiliaries, development banks and export credit agencies).

<sup>4</sup>Table A3 presents the list of countries included in the sample and the number of observations per country. France, Germany, Switzerland, and the United Kingdom have the largest number of observations as reporting countries, while the United Kingdom and the United States appear most frequently as counterparty countries.

<sup>5</sup>Offshore centers are typically used by corporations or banks to arrange financial transactions whose funds are redirected elsewhere for their final use (Avdjiev et al. (2014)). This pass-through nature of offshore centers

The dyadic structure of the LBS data (i.e., multiple reporting countries linked to multiple counterparties) allows us to use various types of fixed effects to control for unobservable variation at the country level (Section 3). Figure 1 provides a schematic representation of the dyadic structure of the data. In this illustrative example, banks from three reporting countries have cross-border exposures to borrowers from five counterparty countries. Thus, the dyadic structure allows us to disentangle changes in cross-border bank flows that are driven by supply factors specific to the reporting country from demand for credit in the counterparty country. Since multiple lending countries report claims on borrowers from the same counterparty country in a given quarter, the use of counterparty-time fixed effects serves to disentangle the effect of demand conditions from that of supply factors that vary across reporting countries. One additional advantage of the LBS dataset arises from the fact that the cross-border claims denominated in multiple currencies are expressed in U.S. dollars and adjusted for exchange rate changes, which allows us to compute cross-border flows that abstract from exchange rate fluctuations over time.<sup>6</sup>

One drawback of the LBS dataset is that it does not contain the historical claims of domestic banks on borrowers residing in their home country, and hence does not allow computing banks' portfolio shares allotted to the domestic vs. foreign economies. Since some of our tests aim to assess whether banks substitute domestic for foreign claims, we overcome this limitation by constructing a new dataset of bank claims on the domestic non-bank sector used to test for the portfolio channel in Section 5. These domestic claims include both loans and debt securities, which is consistent with the composition of cross-border claims provided by the LBS. To construct the series of bank claims on the domestic non-bank sector, we use two data sources. First, we use data on total credit to the private non-financial sector, also provided by the BIS (Dembiermont et al. (2013)). Second, we collect data on domestic banks' claims, loans, and securities holdings vis-a-vis the public sector from national sources, which are consistent with the BIS methodology used to construct the cross-border claims. The resulting series are

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makes their monetary policy irrelevant to the banking flow originated in these locations.

<sup>6</sup>Note that the currency compositions of cross-border claims are also reported, which allows the BIS to calculate the exchange rate-adjusted cross-border claims expressed in U.S. dollars for each reporting country. This is akin to a real measure of bank claims that strips out any currency valuation effects.

used to compute the growth of bank domestic claims on non-banks, which are compatible with the measures described above for the growth of cross-border claims.

We collect data on monetary policy rates, which is our main explanatory variable of interest, 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. For additional controls, we collect country-specific macroeconomic and financial variables—including gross domestic product (GDP) growth, inflation, debt/GDP, and bank equity returns from multiple sources including Datastream, Haver, and Bloomberg, all defined in Appendix 1.

## 2.2 Summary statistics

Table 1 presents a set of summary statistics for the cross-border bank flows computed as the growth in cross-border claims. We drop reporting-counterparty country pairs where the minimum outstanding claims in a given quarter are less than \$5 million or the total outstanding claims are negative. This growth in claims is expressed in percentage points and winsorized at the 2.5 percentile. As shown in the table, the quarterly 'Cross-border flows: All' averages 4.1 percent of the lagged outstanding claims during our sample period. The flows to banks average around 9 percent, while the 'Cross-border flows: Non-banks' average at 4.8 percent. The flows to banks are not only larger but also more dispersed than the flows to non-bank counterparties, as inferred by their standard deviations. In contrast to cross-border flows, the growth of domestic claims on non-banks is only 2.3 percent and has a lower variance. The cross-border flows to Canadian counterparties, reported in Table 1 appear similar to the aggregate flows, although their level is slightly lower. In contrast to cross-border flows, the growth of domestic claims on non-banks was only 2.3 percent and has a lower variance.

Table 1 also reports summary statistics for all variables used in the regressions grouped by both reporting and counterparty countries. Given that the sample of counterparty countries

includes a higher number of emerging market economies relative to the sample of reporting countries, it is not surprising that the monetary policy and inflation rates are higher for the counterparty group, just like credit growth, bank equity returns, and real GDP growth.

We present a cursory assessment of the relationship between cross-border flows to non-bank counterparties and monetary policy rates in Figure 2. The cross-border flows are positively correlated with the average monetary policy rate in reporting countries over the sample period. In contrast to the cross-border flows, the growth in domestic claims seems very stable over time and weakly correlated with the monetary policy rates. The graph provides some suggestive evidence that higher monetary policy rates are associated with faster growth in cross-border claims than in domestic claims, which is consistent with portfolio channel.

### 3 Methodology

This section outlines the empirical tests of monetary policy rates on cross-border lending, the role of a global factor and portfolio rebalancing.

#### 3.1 Main regression specification

To estimate the effect of monetary policy in the reporting countries on cross-border flows while controlling for the demand for credit in the counterparty countries, we rely on the following panel regression with the quarterly cross-border flows as the dependent variable:

$$Flows_{ijt}/Outstanding_{ijt-1} = \alpha Policy\ rate\ rep_{it-1} + \beta' Xrep_{it-1} + \gamma_{jt} + \epsilon_{ijt} \quad (1)$$

where  $i$  and  $j$  indicate the reporting and counterparty countries, and  $t$  denotes time at the quarterly frequency. We use three different measures of cross-border flows: first, the ratio between the change in total claims ( $Flows_{ijt}$ ) on all sectors in a counterparty country scaled by the lagged outstanding claims of a reporting country in a given quarter ( $Outstanding_{ijt-1}$ ); second, we isolate the growth of claims on bank counterparties; and third, we focus on the growth of claims on non-bank counterparties. Thus, our analysis is focused not on the dollar

amount of cross-border flows, but on the growth of cross-border claims, which is equivalent to the flows normalized by lagged claims.

Among the explanatory variables, we use the lagged nominal monetary policy rate *Policy rate rep*<sub>*it*-1</sub> as the reference rate in our main specification.<sup>7</sup> Nominal rates are preferred to real rates when estimating the determinants of cross-border bank flows because banks typically calculate their expected profits using nominal rates rather than real rates. In addition, it is difficult to select the right deflator for the rates that potentially drive cross-border claims. Arguments can be made for using deflators either for the home or the host countries, depending on where the bank profits for the loan would be repatriated or reinvested in the host country, which is not observable. That said, we are aware that the degree of financial tightness associated with nominal rates also depends on the domestic rate of inflation, for which reason we include the inflation rate as an explanatory variable for reporting countries.

A positive estimate for  $\alpha$ , the main coefficient of interest on the monetary policy rate, is consistent with portfolio rebalancing whereby risky assets decrease and safer assets increase when monetary policy in the source country is tighter. Traditionally, monetary policy affects the supply of bank credit through a number of channels, such as the bank lending channel and portfolio channel. First, the bank lending channel operates through a bank's need to substitute the drain in deposits with uninsured liabilities in periods of monetary policy tightening. Thus, this channel affects banks' funding sources and their costs that are closely linked to current bank conditions, as contractionary monetary policy boosts external finance premia (Disyatat (2011), Kishan and Opiela (2012)). Second, the balance sheet channel also affects the banks' funding costs, as tighter monetary policy causes banks' net worth to deteriorate through changes in cash flows, net interest margins, and the valuation of assets through the discount factor (Bernanke and Gertler (1995)).

In addition to these channels, we focus on portfolio rebalancing channel through which banks reallocate their portfolios toward less risky assets, either domestically or abroad, in order to improve their net worth and strengthen their capital base when monetary policy is tighter.

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<sup>7</sup>In section 4 as an alternative, we use shadow rates and LIBOR-OIS.



Because the net worth of local borrowers decreases when monetary policy is tight, banks may reallocate lending to safer foreign borrowers. In a domestic context, Den Haan et al. (2007) find that banks rebalance their portfolios toward relatively safer assets in order to safeguard their capital adequacy ratio in response to monetary tightening. Namely, banks shift away from real estate and consumer loans, and move to commercial industrial loans. In a similar spirit, we argue for a portfolio rebalancing channel, through which banks reallocate lending to relatively safe foreign borrowers (with stronger net worth positions) when monetary policy has tightened at home.

Bank-specific characteristics are also likely to affect the sensitivity of external funding costs to monetary policy changes. Larger, more liquid, and better capitalized banks may be less affected by monetary tightening through the bank lending channel. These characteristics are associated with stronger balance sheets, a smaller degree of informational asymmetries, and hence less variability in the external finance premium. For the same reason, we also expect safer banks to be less engaged in portfolio rebalancing in response to monetary tightening owing to stronger balance sheets and lower funding costs.

Cross-border bank flows are also affected by demand conditions in the recipient country. If monetary policy tightening in the reporting country overlaps with a credit boom abroad, then an increase in cross-border flows may be due to the latter and not the former. To control for time-varying demand factors at the counterparty country level, we make use of the dyadic structure of our data and include counterparty\*year-quarter fixed effects ( $\gamma_{jt}$ ). The identification of demand factors is driven by the variation in cross-border flows sent by different reporting countries to the same counterparty in a given year-quarter. Therefore, the use of dyadic data achieves a cleaner identification of the impact of supply factors, including monetary policy, on cross-border flows compared with studies using balance-of-payment data.

While the counterparty\*year-quarter fixed effects control for demand conditions in the counterparty country, it is also possible that the monetary policy rate in the reporting country depends on domestic macroeconomic conditions that also affect the cross-border flows, such as the outlook for domestic GDP growth. Therefore, omitted variable bias may affect the coefficient on the reporting country's policy rate as a driver of cross-border flows. We

counteract this type of bias in two ways. First, we control for a set of macroeconomic variables in reporting countries that may affect the monetary policy rate either directly or indirectly, such as real GDP growth, inflation, and credit growth, which are included in  $Xrep_{it-1}$ . Second, we use the Eurozone as a special case since the optimal monetary policy rates in some individual Eurozone members may have differed from those set for the euro area as a whole. To the extent that some economies of euro area member states may be unsynchronized, ECB policy actions may have been too loose at times for faster-growing member states such as Ireland, but too tight for slower-growing member states such as Italy.<sup>8</sup> We view the monetary policy rate in these countries as relatively exogenous to cross-border credit.

We also include a set of reporting country controls in  $Xrep_{it-1}$  that have been found to affect cross-border credit flows. A higher level of the domestic debt-to-GDP may be indicative of higher sovereign risk and banks' desire to expand lending abroad (Bruno and Shin (2015a)). We use country-level bank equity returns at the quarterly frequency to measure the health of the banking system and its viability to extend credit (Ghosh et al. (2014) and Bruno and Shin (2015a)). We also include the quarterly change in exchange rates between country pairs, since appreciating counterparty currencies may encourage cross-border flows denominated in the reporting country's currency. We also control for the financial center status of reporting countries, which are U.K., the U.S., Hong Kong, Singapore and Luxembourg. In addition, we consider whether the reporting country is part of the Eurozone, since these countries may have common credit and business cycles, and hence share similar credit supply conditions.

The monetary policy rate is an informative indicator of the monetary policy stance under normal circumstances. However, in our sample period, three central banks—Japan, the U.K., and the U.S—implemented unconventional monetary policy measures after their reference rate hit the zero lower bound. For these three countries, we construct an indicator variable equal to one for the duration of the quantitative easing program and zero otherwise.

