

Cross-Border Bank Flows and Monetary Policy

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Abstract

Using the 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 the source countries is an important determinant of cross-border bank flows. In addition, we find evidence in favor of a cross-border portfolio reallocation 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 banks in source countries with higher prevalence of household credit and weaker financial sectors. Also, the reallocation is directed especially toward foreign non-bank borrowers in advanced economies, or those in economies with investment grade sovereign rating. Thus, our study highlights the spillovers from domestic monetary policy on foreign credit, enhancing the understanding of the international monetary transmission mechanism through global banks.

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1 Introduction

While 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)), 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 both domestically and abroad.¹ Under the bank lending channel, changes in the stance of monetary policy affect credit supply through their impact on banks balance sheets (e.g., Bernanke and Gertler (1995)). However, while monetary policy tightening is expected to lower the supply of bank lending as in Kashyap et al. (1993), the effect may vary not just with the banks liquidity characteristics, but also with the loans risk profile, since lenders rebalance their portfolios toward relatively safer assets. Specifically, 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 (Den Haan et al. (2007)).

In light of this evidence, we assert that during episodes of monetary policy tightening, global banks rebalance their portfolios toward relatively safer loans not just domestically but also abroad, as they may increase lending to relatively safer foreign borrowers in order to preserve net worth and capital base. In addition, global banks may shift not only the composition of their loan portfolios, but also the composition of their funding sources, as they could avoid the effects of domestic monetary tightening by taping cheaper funding sources abroad. In this case, global banks may not just shift the composition of their portfolio toward relatively safer loans abroad, but may increase their cross-border lending in absolute terms as well. Our paper provides an empirical test of this assertion.

Empirically, identifying the impact of domestic monetary policy on the supply of cross-

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

border banking 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.² 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 database by residence. 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 is 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.

The dyadic (i.e., bilateral) structure of the dataset allows us to disentangle the supply vs. demand-related drivers of cross-border bank flows by using a number of fixed effects in panel data regressions. Namely, the use of counterparty*time fixed effects allows to control for unobserved time-variant factors that may affect the demand for credit in recipient countries. In this setup, the identification of supply effects related to domestic monetary policy relies on the existence of bank flows from multiple source countries to one given recipient country at a given point in time. 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.

Our results are three-fold. First, domestic monetary tightening has a positive effect on the cross-border bank flows to foreign recipient economies. Specifically, a one percentage-point increase in monetary policy rates leads to 0.33% higher growth in cross-border claims. Across sectors, the effect is 0.37% and 0.43% higher growth in claims for foreign bank and non-bank counterparties, respectively. Second, in response to domestic monetary tightening, banks increase lending abroad while they reducing credit domestically. Third, we find evidence that banks undertake portfolio rebalancing toward relatively safer loans abroad. Although the

²We use the terms reporting and source country interchangeably; the same applies for counterparty and recipient country.