The standard errors are clustered at the reporting and counterparty country levels,

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<sup>8</sup>The result is found in Lee and Crowley (2009) who conduct counterfactual exercises with a popular Taylor rule-type policy reaction function. Based on these exercises, the authors construct aggregate 'stress' measures, which indicate how divergent economic conditions are within the euro area. Following Clarida et al. (1998), policy 'stress' refers to the extent to which actual policy deviates from the optimal policy.

which is the most conservative clustering setup. Clustering at the reporting country level accounts for the autocorrelation of the monetary policy rate and other macro variables over time, while clustering at the counterparty level accounts for the correlation of cross-border flows at the counterparty level.

### 3.2 Specification for robustness to global factors

Miranda-Agrippino and Rey (2015) and Rey (2013) argue that cross-border flows are largely driven by a global factor, which in turn can be related to monetary policy in the center country, the U.S. Also, Bruno and Shin (2015b) argue that U.S. monetary policy is a key driver of cross-border flows because local banks borrow in U.S. dollars from global banks, which use U.S. dollar financing from money market funds in financial centers. To test the robustness of monetary policy in the source country as a driver of cross-border banking flows, we rely on a regression similar to equation (1), but instead of counterparty\*year-quarter fixed effects, which do not allow us to control for time-varying factors, we use separately reporting-counterparty fixed effects and year-quarter fixed effects, with the latter controlling for the effect of a global factor. Alternatively, we use VIX instead of year-quarter fixed effects to control for the global factor, since VIX is a proxy for the perception of risk and risk appetite in asset markets (Bekaert et al. (2013)).

$$\begin{aligned} Flows_{ijt}/Outstanding_{ijt-1} &= \alpha Policy\ rate\ rep_{it-1} + \theta Policy\ rate\ cp_{jt-1} + \\ &= \beta' Xrep_{it-1} + \mu' Ycp_{jt-1} + \gamma_{ij} + \phi_t + \epsilon_{ijt}. \end{aligned} \quad (2)$$

This setup allows us to separately identify ‘push’ factors from reporting countries  $Xrep_{it-1}$  and ‘pull’ factors from counterparty countries ( $Ycp_{jt-1}$ ) while also controlling for a time-variant global factor.<sup>9</sup> We include the same set of counterparty controls,  $Ycp_{jt-1}$ , as for the reporting countries (Ahmed and Zlate (2014), Ahmed et al. (2015)). The year-quarter fixed effect,  $\phi_t$ , controls for the unspecified global factor, while the reporting-counterparty fixed effect  $\gamma_{ij}$

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<sup>9</sup>Calvo et al. (1996) emphasize the importance of external push factors in explaining capital flows to emerging economies in the 1990s.

control for unobserved factors at the pair level that may drive the cross-border flows. With this specification we can assess whether monetary policy in the source country is still a relevant driver when controlling for a global factor. Our conjecture is that, if the global factor were the driver of both banking flows and monetary policy in the source countries, the effect of monetary policy would vanish when the global factor is taken into account. On the contrary, if monetary policy still has a role while accounting for the global factor, the results from our baseline specification should be preserved.

### 3.3 Specification for the portfolio channel

Portfolio rebalancing in the context of global banks should be reflected in a shift from domestic to foreign lending when monetary policy in the source country becomes relatively tighter. To test for banks' portfolio reallocation, we use data on both domestic and cross-border credit to non-bank borrowers in the following specification:

$$Flows\ Differential_{ijt} = \alpha Policy\ rate\ rep_{it-1} + \beta' Xrep_{it-1} + \gamma_{jt} + \epsilon_{ijt}. \quad (3)$$

*Flows Differential*<sub>ijt</sub> is the difference between *Flows*<sub>ijt</sub>/*Outstanding*<sub>ijt-1</sub> and *Flows Domestic Nonbank Credit*<sub>it</sub>/*Outstanding*<sub>ijt-1</sub>. Since we have available domestic credit to non-banks only, we narrow the analysis to cross-border flows to non-banks as well. If portfolio rebalancing is present,  $\alpha$  should be positive since tighter monetary policy in reporting countries would be associated with faster growth of credit to foreign than domestic counterparties. We also examine whether the relationship between monetary policy and cross-border flows holds mostly for reporting countries with riskier financial sector (such as those with higher SRISK/GDP ratios, or financial sectors with lower ratings) and counterparty countries deemed safer (such as those classified as advanced economies or with investment-grade sovereign risk). Developed by Brownless and Engle (2016), SRISK is a suitable measure for the riskiness of a banking sector because it estimates the amount of capital that a financial institution would need to raise in order to function normally under stress. Since more risky banking sectors are more concerned with safeguarding their capital, they are more likely to shift to less risky assets in

response to monetary policy tightening at home.

## 4 Main Results

This section reports four sets of results: the supply effect of monetary policy on cross-border credit, the role of the economic development in reporting countries, the role of global factors, and the effect of banks' exposure to U.S. monetary policy through the use of U.S. dollar funding.

### 4.1 Monetary policy in the source countries

Table 2 presents estimates for the relationship between monetary policy in reporting countries and cross-border flows. In column (1), the dependent variable is the growth of cross-border claims to all sectors of recipient countries (bank, non-bank, and unallocated sectors). The coefficient on *Lag policy rate rep* shows that a one percentage point increase in the monetary policy rate in a source country is associated with 0.33 percentage point increase in cross-border flows. Given the 4 percent mean of bank flows, this impact is economically significant. In addition, in columns (2) and (3), we split the cross-border flows into those to banking and non-banking foreign counterparties, respectively. We find that a one-percentage point increase in the monetary policy rate in a source country leads to a 0.369 percentage point credit to banks and a 0.426 percentage point credit to non-bank counterparties. Overall, it appears that monetary policy affects cross-border flows to banks and non-banks in a similar way. These results are robust to excluding the U.S. and other financial centers from the sample. Further, since we rely on counterparty\*year-quarter fixed effects, these estimates are relevant for the cross-section of reporting countries that have a common counterparty in a given year-quarter.

Among the reporting-country controls, we find that higher government debt-to-GDP in the reporting country is associated with lower cross-border flows. In addition, positive changes in a reporting country's nominal exchange rate (i.e., reflecting an appreciation of the counterparty's currency) are associated with more cross-border flows. Also, financial centers lend less abroad compared with other countries, consistent with the view that these countries

attract capital rather than send out capital. The Eurozone countries also send less cross-border flows than the rest of the world. Interestingly, the *QE indicator rep* has a positive and statistically significant coefficient for the total cross-border flows, although it is not statistically significant when the flows are detailed by bank vs. non-bank recipients.

Given the elevated global uncertainty, quantitative easing, and new regulatory requirements for banks since the global financial crisis, we check whether the results reported above are preserved when the pre-/post-crisis periods are considered separately. In Table 3, columns (1)-(3) show results for the period before 2007:Q2. The coefficient on the monetary policy rate is positive and statistically significant for all three types of cross-border bank flows. In columns (4)-(6), which cover the period after 2007:Q2, the positive statistically significant effect is preserved only for the cross-border credit to all sectors in column (4), but not for the flows to banks and non-bank counterparties taken separately. Interestingly, the negative effect of debt/GDP on cross-border flows is present only for the period after 2007:Q2, when sovereign risk increased for several reporting countries. Also, Eurozone countries have lower cross-border flows than the rest of the sample since 2007:Q2, which is not surprising given their experience during the Great Recession and the European Sovereign Debt Crisis.

While controlling for the stance of monetary policy, the LIBOR-OIS spread is likely to affect banks' cost of funding and hence their supply of cross-border loans. In Table 4, we add the lagged LIBOR-OIS spread to the explanatory variables used in Table 2, and repeat the estimation for the full sample (columns 1-3) and the post-2007:Q2 period (columns 4-6). The effect of monetary policy on cross-border flows is still positive, statistically significant, with the exception of column 2. While controlling for the stance of monetary policy, the LIBOR-OIS spread has a negative and statistically significant effect on the cross-border flows to non-banks, suggesting that higher funding costs for banks lead to less lending (columns 3 and 6).

With the monetary policy rates having persisted near the zero lower bound in the post-crisis period, we also use a two-factor model to compute the shadow interest rates at the zero lower bound (Krippner (2013)). This approach is useful to gauge the stance of monetary policy at the zero lower bound for the U.S., the EURO area, Japan, and the U.K. In Table 4, columns (7)-(9), the relationship between the shadow interest rates in reporting countries and

cross-border flows remains positive and statistically significant, which shows that our results on the effect of monetary policy on cross-border flows are robust to the episodes of unconventional monetary policy.

Overall, the effect of monetary policy on cross-border flows is positive and significant when using alternative monetary policy measures. For the post-2007:Q2 period, the estimates are noisier, potentially due to the overall increased level of uncertainty. In the next section, we test whether the effect of monetary policy rates on cross-border flows is driven by the economic conditions in the reporting country.

## 4.2 Economic conditions in the reporting countries

Our analysis could be subject to the endogeneity concern that monetary policy and economic activity in the reporting country evolve simultaneously, and hence cross-border flows may be driven by economic conditions rather than monetary policy in reporting countries. For example, if monetary tightening leads to a slowdown in economic activity and credit demand in reporting countries, banks may choose to increase cross-border lending because their risk-adjusted returns will be higher abroad. It would then be difficult to disentangle the effect of tighter monetary policy—and hence increased riskiness of domestic borrowers—from that of the domestic economic slowdown on cross-border flows. In an attempt to isolate the effect of monetary policy from that of domestic economic conditions, we use the sample of Euro reporting countries as an empirical setup in which monetary policy may be misaligned with domestic economic conditions for some countries. Namely, we test whether the relationship between cross-border flows and monetary policy differs for the Eurozone vs. non-Eurozone reporting countries under the assumption that Eurozone monetary policy may not co-move strongly with macroeconomic conditions in certain member countries (i.e., monetary policy and economic conditions are relatively less endogenous). The relationship between monetary policy and cross-border claims, therefore, is expected to be relatively cleaner from biases compared with countries in which monetary policy and cross-border credit supply arise endogenously.

In Table 5 we interact *Euro rep* with all control variables. Our focus is on the interaction term, *Policy rate rep\*Euro rep*. Since the policy rate is more synchronized with

the German and French business conditions, as a robustness check we exclude Germany and France from the sample. The results from this test are reported in columns (4)-(6), while in columns (1)-(3) all countries are considered. The coefficient on the monetary policy rate is positive and significant across all specifications, and its magnitude is larger for the Eurozone than for non-Eurozone countries, implying that endogenous development of monetary policy and cross-border credit likely introduces a downward bias.

Alternatively, we also examine whether the relationship between monetary policy and cross-border lending varies with economic conditions in the reporting countries. Figure A2.1 shows that the policy rate is similarly distributed across high- and low-GDP growth regimes, suggesting that the effect of monetary policy is relatively independent from that of domestic economic conditions. In Table 6, the interaction between *Lag policy rate rep* and *HGDP rep* (an indicator variable that takes one if the quarterly GDP growth is higher than the sample median in a given period) is relatively small in magnitude and is not statistically significant for any of the dependent variables, suggesting that the effect of monetary policy is independent from that of the GDP growth regime in the reporting country.

In Table 7, we report results from a similar exercise for periods of currency appreciation and depreciation in the reporting country. The lack of statistical significance on the interaction term between the indicator variable *Appr* (an indicator variable that takes one if the counterparty currency appreciates in a given quarter) and the monetary policy rate confirms that the relationship between monetary policy and cross-border flows is independent from domestic exchange rate conditions. This is further reinforced by the comparable distributions of monetary policy rates and currency regimes shown in Figure A2.2.

### 4.3 Global factors

Omitting global factors from our specification could lead to biases that overstate the effect of monetary policy on cross-border flows. We follow two paths to counteract this potential bias. First, we use reporting-counterparty pair fixed effects and year-quarter fixed effects, along with monetary policy rates in the source and recipient countries, where the year-quarter fixed effects control for the unobserved global factor. Second, using fixed effects for reporting-counterparty



pairs and year fixed effects, we include quarterly VIX among the explanatory variables, since VIX is found to proxy for global conditions.

In Table 8, columns (1)-(3), we estimate specification (1) with reporting-counterparty and year-quarter fixed effects. Taking into account time-invariant effects within the reporting-counterparty country pairs, the additional year-quarter fixed effects control for the quarterly global factor. In column (1), the coefficient on the policy rate in reporting countries is positive and statistically significant, while the coefficient on the counterparty countries' policy rates is negative and statistically significant, suggesting that cross-border flows go to countries with relatively lower monetary policy rates. This finding corroborates the argument that banks avoid lending to risky borrowers at home in favor of borrowers at foreign destinations where collateral values and net worth are higher (i.e., due to lower policy rates). Similar conclusions arise from the results in columns (2) and (3) for cross-border flows to banks and non-banks respectively.

In terms of other control variables, *Lag credit growth cp* is positive and significant, implying that the demand for credit from the counterparty country attracts capital flows to all sectors. The same holds when the counterparty country has high GDP growth, while a high sovereign debt-to-GDP ratio deters cross-border credit. In the reporting country, high sovereign debt is also a barrier to cross-border credit, likely because investors demand higher returns. Finally, during the QE episodes when banks' liquidity is elevated, cross-border flows are higher compared with other periods without QE policies. It is likely that QE policy allows banks to expand their balance sheet and hence the higher credit growth, including credit abroad.

In columns (4)-(6) we include the log of VIX, which captures the perception of global risk and risk aversion (Bekaert et al. (2013)). While VIX affects cross-border flows negatively, the monetary policy rate in the reporting country still has a positive impact and in counterparty countries, that has a negative impact on cross-border flows.<sup>10</sup> Finally, in columns (7)-(9), monetary policy is measured by the policy rate differential between the reporting and

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<sup>10</sup>Instead of year-quarter, we use year fixed effects in order to estimate the impact on VIX that varies at the quarterly frequency.

counterparty countries. The negative coefficient on VIX and the positive coefficient on the monetary policy differential are preserved.

#### 4.4 U.S. dollar funding

To the extent that global banks use dollar-denominated liabilities to finance cross-border claims, it may be the case that U.S. monetary policy, rather than the monetary policies of source countries, is the sole driver of cross-border bank flows. To address this concern, in Table 9 we omit the U.S. as a reporting country from the sample, and add the ratio of banks' dollar-denominated cross-border liabilities over cross-border claims (*USD CB Liabilities/CB Liabilities rep*) and its interaction with the U.S. policy rate. If cross-border flows are driven solely by the U.S. monetary policy rates rather than the source countries' monetary policy rate, we would expect the coefficient estimate on the latter to lose statistical significance. However, the coefficient of interest is still statistically significant, which suggests that our results on the monetary policy impacts is not driven by the U.S. monetary policy stance and global banks' dollar funding.

## 5 Portfolio Channel

This section reports a host of tests of the portfolio rebalancing channel. Specifically, we examine whether cross-border credit goes to safer destinations, whether domestic credit is less responsive to the monetary policy compared to foreign credit, and whether the riskiness of the reporting country matters for cross-border credit.

### 5.1 Is there substitution between domestic and foreign credit growth?

For the next set of results, we merge the sample of cross-border claims with that of domestic claims for non-bank borrowers. This specification allows us to examine whether the growth of cross-border credit increases relative to that of domestic credit when monetary policy is tighter in reporting countries. In Table 12, column (1), we interact *Lag policy rate rep* with a *Domestic Indicator* that takes the value one for domestic lending and zero for foreign lending.

The positive sign on *Lag policy rate rep* suggests that cross-border claims to non-banks increase as monetary policy is tight. However, the negative estimate on the interaction term suggests that banks decrease their lending to domestic relative to foreign non-bank borrowers. We also estimate a more restrictive model in column (2), whereby the dependent variable is the difference in growth rates for foreign and domestic credit. The positive and statistically significant estimate suggests that the differential between the foreign and domestic growth increases as monetary policy in the reporting country is tightened, which supports the portfolio rebalancing channel.<sup>11</sup>

## 5.2 Is cross-border credit reallocated away from riskier reporting countries?

Finally, we explore additional characteristics of the banking sector in the reporting country that have implications for the portfolio rebalancing channel. In particular, we examine whether the health of the domestic financial system plays a role in portfolio rebalancing. We expect banks in reporting countries with relatively weaker banking sectors to be involved more actively in portfolio rebalancing. Brownless and Engle (2016)'s SRISK measure is a suitable proxy of a country's financial health. It is an estimate of the amount of capital that a financial institution would need to raise in order to function normally if we have another financial crisis. Banks can reduce SRISK by reducing size, leverage or risk. To account for bank size, we scale the measure by quarterly GDP of the reporting country, and construct an indicator variable *H RISK*, which takes one for values higher than the yearly median values and zero otherwise. Next, we interact *H RISK* with *Lag policy rate rep* in column (3), Table 12.<sup>12</sup> The positive estimate on this interaction term confirms that banking sectors with high SRISK rebalance toward foreign borrowers more in response to monetary tightening compared with banking sectors with low SRISK.<sup>13</sup>

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<sup>11</sup>A more direct test of the portfolio rebalancing channel is based on individual banks' portfolios, which would allow for testing of whether banks change the portfolio weights of domestic and foreign credit. However, such a test is not obtainable given that we use cross-country data.

<sup>12</sup>The number of observations in column (3) drops because of the availability of the SRISK.

<sup>13</sup>The impact of SRISK on cross-border flows is likely non-linear suggesting that for the highest SRISK values, banks have to deleverage and cut credit for both domestic and foreign banks. Therefore, portfolio rebalancing likely happens when SRISK is high, but not too high.

Overall, we provide three pieces of supporting evidence of the portfolio rebalancing channel—cross-border credit is reallocated to less risky foreign destinations and sectors, domestic credit growth is weaker relative to foreign credit growth, and finally, more vulnerable banking sectors are more involved in portfolio rebalancing.

In the next section, we provide an additional robustness test of our results. For that purpose, we select Canada as an advanced counterparty economy with increasing cross-border flows.

## 6 Canada as a Counterparty Country

We focus on Canada as a counterparty country to explore whether our results on the effect of monetary policy on cross-border bank flows holds for a single country. The case of Canada is interesting because it has recently attracted sizable international portfolio and bank flows. Since 2006, Canada is the only G7 country that exhibits positive cross-border credit growth whereby the total outstanding claims on Canadian banks and non-banks is USD 256 billion in 2006 and USD 461 billion in 2015, while for the same period, other G7 countries have experienced outflows of foreign credit.

Given our results that cross-border flows increase toward safer destinations under tighter monetary policy abroad, Canada is expected to be a receiver of cross-border credit from countries with tighter monetary policies. Following the methodology in Section 3, our analysis investigates the effect of reporting countries' monetary policies on cross-border bank flows to Canada (Tables 13 and Table 14), the role of a global factor on cross-border flows (Table 15) and whether Canada attracts more cross-border flows relative to other countries (Table 16).

Starting with Table 13, we report the results of the same specifications as in Table 2 but restricting the counterparty sample to Canada. The results are very similar to those reported for the entire sample in Table 2, whereby monetary policy in the reporting countries is positively linked to cross-border flows to counterparties. Cross-border flows to Canadian non-banks do not seem to be significantly affected by foreign monetary policies (column 3).

However, a 1 percent increase in the monetary policy rate abroad is associated with 0.973 percent quarterly cross-border credit growth to banks (column 2). Given the structure of the data, it may be that cross-border credit is in the form of inter-bank transfers from foreign affiliates abroad and/or direct cross-border lending. Although the main premise of our paper does not depend on the source of cross-border flows, the latter would matter if one were to choose macroprudential policies to mitigate risks from abroad, such as sudden stop and/or rush for the exit. For example, if these risks are associated with foreign affiliates of Canadian banks, the optimal policy tool may be sound liquidity management within the bank group; however, if the risks are related to foreign banks' cross-border flows in the Canadian banking system, the appropriate tool may be countercyclical capital buffers.

Since the Canadian banking sector is the most exposed to the U.S., we examine whether the relationship between cross-border credit and U.S. monetary policy plays a more important role than the rest of reporting countries. In Table 14 the estimate on the interaction term *Lag policy rate rep* $\times$ *US* (U.S. is an indicator variable that takes the value of one, and zero otherwise) is positive and significant for all sectors and banks, reported in columns (1) and (2), respectively. The interpretation is that the U.S. monetary policy tightening plays a more important role in cross-border credit to Canada than tightening in other reporting countries. This finding confirms that U.S. banks and/or U.S. affiliates of Canadian banks view the Canadian banks as a safe haven when the U.S. policy rate tightens and borrowers' collateral value decreases.

In Table 15, we take into account the impact of global factors on cross-border flows to Canada. In columns (1)-(3), we use year-quarter fixed effects and reporting country fixed effects, which should account for the effect of a global factor. The positive sign on the monetary policy rate of the reporting country is positive and significant for all sectors and banks, and still remains insignificant for non-banks. The same conclusion holds based on columns (4)-(6) where we include VIX as a proxy for a global factor. In columns (7)-(9) we use the monetary policy rate differential between the reporting countries and Canada, and still find a positive relationship between cross-border credit and the interest rate differential.

Finally, in Table 16 we explore whether cross-border credit in Canada is more sensitive

to foreign monetary policies than other counterparties. We interact *Lag policy rate rep* with an indicator variable, *Canada cp*, which takes one if the counterparty country is Canada and zero otherwise. The positive signs of the interaction terms in columns (1) and (2) confirm that the impact of the policy rate on cross-border credit is more sensitive for Canada as a counterparty relative to other countries, possibly because Canada is a relatively safer destination than other countries. This effect holds above and beyond the effect of counterparty countries credit ratings (*Lag policy rate rep* × *Speculative grade cp*). The lower panel of Table 16 uses *EME cp* instead the credit rating of the counterparty.

To sum up, this section establishes several patterns regarding cross-border bank flows to Canada. First, cross-border bank claims on the Canadian economy are sizable and growing. Second, tighter foreign monetary policy, and especially tighter U.S. monetary policy, leads to higher cross-border credit growth to the Canadian banking sector, but not to the non-banking sector. Our results pose some important questions left for future work—given that Canadian banks depend on funding provided by foreign banks, mostly from U.S. banks, the question arises as to whether a potential withdrawal of foreign funding poses financial stability concerns for the Canadian economy. Do Canadian bank affiliates contribute the most to cross-border credit, or do U.S. investors contribute the most? To address these questions, disaggregated bank-level data of foreign bank affiliates are needed, which is beyond the scope of this paper.

## 7 Conclusion

Since cross-border bank flows have expanded rapidly over the past three decades, it has become critical to understand the main drivers of these international transactions, as well as the risks that they may impose for creditors and borrowers. This paper focuses on the role of global banks in the cross-border transmission of monetary policy.

We use information from the BIS LBS, 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 the supply effect of cross-border flows as a result of changes in monetary policy rates.

Our paper provides three main results. First, a relatively tighter stance of monetary policy in source countries is associated with higher growth of cross-border claims relative to domestic credit. Second, banks appear to rebalance their portfolios toward foreign non-bank borrowers, especially when they reside in a reporting country with a relatively weaker financial sector. Third, banks reallocate credit mainly toward foreign borrowers in safer economies, such as advanced economies or economies with investment-grade ratings for sovereign debt. Canada, in particular, is a destination that attracts cross-border flows from countries with relatively tight monetary policies. To the extent that an economy relies on foreign credit, questions for future research include whether a sudden dry-up of foreign credit would make the recipient financial system more vulnerable. Another question is whether cross-border bank and portfolio flows display a positive co-movement and/or are affected by similar drivers as bank flows. Finally, using bank-level data, one can construct the bank portfolio of domestic and global assets and pin down more precisely the compositional shift of the portfolio.

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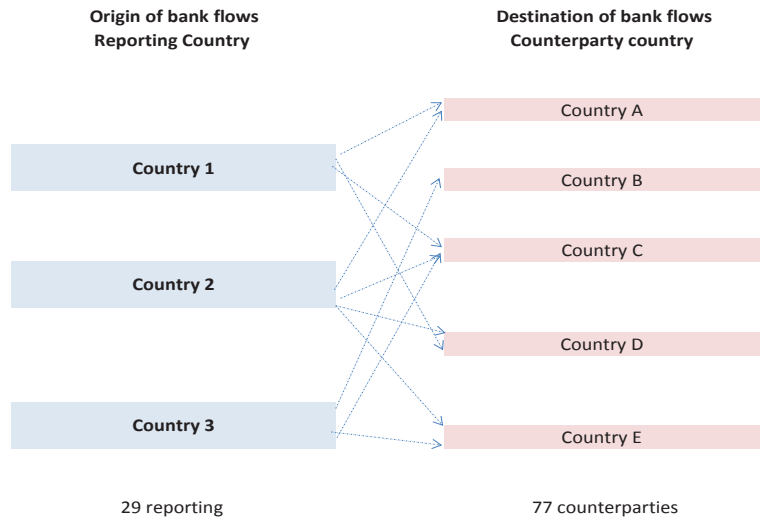
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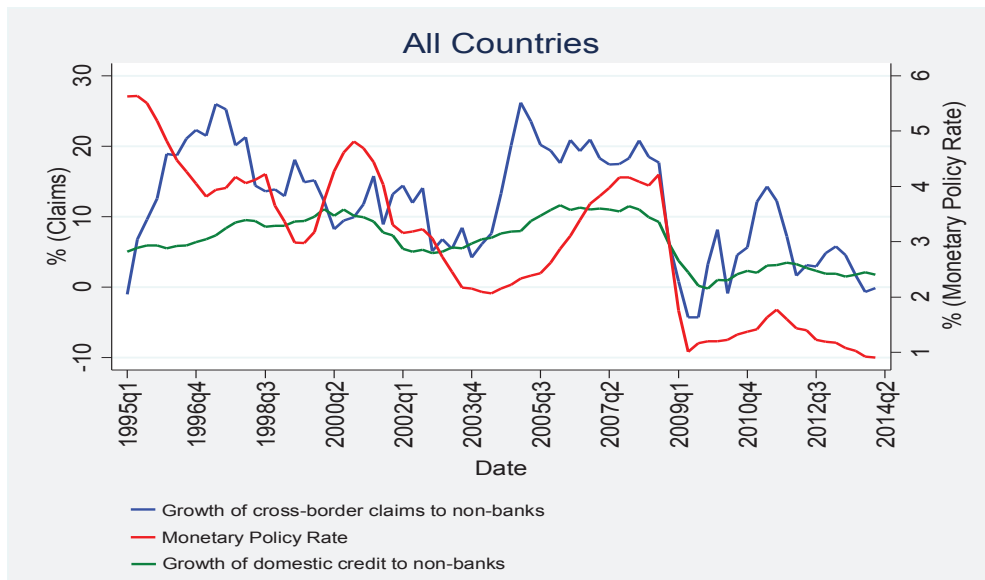
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Figure 1: Structure of BIS Locational Banking Statistics



Note: This graph is a stylized example of the bilateral structure of our data.

Figure 2: Monetary Policy and Cross-Border Claims



Note: Monetary policy rate is the average rate for reporting countries in a given quarter. Growth of cross-border claims (domestic credit) to non-banks at the quarterly level, defined in Appendix 1.

Table 1: **Sample Characteristics**

This table reports summary statistics for cross-border bank flows, reporting and counterparty countries. All variables are defined in Appendix 1.

	Mean	Median	StDev
All Sample			
Cross-border flows: All (%)	4.108	0.847	24.365
Cross-border flows: Banks (%)	9.039	0.504	46.983
Cross-border flows: Non-banks (%)	4.844	0.551	27.211
Domestic flows: Non-banks (%)	2.339	1.676	4.966
Canada (as a counterparty)			
Cross-border flows: All (%)	3.927	1.387	23.747
Cross-border flows: Banks (%)	8.451	0.883	44.544
Cross-border flows: Non-banks (%)	4.319	0.961	25.806
Domestic flows: Non-banks (%)	1.900	1.696	1.689
Reporting Countries			
Policy rate rep	3.074	2.58	3.211
Credit growth rep	1.914	1.765	4.995
Bank equity returns rep	2.62	3.053	16.742
Real GDP growth rep	0.541	0.584	1.073
Debt/GDP rep	65.9	61.19	39.225
Inflation rep	0.553	0.489	0.821
QE indicator rep	0.047	0.000	0.211
SRISK/GDP rep	0.047	0.031	0.051
Euro rep	0.399	0.000	0.49
Financial Center rep	0.201	0.000	0.401
EME rep	0.100	0.000	0.300
USD CB Liabilities/CB Liabilities rep	0.100	0.000	0.300
Counterparty Countries			
Policy rate cp	5.905	2.58	3.211
Credit growth cp	2.251	4.000	11.450
Bank equity returns cp	3.524	3.159	19.155
Real GDP growth cp	0.723	0.747	1.381
Debt/GDP cp	56.409	48.88	35.446
Inflation cp	1.171	0.665	4.947
SRISK/GDP cp	0.03	0.007	0.044
Speculative grade	0.21	0.000	0.407
EME cp	0.127	0.000	0.333
VIX	21.017	19.93	8.007
Exchange Rate Growth	0.418	0.000	4.362

**Table 2: Main Regression: Cross-Border Bank Flows and Monetary Policy Rates in the Reporting Countries**

The dependent variables are growth rates of cross-border flows to all sectors (banks and non-banks), banks and non-banks. Each regression includes counterparty\*year-quarter fixed effects. All variables are lagged one quarter. Variable definitions are listed in Appendix 1. Standard errors are clustered at the counterparty and reporting country levels. \*\*\* denotes 1% significant level, \*\* denotes 5% significance level, and \* denotes 10% significance level.

	All	Banks	Non-Banks
	(1)	(2)	(3)
Lag policy rate rep	0.330*** [0.068]	0.369*** [0.095]	0.426*** [0.136]
Lag credit growth rep	0.023 [0.050]	0.105 [0.078]	0.064 [0.053]
Lag bank equity returns rep	-0.006 [0.011]	-0.007 [0.020]	-0.008 [0.011]
Lag real GDP growth rep	0.160 [0.100]	-0.101 [0.210]	0.107 [0.174]
Lag Debt/GDP rep	-0.010** [0.004]	-0.026*** [0.007]	-0.007 [0.005]
Lag inflation rep	-0.143 [0.269]	0.335 [0.496]	0.160 [0.417]
Exchange Rate Growth	0.106* [0.057]	0.178* [0.095]	0.122** [0.053]
Financial Center rep	-1.177* [0.667]	-3.368*** [1.029]	-1.382 [0.823]
Euro rep	-0.992** [0.390]	-1.456 [0.921]	-1.745*** [0.554]
QE indicator rep	1.332** [0.484]	1.262 [1.140]	1.317 [0.912]
EME rep	0.814 [0.658]	1.701 [1.256]	0.818 [0.987]
Observations	72,249	69,854	70,643
$R^2$	0.12	0.12	0.11

**Table 3: Cross-Border Flows and Monetary Policy Rates in the Reporting Countries: Before/After the Global Financial Crisis (GFC)**

The dependent variables are growth rates of cross-border flows to all sectors (banks and non-banks), banks and non-banks. Each regression includes counterparty\*year-quarter fixed effects. All variables are lagged one quarter. Variable definitions are listed in Appendix 1. Standard errors are clustered at the counterparty and reporting country levels. \*\*\* denotes 1% significant level, \*\* denotes 5% significance level, and \* denotes 10% significance level.

	All	Banks	Non-Banks	All	Banks	Non-Banks
	Before 2007Q2			After 2007Q2		
	(1)	(2)	(3)	(4)	(5)	(6)
Lag policy rate rep	0.289*** [0.074]	0.364*** [0.127]	0.411** [0.172]	0.353** [0.136]	0.396 [0.243]	0.410 [0.249]
Lag credit growth rep	-0.030 [0.062]	-0.027 [0.126]	0.071 [0.078]	0.055 [0.084]	0.181 [0.125]	0.055 [0.072]
Lag bank equity returns rep	-0.021 [0.022]	-0.023 [0.039]	-0.007 [0.016]	0.004 [0.012]	0.001 [0.028]	-0.010 [0.018]
Lag real GDP growth rep	0.122 [0.174]	0.163 [0.469]	-0.085 [0.166]	0.173 [0.184]	-0.359 [0.314]	0.281 [0.273]
Lag Debt/GDP rep	-0.011 [0.007]	-0.022 [0.015]	0.000 [0.009]	-0.009** [0.004]	-0.023*** [0.007]	-0.012** [0.005]
Lag inflation rep	0.501 [0.318]	0.852 [0.776]	0.425 [0.445]	-0.746** [0.362]	-0.422 [0.612]	-0.146 [0.558]
Exchange Rate Growth	0.169** [0.071]	0.257** [0.116]	0.192* [0.094]	0.034 [0.114]	0.077 [0.176]	0.049 [0.094]
Financial Center	-1.126 [0.699]	-4.007*** [1.040]	-1.243 [0.872]	-0.875 [0.838]	-2.204* [1.207]	-0.982 [0.950]
Euro rep	-0.534 [0.407]	-0.639 [1.100]	-1.526** [0.620]	-1.537*** [0.531]	-2.728*** [0.957]	-1.924*** [0.646]
QE indicator rep	1.799** [0.664]	-1.591 [1.672]	1.598* [0.824]	0.898 [0.665]	0.922 [1.428]	0.702 [1.248]
EME rep	0.976 [0.797]	1.736 [2.184]	1.120 [1.218]	0.999 [0.786]	1.879 [1.494]	0.855 [1.245]
Observations	42,071	40,805	41,184	30,178	29,049	29,459
$R^2$	0.12	0.12	0.12	0.11	0.11	0.10

Table 4: **Cross-Border Flows and Monetary Policy Rates in the Reporting Countries: Alternative Monetary Policy Measures**

The dependent variables are growth rates of cross-border flows to all sectors (banks and non-banks), banks and non-banks. Each regression includes counterparty\*year-quarter fixed effects. All variables are lagged one quarter. Variable definitions are listed in Appendix 1. Standard errors are clustered at the counterparty and reporting country levels. \*\*\* denotes 1% significant level, \*\* denotes 5% significance level, and \* denotes 10% significance level.

	All		LIBOR-OIS		All		All		Banks		Non-Banks	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)			
Lag policy rate rep	0.337** [0.143]	0.237 [0.248]	0.518** [0.193]	0.405** [0.166]	0.347 [0.305]	0.494** [0.236]	0.308** [0.049]	0.363** [0.082]	0.418** [0.118]			
Lag Libor-OIS spread	-0.506 [0.443]	-0.935 [0.702]	-0.753** [0.349]	-0.428 [0.388]	-0.599 [0.563]	-0.821** [0.312]						
Lag shadow rates rep												
Lag credit growth rep	-0.001 [0.052]	0.052 [0.077]	0.046 [0.051]	-0.008 [0.082]	0.065 [0.121]	0.004 [0.065]						
Lag bank equity returns rep	-0.003 [0.010]	-0.001 [0.022]	-0.019* [0.011]	0.003 [0.012]	0.000 [0.029]	-0.015 [0.017]						
Lag real GDP growth rep	0.193 [0.124]	-0.067 [0.224]	0.134 [0.196]	0.278 [0.171]	-0.300 [0.324]	0.442 [0.294]						
Lag Debt/GDP rep	-0.006 [0.005]	-0.024** [0.007]	-0.005 [0.006]	-0.007 [0.005]	-0.024** [0.008]	-0.010* [0.006]						
Lag inflation rep	0.245 [0.255]	1.091* [0.543]	0.400 [0.400]	-0.508 [0.398]	-0.146 [0.715]	0.126 [0.485]						
Exchange Rate Growth	0.155** [0.060]	0.260** [0.107]	0.131** [0.056]	0.098 [0.094]	0.170 [0.159]	0.075 [0.082]						
Financial Center rep	-1.015 [0.673]	-3.176** [1.143]	-1.314 [0.875]	-0.640 [0.787]	-2.300* [1.289]	-0.971 [0.879]						
Euro rep	-0.847* [0.422]	-1.344 [0.967]	-1.675*** [0.565]	-1.326** [0.523]	-2.739*** [0.943]	-1.657** [0.651]						
QE indicator rep	1.193** [0.552]	0.994 [1.122]	1.310 [0.944]	0.743 [0.735]	0.878 [1.583]	0.738 [1.358]						
EME rep	0.666 [0.818]	2.385 [1.784]	0.397 [1.139]	0.760 [1.008]	2.638 [2.011]	0.125 [1.435]						
Observations	61,903	59,717	61,297	29,013	27,886	28,687						
R <sup>2</sup>	0.13	0.13	0.12	0.12	0.12	0.10						

Table 5: **Cross-Border Flows and Monetary Policies in the Reporting Countries: Eurozone counterparties**

The dependent variables are growth rates of cross-border flows to all sectors (banks and non-banks), banks and non-banks. Each regression includes counterparty\*year-quarter fixed effects. All variables are lagged one quarter. Variable definitions are listed in Appendix 1. *Euro rep* takes one for Eurozone reporting countries and zero otherwise. Standard errors are clustered at the counterparty and reporting country levels. \*\*\* denotes 1% significance level, \*\* denotes 5% significance level, and \* denotes 10% significance level.

	All	Banks	Non-Banks	All	Banks	Non-Banks
	(1)	(2)	(3)	All excluding Germany and France	(5)	(6)
	(4)					
Lag policy rate rep	0.364*** [0.058]	0.456*** [0.108]	0.436*** [0.136]	0.380*** [0.062]	0.478*** [0.116]	0.447*** [0.141]
Lag policy rate rep× <i>Euro rep</i>	0.401* [0.198]	0.658** [0.306]	0.237 [0.265]	0.579*** [0.201]	0.833** [0.346]	0.384 [0.296]
Lag credit growth rep	0.401* [0.198]	0.658** [0.306]	0.237 [0.265]	-0.006 [0.054]	0.045 [0.112]	0.066 [0.050]
Lag credit growth rep× <i>Euro rep</i>	0.401* [0.198]	0.658** [0.306]	0.237 [0.265]	-0.015 [0.072]	-0.041 [0.118]	-0.058 [0.071]
Lag bank equity returns rep	0.401* [0.198]	0.658** [0.306]	0.237 [0.265]	-0.007 [0.017]	-0.002 [0.039]	0.001 [0.019]
Lag bank equity returns rep× <i>Euro rep</i>	0.401* [0.198]	0.658** [0.306]	0.237 [0.265]	0.003 [0.015]	0.001 [0.048]	-0.011 [0.023]
Lag real GDP growth rep	0.401* [0.198]	0.658** [0.306]	0.237 [0.265]	0.130 [0.209]	-0.241 [0.334]	-0.007 [0.335]
Lag real GDP growth rep× <i>Euro rep</i>	0.401* [0.198]	0.658** [0.306]	0.237 [0.265]	-0.032 [0.266]	0.171 [0.435]	0.169 [0.385]
Lag Debt/GDP rep	0.401* [0.198]	0.658** [0.306]	0.237 [0.265]	-0.007 [0.004]	-0.026*** [0.006]	-0.007 [0.007]
Lag Debt/GDP rep× <i>Euro rep</i>	0.401* [0.198]	0.658** [0.306]	0.237 [0.265]	-0.021* [0.012]	-0.018 [0.027]	-0.011 [0.013]
Lag inflation rep	0.401* [0.198]	0.658** [0.306]	0.237 [0.265]	-0.309 [0.332]	0.020 [0.549]	-0.039 [0.483]
Lag inflation rep× <i>Euro rep</i>	0.401* [0.198]	0.658** [0.306]	0.237 [0.265]	0.147 [0.617]	0.168 [1.107]	0.080 [0.692]
Exchange Rate Growth	0.094 [0.062]	0.139 [0.110]	0.116* [0.059]	0.091 [0.063]	0.126 [0.119]	0.119* [0.064]
Exchange Rate Growth× <i>Euro rep</i>	0.022 [0.075]	0.135 [0.126]	-0.005 [0.072]	-0.002 [0.086]	0.149 [0.138]	-0.082 [0.065]
Financial Center rep	-0.984 [0.784]	-3.706*** [1.184]	-1.183 [1.010]	-1.064 [0.831]	-3.877*** [1.278]	-1.307 [1.066]
Financial Center rep× <i>Euro rep</i>	-1.189 [1.144]	1.113 [2.292]	-0.914 [1.396]	-1.691 [1.123]	-0.556 [2.120]	-1.405 [1.352]
QE indicator rep	0.757* [0.408]	0.867 [0.701]	0.987 [0.991]	0.820** [0.380]	0.964 [0.808]	1.126 [0.931]
QE indicator rep× <i>Euro rep</i>	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]
EME rep	0.342 [0.796]	0.142 [1.156]	0.620 [1.286]	0.446 [0.805]	0.607 [1.154]	0.707 [1.258]
EME rep× <i>Euro rep</i>	2.539* [1.312]	5.585** [2.420]	1.383 [1.163]	2.359* [1.242]	4.629** [2.021]	1.213 [1.095]
Euro rep	-0.866 [1.393]	-3.295 [3.013]	-1.852 [1.642]	-0.450 [1.352]	-1.388 [2.688]	-1.313 [1.497]
Observations	72,249	69,854	70,643	61,694	59,329	60,187
$R^2$	0.12	0.12	0.11	0.12	0.13	0.12
Coef. Policy Rate Euro cp	0.765	1.114	0.673	0.959	1.310	0.830
t-statistic	3.900	3.401	2.136	5.004	3.508	2.437



Table 6: **Cross-Border Flows and Monetary Policies in the Reporting Countries: Good Times vs. Bad Times**

The dependent variables are growth rates of cross-border flows to all sectors (banks and non-banks), banks and non-banks. Each regression includes counterparty\*year-quarter fixed effects. All variables are lagged one quarter. Variable definitions are listed in Appendix 1. *HGDP rep* takes one if GDP growth is higher than the sample median and zero otherwise. Standard errors are clustered at the counterparty and reporting country levels. \*\*\* denotes 1% significance level, \*\* denotes 5% significance level, and \* denotes 10% significance level.

	All	Banks	Non-Banks
Lag policy rate rep	0.435*** [0.102]	0.391* [0.212]	0.495** [0.183]
Lag policy rate rep× <i>HGDP rep</i>	-0.160 [0.144]	-0.051 [0.277]	-0.087 [0.127]
Lag credit growth rep	0.038 [0.051]	0.091 [0.080]	0.100 [0.075]
Lag credit growth rep× <i>HGDP rep</i>	-0.030 [0.049]	0.023 [0.082]	-0.050 [0.052]
Lag bank equity returns rep	-0.009 [0.011]	0.002 [0.028]	-0.015 [0.013]
Lag bank equity returns rep× <i>HGDP rep</i>	0.005 [0.016]	-0.012 [0.031]	0.011 [0.019]
Lag real GDP growth rep	0.250 [0.199]	-0.291 [0.421]	0.468 [0.310]
Lag real GDP growth rep× <i>HGDP rep</i>	-0.035 [0.306]	0.065 [0.516]	-0.161 [0.481]
Lag Debt/GDP rep	-0.005 [0.005]	-0.022** [0.008]	-0.011 [0.008]
Lag Debt/GDP rep× <i>HGDP rep</i>	-0.010 [0.007]	-0.008 [0.010]	0.007 [0.009]
Lag inflation rep	-0.208 [0.321]	0.864 [0.723]	-0.481 [0.488]
Lag inflation rep× <i>HGDP rep</i>	0.023 [0.469]	-0.836 [0.926]	0.983 [0.672]
Exchange Rate Growth	0.071 [0.058]	0.154 [0.116]	0.043 [0.063]
Exchange Rate Growth× <i>HGDP rep</i>	0.056 [0.050]	0.042 [0.128]	0.133*** [0.041]
Financial Center rep	-0.619 [0.850]	-2.875* [1.630]	-1.513* [0.785]
Financial Center rep× <i>HGDP rep</i>	-1.042 [0.621]	-0.974 [1.440]	0.244 [0.728]
Euro rep	-0.926** [0.416]	-1.063 [1.082]	-2.053** [0.758]
Euro rep× <i>HGDP rep</i>	-0.038 [0.503]	-0.773 [1.005]	0.616 [0.710]
QE indicator rep	0.779 [0.541]	1.346 [1.351]	0.497 [0.803]
QE indicator rep× <i>HGDP rep</i>	1.301 [0.998]	-0.102 [1.766]	1.706* [0.860]
EME rep	0.551 [1.171]	2.518 [2.540]	1.431 [1.793]
EME rep× <i>HGDP rep</i>	0.459 [1.438]	-1.090 [2.866]	-0.857 [1.621]
H GDP	1.119 [0.882]	2.101 [1.638]	-1.606 [1.327]
Observations	72,249	69,854	70,643
$R^2$	0.12	0.12	0.11

Table 7: **Cross-Border Flows and Monetary Policies in the Reporting Countries: Currency Appreciation vs. Currency Depreciation**

The dependent variables are growth rates of cross-border flows to all sectors (banks and non-banks), banks and non-banks. Each regression includes counterparty\*year-quarter fixed effects. All variables are lagged one quarter. Variable definitions are listed in Appendix 1. *Appr* takes one for currency appreciation and zero otherwise. Standard errors are clustered at the counterparty and reporting country levels. \*\*\* denotes 1% significance level, \*\* denotes 5% significance level, and \* denotes 10% significance level.

	All	Banks	Non-Banks
Lag policy rate rep	0.383*** [0.113]	0.481** [0.203]	0.416** [0.152]
Lag policy rate rep× <i>Appr</i>	-0.105 [0.208]	-0.242 [0.310]	-0.000 [0.181]
Lag credit growth rep	0.008 [0.060]	0.057 [0.109]	0.071 [0.055]
Lag credit growth rep× <i>Appr</i>	0.037 [0.068]	0.110 [0.125]	-0.010 [0.070]
Lag bank equity returns rep	-0.003 [0.011]	-0.006 [0.026]	0.002 [0.020]
Lag bank equity returns rep× <i>Appr</i>	-0.010 [0.018]	-0.005 [0.035]	-0.026 [0.021]
Lag real GDP growth rep	-0.048 [0.196]	-0.480 [0.390]	-0.054 [0.229]
Lag real GDP growth rep× <i>Appr</i>	0.535* [0.286]	0.943 [0.635]	0.449 [0.357]
Lag Debt/GDP rep	-0.011* [0.005]	-0.035*** [0.012]	-0.009 [0.006]
Lag Debt/GDP rep× <i>Appr</i>	0.003 [0.007]	0.018 [0.015]	0.002 [0.007]
Lag inflation rep	-0.295 [0.434]	0.454 [0.639]	-0.369 [0.594]
Lag inflation rep× <i>Appr</i>	0.299 [0.699]	-0.283 [1.140]	1.092* [0.546]
Exchange Rate Growth	0.116 [0.095]	-0.097 [0.141]	0.224** [0.087]
Exchange Rate Growth× <i>Appr</i>	-0.059 [0.125]	0.463** [0.204]	-0.193 [0.121]
Financial Center rep	-1.330* [0.744]	-4.205*** [1.320]	-1.594** [0.725]
Financial Center rep× <i>Appr</i>	0.382 [0.639]	1.932* [1.116]	0.483 [0.544]
Euro rep	-0.933** [0.435]	-1.586 [1.038]	-1.864*** [0.567]
Euro rep× <i>Appr</i>	-0.049 [0.547]	1.028 [0.942]	0.103 [0.611]
QE indicator rep	2.122** [0.821]	2.643 [1.637]	2.024** [0.978]
QE indicator rep× <i>Appr</i>	-1.583 [1.214]	-2.787 [1.788]	-1.460 [1.140]
EME rep	0.362 [0.724]	0.458 [2.271]	1.125 [1.269]
EME rep× <i>Appr</i>	1.025 [1.257]	2.778 [2.842]	-0.617 [1.544]
<i>Appr</i>	-0.179 [1.009]	-1.548 [1.760]	-0.882 [1.150]
Observations	72,249	69,854	70,643
$R^2$	0.12	0.12	0.11

Table 8: **Cross-Border Flows and Monetary Policies in the Reporting Countries: The Role of Global Factors**

The dependent variables are growth rates of cross-border flows to all sectors (banks and non-banks), banks and non-banks. Columns (1)-(3) include counterparty\*reporting country fixed effects and year-quarter fixed effects; columns (4)-(9) include counterparty x reporting country fixed effects and year fixed effects. All variables are one quarter lagged. Variable definitions are listed in Appendix 1. Standard errors are clustered at the counterparty-reporting country levels. \*\*\* denotes 1% significance level, \*\* denotes 5% significance level, and \* denotes 10% significance level.

	All	Banks	Non-Banks	All	Banks	Non-Banks	All	Banks	Non-Banks
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Lag policy rate rep	0.155** [0.063]	0.182* [0.108]	0.251* [0.143]	0.170*** [0.062]	0.211** [0.107]	0.288** [0.141]			
Lag policy rate cp	-0.096** [0.038]	-0.247*** [0.074]	-0.052 [0.045]	-0.078** [0.037]	-0.220*** [0.073]	-0.017 [0.044]			
Ln VIX				-3.541*** [0.686]	-3.195*** [1.194]	-5.105*** [0.749]	-3.453*** [0.680]	-3.203*** [1.185]	-4.878*** [0.757]
Ln policy rate difference							0.114*** [0.033]	0.216*** [0.061]	0.099* [0.055]
Lag credit growth rep	0.033 [0.036]	0.106 [0.065]	0.029 [0.044]	0.000 [0.028]	0.012 [0.054]	0.036 [0.032]	-0.001 [0.028]	0.012 [0.054]	0.034 [0.032]
Lag credit growth cp	0.200*** [0.030]	0.348*** [0.054]	0.090** [0.036]	0.180*** [0.028]	0.298*** [0.049]	0.084*** [0.032]	0.180*** [0.028]	0.298*** [0.049]	0.083*** [0.032]
Lag bank equity returns rep	-0.010 [0.011]	-0.006 [0.018]	-0.007 [0.012]	-0.011 [0.008]	-0.010 [0.014]	-0.017* [0.009]	-0.011 [0.008]	-0.010 [0.014]	-0.017* [0.009]
Lag bank equity returns cp	0.012 [0.009]	0.026* [0.015]	0.003 [0.010]	0.009 [0.008]	0.018 [0.013]	-0.006 [0.009]	0.009 [0.008]	0.018 [0.013]	-0.006 [0.009]
Lag real GDP growth rep	0.065 [0.147]	-0.128 [0.257]	0.118 [0.163]	0.043 [0.131]	-0.213 [0.227]	0.021 [0.155]	0.037 [0.131]	-0.212 [0.227]	0.005 [0.153]
Lag real GDP growth cp	0.448*** [0.134]	0.707*** [0.246]	0.222 [0.148]	0.414*** [0.126]	0.601*** [0.230]	0.151 [0.143]	0.407*** [0.126]	0.602*** [0.230]	0.132 [0.143]
Lag Debt/GDP rep	-0.025*** [0.007]	-0.026** [0.012]	-0.029*** [0.009]	-0.028*** [0.007]	-0.032** [0.013]	-0.032*** [0.009]	-0.026*** [0.007]	-0.033*** [0.012]	-0.028*** [0.009]
Lag Debt/GDP cp	-0.018** [0.008]	0.018 [0.012]	-0.050*** [0.011]	-0.022*** [0.008]	0.011 [0.012]	-0.052*** [0.011]	0.303* [0.157]	0.293 [0.324]	0.135 [0.182]
Lag inflation rep	-0.346 [0.264]	-0.242 [0.423]	0.006 [0.302]	-0.380 [0.247]	-0.224 [0.412]	-0.281 [0.277]	-0.323 [0.240]	-0.229 [0.399]	-0.154 [0.289]
Lag inflation cp	0.256 [0.169]	0.213 [0.350]	0.242 [0.191]	0.266* [0.162]	0.297 [0.333]	0.052 [0.181]	0.303* [0.157]	0.293 [0.324]	0.135 [0.182]
Euro rep	-0.163 [0.622]	0.317 [1.091]	-1.684* [0.876]	-0.206 [0.624]	0.171 [1.090]	-1.620* [0.874]	-0.218 [0.624]	0.172 [1.091]	-1.663* [0.877]
QE indicator rep	1.795*** [0.555]	2.575*** [0.905]	2.629*** [0.693]	1.759*** [0.553]	2.478*** [0.904]	2.801*** [0.685]	1.666*** [0.544]	2.486*** [0.886]	2.511*** [0.660]
Observations	45,386	44,638	44,239	45,386	44,638	44,239	45,386	44,638	44,239
R <sup>2</sup>	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03

**Table 9: Cross-Border Flows and Monetary Policies in the Reporting Countries: The Role of U.S. dollar funding**

The dependent variables are growth rates of cross-border flows to all sectors (banks and non-banks), banks and non-banks. USD CB Liabilities/CB Liabilities rep is the ratio of cross-border liabilities denominated in US dollars over cross-border liabilities. Each regression includes counterparty\*year-quarter fixed effects. All variables are one quarter lagged. Variable definitions are listed in Appendix 1. Standard errors are clustered at the counterparty and reporting country levels. \*\*\* denotes 1% significance level, \*\* denotes 5% significance level, and \* denotes 10% significance level.

	All	Banks	Non-Banks
Lag policy rate rep	0.291*** [0.071]	0.329*** [0.118]	0.415*** [0.139]
USD CB Liabilities/CB Liabilities rep	3.332** [1.478]	2.562 [3.497]	2.300 [1.953]
Lag US policy rate rep $\times$ USD CB Liabilities/CB Liabilities rep	-0.522 [0.365]	-0.079 [0.562]	-0.778 [0.470]
Lag credit growth rep	0.044 [0.049]	0.123 [0.080]	0.068 [0.059]
Lag bank equity returns rep	-0.014 [0.011]	-0.020 [0.019]	-0.009 [0.012]
Lag real GDP growth rep	0.122 [0.109]	-0.143 [0.219]	0.052 [0.174]
Lag Debt/GDP rep	-0.013*** [0.005]	-0.030*** [0.010]	-0.010* [0.006]
Lag inflation rep	-0.130 [0.270]	0.446 [0.509]	0.119 [0.415]
Exchange Rate Growth	0.120* [0.064]	0.225** [0.092]	0.101* [0.057]
Financial Center	-1.881*** [0.373]	-4.185*** [0.915]	-2.096*** [0.641]
Euro rep	-0.363 [0.476]	-0.784 [1.375]	-1.576*** [0.536]
EME rep	1.205*** [0.366]	0.593 [1.227]	0.558 [0.822]
QE indicator rep	0.895 [0.596]	1.785 [1.316]	0.768 [0.979]
Observations	68,238	65,851	66,671
$R^2$	0.12	0.12	0.12

Table 10: **Cross-Border Flows and Monetary Policies in the Reporting Countries: Speculative vs. Investment Grade**

The dependent variables are growth rates of cross-border flows to all sectors (banks and non-banks), banks and non-banks. *Speculative grade cp* takes one if the counterparty has non-investment grade rating in a given year-quarter. *Joint Speculative grade cp* is the sum of *Lag policy rate rep* and *Lag policy rate rep\*Speculative grade cp*. Each regression includes counterparty\*year-quarter fixed effects. All variables are one quarter lagged. Variable definitions are listed in Appendix 1. Standard errors are clustered at the counterparty and reporting country levels. \*\*\* denotes 1% significance level, \*\* denotes 5% significance level, and \* denotes 10% significance level.

	All	Banks	Non-Banks
Lag policy rate rep	0.404***	0.539***	0.457***
	[0.064]	[0.082]	[0.148]
Lag policy rate rep× <i>Speculative grade cp</i>	-0.266**	-0.709**	-0.035
	[0.117]	[0.279]	[0.172]
Lag credit growth rep	0.055	0.107	0.109*
	[0.061]	[0.091]	[0.061]
Lag credit growth rep× <i>Speculative grade cp</i>	-0.141	-0.061	-0.182*
	[0.094]	[0.224]	[0.106]
Lag bank equity returns rep	-0.013	-0.020	-0.013
	[0.014]	[0.022]	[0.014]
Lag bank equity returns rep× <i>Speculative grade cp</i>	0.028	0.057	0.024
	[0.021]	[0.058]	[0.020]
Lag real GDP growth rep	0.147	0.033	0.017
	[0.114]	[0.266]	[0.177]
Lag real GDP growth rep× <i>Speculative grade cp</i>	0.348	-0.307	0.817*
	[0.330]	[0.697]	[0.403]
Lag Debt/GDP rep	-0.010**	-0.024***	-0.006
	[0.005]	[0.008]	[0.007]
Lag Debt/GDP rep× <i>Speculative grade cp</i>	0.008	0.002	-0.000
	[0.008]	[0.018]	[0.008]
Lag inflation rep	-0.149	0.443	0.303
	[0.302]	[0.557]	[0.399]
Lag inflation rep× <i>Speculative grade cp</i>	0.435	-0.197	-0.348
	[0.369]	[0.971]	[0.237]
Exchange Rate Growth	0.122*	0.219**	0.133
	[0.071]	[0.106]	[0.080]
Exchange Rate Growth× <i>Speculative grade cp</i>	-0.120	-0.326*	-0.113
	[0.092]	[0.186]	[0.118]
Financial Center rep	-1.715*	-4.155***	-1.724
	[0.848]	[1.368]	[1.048]
Financial Center rep× <i>Speculative grade cp</i>	1.609*	2.371	0.684
	[0.830]	[2.071]	[1.175]
Euro rep	-0.808	-1.168	-1.600**
	[0.490]	[0.928]	[0.691]
Euro rep× <i>Speculative grade cp</i>	-0.872	-2.326	-0.632
	[0.618]	[1.746]	[0.804]
QE indicator rep	1.696***	1.786	1.543*
	[0.538]	[1.323]	[0.826]
QE indicator rep× <i>Speculative grade cp</i>	-1.811	-3.648	-0.784
	[1.444]	[2.967]	[0.910]
Observations	69,232	67,050	67,646
$R^2$	0.11	0.11	0.10
Joint Speculative grade cp	0.138	-0.170	0.422***
t-statistic	0.931	-0.560	3.393

**Table 11: Cross-Border Flows and Monetary Policies in the Reporting Countries: Emerging Market vs. Advanced Economies**

The dependent variables are growth rates of cross-border flows to all sectors (banks and non-banks), banks and non-banks. *EME cp* takes one if the counterparty is classified as an emerging market economy. Joint *EME cp* is the sum of *Lag policy rate rep* and *Lag policy rate rep*×*EME cp*. Each regression includes counterparty\*year-quarter fixed effects. All variables are one quarter lagged. Variable definitions are listed in Appendix 1. Standard errors are clustered at the counterparty and reporting country levels. \*\*\* denotes 1% significance level, \*\* denotes 5% significance level, and \* denotes 10% significance level.

	All	Banks	Non-Banks
Lag policy rate rep	0.448*** [0.059]	0.650*** [0.102]	0.373** [0.154]
Lag policy rate rep× <i>EME cp</i>	-0.295** [0.116]	-0.796*** [0.247]	0.231 [0.241]
Lag credit growth rep	0.045 [0.061]	0.099 [0.100]	0.119 [0.072]
Lag credit growth rep× <i>EME cp</i>	-0.036 [0.063]	0.022 [0.111]	-0.095 [0.076]
Lag bank equity returns rep	-0.019 [0.018]	-0.016 [0.029]	0.004 [0.017]
Lag bank equity returns rep× <i>EME cp</i>	0.024 [0.025]	0.020 [0.049]	-0.024 [0.024]
Lag real GDP growth rep	0.048 [0.178]	0.045 [0.374]	-0.194 [0.243]
Lag real GDP growth rep× <i>EME cp</i>	0.329 [0.238]	-0.132 [0.519]	0.687* [0.367]
Lag Debt/GDP rep	-0.012* [0.006]	-0.021* [0.012]	-0.009 [0.009]
Lag Debt/GDP rep× <i>EME cp</i>	0.006 [0.008]	-0.009 [0.018]	0.006 [0.010]
Lag inflation rep	-0.370 [0.381]	0.031 [0.692]	0.320 [0.455]
Lag inflation rep× <i>EME cp</i>	0.624 [0.394]	0.979 [0.879]	-0.203 [0.400]
Exchange Rate Growth	0.116 [0.086]	0.186 [0.140]	0.127 [0.086]
Exchange Rate Growth× <i>EME cp</i>	-0.025 [0.089]	-0.032 [0.157]	-0.013 [0.091]
Financial Center rep	-2.295** [0.921]	-5.590*** [1.683]	-1.677 [1.267]
Financial Center rep× <i>EME cp</i>	1.894*** [0.611]	3.912** [1.856]	0.321 [1.087]
Euro rep	-1.167** [0.541]	-2.000 [1.215]	-2.134** [0.842]
Euro rep× <i>EME cp</i>	0.176 [0.645]	0.722 [1.996]	0.615 [0.885]
QE indicator rep	0.839 [0.655]	0.392 [1.388]	0.186 [0.852]
QE indicator rep× <i>EME cp</i>	0.383 [0.998]	0.472 [1.841]	1.896 [1.580]
Observations	72,249	69,854	70,643
$R^2$	0.12	0.12	0.11
Joint <i>EME cp</i>	0.153	-0.147	0.604
t-statistic	1.076	-0.597	4.009

Table 12: **Cross-Border Flows and Monetary Policies in the Reporting Countries: Portfolio Channel**

The dependent variables are growth rates of cross-border flows to all sectors (banks and non-banks), banks and non-banks. *Domestic Indicator* takes one for domestic credit and zero otherwise. *Joint* is the sum of *Lag policy rate rep* and *Lag policy rate rep*×*Domestic Indicator* in column (1) and the sum of the interaction of *H SRISK rep* and monetary policy and the monetary policy base effect. Each regression includes counterparty\*year-quarter fixed effects. All variables are one quarter lagged. Variable definitions are listed in Appendix 1. Standard errors are clustered at the counterparty and reporting country levels. \*\*\* denotes 1% significance level, \*\* denotes 5% significance level, and \* denotes 10% significance level.

	Non-Bank	Growth Diff.	Growth Diff.
	(1)	(2)	(3)
Lag policy rate rep	0.475*** [0.109]	0.349*** [0.083]	0.320*** [0.094]
Lag policy rate rep× <i>Domestic Indicator</i>	-0.358*** [0.092]		
Domestic Indicator	-2.378*** [0.416]		
H SRISK rep			-2.162*** [0.654]
Lag policy rate rep× <i>H RISK rep</i>			0.589** [0.269]
Lag bank equity returns rep	-0.006 [0.011]	-0.018* [0.010]	-0.021* [0.011]
Lag real GDP growth rep	0.156 [0.170]	-0.117 [0.191]	-0.186 [0.215]
Lag Debt/GDP rep	-0.004 [0.005]	0.006 [0.006]	0.007 [0.005]
Lag inflation rep	0.063 [0.098]	-0.083 [0.103]	-0.163 [0.114]
Exchange Rate Growth	0.111** [0.051]	0.181*** [0.055]	0.175** [0.070]
Financial Center	-1.245 [0.915]	-0.935 [0.904]	-1.270* [0.633]
Euro rep	-1.827*** [0.584]	-1.490*** [0.502]	-1.611*** [0.468]
QE indicator rep	0.950 [0.890]	0.769 [1.215]	1.290 [1.162]
Observations	72,353	67,633	54,357
$R^2$	0.11	0.11	0.12
Joint	0.118		0.9
t-statistic	2.24		3.100

**Table 13: Cross-Border Flows and Monetary Policies in the Reporting Countries: Canada as a Counterparty**

The dependent variables are cross-border flows growth to all sectors (banks and non-banks), banks and non-banks in Canada. Each regression includes year-quarter fixed effects. All variables are lagged one quarter. Variable definitions are listed in Appendix 1. Standard errors are clustered at the reporting country levels. \*\*\* denotes 1% significance level, \*\* denotes 5% significance level, and \* denotes 10% significance level.

	All	Banks	Non-Banks
Lag policy rate rep	0.573*** [0.201]	0.973** [0.458]	0.532 [0.680]
Lag credit growth rep	0.422*** [0.138]	0.401 [0.256]	0.606*** [0.208]
Lag bank equity returns rep	-0.014 [0.042]	0.042 [0.099]	-0.046 [0.071]
Lag real GDP growth rep	-0.233 [0.658]	0.732 [1.333]	-0.384 [0.650]
Lag Debt/GDP rep	-0.006 [0.014]	0.006 [0.028]	-0.016 [0.012]
Lag inflation rep	-1.487 [1.276]	-2.249 [2.164]	-0.567 [1.266]
Exchange Rate Growth	0.252* [0.141]	0.030 [0.364]	0.272 [0.179]
Financial Center rep	-3.191** [1.210]	-8.349** [3.037]	-2.878** [1.115]
Euro rep	-1.663 [1.201]	-1.220 [3.655]	-1.849* [1.041]
QE indicator rep	2.121 [1.475]	0.129 [4.586]	3.427 [2.365]
Observations	1,383	1,373	1,309
R-squared	0.07	0.07	0.07



**Table 14: Cross-Border Flows and Monetary Policies in the Reporting Countries: U.S. Monetary Policy**

The dependent variables are cross-border flows growth to all sectors (banks and non-banks), banks and non-banks in Canada. Each regression includes year-quarter fixed effects. All variables are lagged one quarter. Variable definitions are listed in Appendix 1. Standard errors are clustered at the reporting country levels. \*\*\* denotes 1% significance level, \*\* denotes 5% significance level, and \* denotes 10% significance level.

	All	Banks	Non-Banks
Lag policy rate rep	0.569** [0.204]	0.982** [0.472]	0.531 [0.723]
Lag policy rate rep×US	1.285*** [0.356]	1.267** [0.580]	0.394 [0.598]
Lag credit growth rep	0.429*** [0.139]	0.403 [0.262]	0.616*** [0.212]
Lag credit growth rep×US	-3.404*** [0.868]	-4.288** [1.908]	-0.741 [0.875]
Lag bank equity returns rep	-0.013 [0.045]	0.042 [0.104]	-0.043 [0.074]
Lag bank equity returns rep×US	-0.028 [0.058]	-0.051 [0.131]	-0.058 [0.073]
Lag real GDP growth rep	-0.221 [0.669]	0.786 [1.339]	-0.415 [0.660]
Lag real GDP growth rep×US	-0.385 [1.074]	-4.130 [2.673]	2.021 [1.389]
Lag Debt/GDP rep	-0.009 [0.015]	0.006 [0.029]	-0.017 [0.012]
Lag Debt/GDP rep×US	0.063 [0.107]	0.188 [0.141]	0.082 [0.078]
Lag inflation rep	-1.730 [1.318]	-2.559 [2.199]	-0.704 [1.345]
Lag inflation rep×US	4.091** [1.764]	6.522** [2.725]	1.441 [1.458]
Exchange Rate Growth	0.247 [0.146]	0.018 [0.370]	0.290 [0.180]
Exchange Rate Growth×US	-0.246 [0.270]	-0.231 [0.464]	-0.609** [0.253]
Financial Center rep	-3.970*** [1.164]	-8.766*** [3.044]	-3.040** [1.410]
Euro rep	-1.695 [1.232]	-1.385 [3.758]	-1.892 [1.131]
QE indicator rep	1.245 [1.481]	-3.128 [5.789]	3.023 [2.651]
US	-3.984 [6.911]	-12.579 [12.814]	-8.712 [9.497]
Observations	1,383	1,373	1,309
R-squared	0.07	0.07	0.07

Table 15: Cross-Border Flows and Monetary Policies in the Reporting Countries: Canada as a Counterparty and The Role of Global Factors

The dependent variables are cross-border flows growth to all sectors (banks and non-banks), banks and non-banks in Canada. Columns (1)-(3) include reporting country and year-quarter fixed effects, and the rest include reporting country and year fixed effects. All variables are lagged one quarter. Variable definitions are listed in Appendix 1. Standard errors are clustered at the reporting country levels. \*\*\* denotes 1% significance level, \*\* denotes 5% significance level, and \* denotes 10% significance level.

	All	Banks	Non-Banks	All	Banks	Non-Banks	All	Banks	Non-Banks
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Lag policy rate rep	0.602** [0.220]	1.047** [0.465]	0.569 [0.658]	0.618*** [0.220]	1.074** [0.459]	0.604 [0.668]			
Lag policy rate cp	-0.477 [1.980]	-1.186 [5.925]	-0.148 [1.860]	-0.509 [1.974]	-1.246 [5.935]	-0.186 [1.863]			
Ln VIX				-3.356 [4.317]	-5.780 [7.619]	-2.511 [4.743]	-3.358 [4.318]	-5.776 [7.606]	-2.513 [4.740]
Ln policy rate difference							0.616*** [0.207]	1.077** [0.488]	0.587 [0.636]
Lag credit growth rep	0.375* [0.182]	0.436 [0.255]	0.440** [0.181]	0.367* [0.180]	0.422 [0.257]	0.435** [0.178]	0.369** [0.165]	0.419* [0.206]	0.443** [0.172]
Lag credit growth cp	-0.003 [0.240]	-0.168 [0.333]	-0.165 [0.296]	-0.032 [0.231]	-0.219 [0.330]	-0.188 [0.298]	-0.034 [0.221]	-0.216 [0.288]	-0.195 [0.290]
Lag bank equity returns rep	0.007 [0.039]	0.037 [0.102]	-0.010 [0.065]	0.005 [0.038]	0.033 [0.099]	-0.012 [0.065]	0.005 [0.038]	0.033 [0.099]	-0.012 [0.065]
Lag bank equity returns cp	0.075 [0.082]	-0.044 [0.148]	0.036 [0.088]	0.071 [0.081]	-0.051 [0.150]	0.033 [0.090]	0.071 [0.081]	-0.051 [0.149]	0.033 [0.090]
Lag real GDP growth rep	-0.136 [0.620]	0.946 [1.241]	-0.451 [0.721]	-0.231 [0.616]	0.781 [1.166]	-0.526 [0.735]	-0.231 [0.614]	0.780 [1.155]	-0.522 [0.735]
Lag real GDP growth cp	-0.070 [1.644]	2.642 [4.028]	-0.441 [1.441]	0.046 [1.707]	2.840 [4.088]	-0.352 [1.509]	0.032 [1.785]	2.863 [4.096]	-0.407 [1.406]
Lag Debt/GDP rep	-0.006 [0.014]	0.008 [0.029]	-0.018 [0.012]	-0.006 [0.014]	0.007 [0.029]	-0.018 [0.011]	-0.006 [0.014]	0.007 [0.029]	-0.018 [0.011]
Lag Debt/GDP cp	0.150 [0.521]	-0.191 [1.277]	0.167 [0.474]	0.151 [0.521]	-0.191 [1.278]	0.168 [0.474]	0.136 [0.420]	-0.167 [1.070]	0.111 [0.376]
Lag inflation rep	-1.528 [1.276]	-2.696 [2.154]	-0.466 [1.315]	-1.591 [1.304]	-2.803 [2.182]	-0.523 [1.325]	-1.590 [1.301]	-2.805 [2.195]	-0.513 [1.310]
Lag inflation cp	-0.286 [2.053]	-1.084 [4.872]	-0.426 [1.830]	-0.406 [2.017]	-1.290 [4.861]	-0.513 [1.893]	-0.411 [1.971]	-1.283 [4.680]	-0.533 [1.890]
Exchange Rate Growth	-0.024 [0.124]	-0.096 [0.294]	-0.066 [0.122]	0.004 [0.136]	-0.048 [0.307]	-0.042 [0.128]	0.005 [0.139]	-0.049 [0.316]	-0.041 [0.129]
Financial Center rep	-3.194** [1.181]	-8.344*** [2.959]	-2.870*** [1.010]	-3.214** [1.182]	-8.380*** [2.974]	-2.892*** [1.012]	-3.214** [1.183]	-8.380*** [2.973]	-2.887*** [1.010]
Euro rep	-1.467 [1.133]	-0.980 [3.525]	-1.664 [0.993]	-1.501 [1.137]	-1.038 [3.542]	-1.685 [0.991]	-1.503 [1.127]	-1.035 [3.583]	-1.695* [0.961]
QE indicator rep	1.982 [1.317]	0.336 [4.404]	2.996 [2.026]	2.047 [1.332]	0.445 [4.422]	3.076 [2.040]	2.044 [1.326]	0.449 [4.428]	3.053 [1.995]
Observations	1,383	1,373	1,309	1,383	1,373	1,309	1,383	1,373	1,309
R-squared	0.04	0.03	0.03	0.04	0.03	0.03	0.04	0.03	0.03

**Table 16: Cross-Border Flows and Monetary Policies in the Reporting Countries: Canada as a Counterparty**

The dependent variables are cross-border flows growth to all sectors (banks and non-banks), banks and non-banks in Canada. All regressions include reporting country and year-quarter fixed effects. All variables are lagged one quarter. Variable definitions are listed in Appendix 1. Standard errors are clustered at the reporting country levels. \*\*\* denotes 1% significance level, \*\* denotes 5% significance level, and \* denotes 10% significance level.

	All	Banks	Non-Banks
		Panel A	
Lag policy rate rep	0.398*** [0.074]	0.526*** [0.111]	0.456*** [0.153]
Lag policy rate rep× <i>Canada cp</i>	0.175* [0.088]	0.447** [0.215]	0.075 [0.192]
Lag policy rate rep× <i>Speculative grade cp</i>	-0.261 [0.154]	-0.696** [0.308]	-0.034 [0.185]
Controls× <i>Canada cp</i>	Yes	Yes	Yes
Controls× <i>Speculative grade cp</i>	Yes	Yes	Yes
Observations	69,232	67,050	67,646
R-squared	0.11	0.11	0.10
		Panel B	
Lag policy rate rep	0.443*** [0.075]	0.638*** [0.125]	0.371** [0.157]
Lag policy rate rep× <i>Canada cp</i>	0.130 [0.103]	0.336* [0.190]	0.161 [0.208]
Lag policy rate rep× <i>EME cp</i>	-0.290** [0.131]	-0.784*** [0.276]	0.233 [0.254]
Controls× <i>Canada cp</i>	Yes	Yes	Yes
Controls× <i>EME cp</i>	Yes	Yes	Yes
Observations	72,249	69,854	70,643
R-squared	0.12	0.12	0.11

## Appendix 1: Definition of Variables

Bank equity returns rep/cp is stock returns of the banking sector. Source: Haver.

Credit growth rep/cp is credit growth of the domestic non-financial sector. Source: Bank of International Settlements.

Cross-border flows to all sectors, banks and non-banks is the ratio of quarterly flows adjusted for exchange rate changes to the previous quarter outstanding amounts, respectively to all sectors, banks and non-banks; winsorized at the 2.5 percentile. Source: Bank of International Settlements.

Debt/GDP rep/cp gross debt-to-GDP reporting/counterparty countries. It is gross debt as a percentage of nominal GDP for reporting countries. Source, International Monetary Fund, World Economic Outlook, Haver

EME rep/cp is an indicator variable that takes one if a country is classified as an emerging economy and zero otherwise.

Exchange rate growth is quarter-over-quarter growth rate of nominal exchange rates of the reporting vis-a-vis the counterparty. Source: Bloomberg, Haver, New York Federal Reserve, Datastream.

Euro rep/cp is one if a reporting/counterparty country is one and zero otherwise.

Financial center rep is an indicator variable that takes one if the reporting country is a financial center (U.S., U.K., Hong Kong, Singapore and Luxembourg) and zero otherwise.

Inflation rep/cp is the quarter-over-quarter inflation for the reporting-counterparty country calculated using consumer price indices. Source: Haver.

Policy rate rep/cp is the monetary policy rate of reporting/counterparty countries. Source: Central banks, International Monetary Fund.

Real GDP growth rep/cp is the real quarter-over-quarter real/chained GDP growth for reporting-counterparty countries.

SRISK/GDP rep is the ratio of SRISK defined in Brownless and Engle (2016) over GDP.

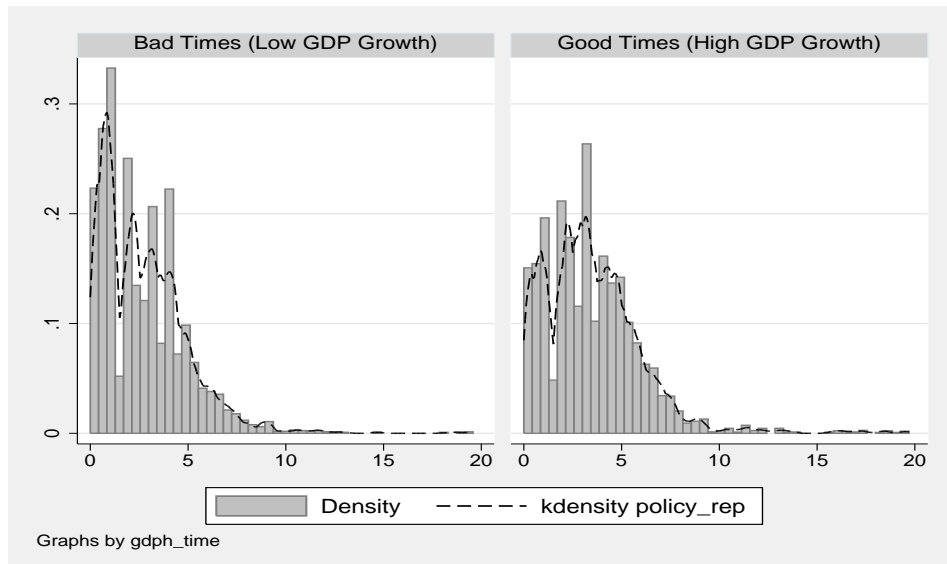
USD CB liabilities/CB liabilities rep is the ratio of cross-border liabilities denominated in U.S. dollars over cross-border liabilities.

QE indicator rep takes one if a counting country has a quantitative easing program.

VIX is a measure of market expectation of stock market volatility over the next 30-day period. It is calculated by the Chicago Board Options Exchange, often referred to as the fear index.

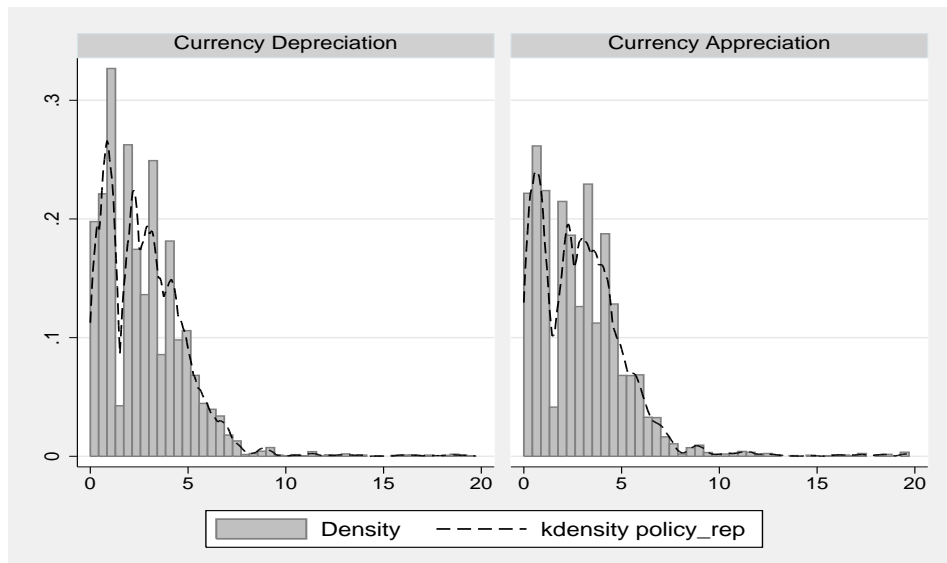
## Appendix 2

Figure A2.1: Monetary Policy Rate for Different Economic Conditions



Note: The graphs show the distributions of monetary policy rate in reporting countries for periods of relatively high GDP growth (values are higher than the median) and periods of relatively low GDP growth.

Figure A2.2: Monetary Policy Rate for Currency Appreciation and Depreciation Periods



Note: The graph shows the distributions of monetary policy rate in reporting countries for periods of currency appreciation and currency depreciation.

## Appendix 3

Table A3: List of Reporting and Counterparty Countries

EME reporting (EME counterparty) takes one if the reporting 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	0
			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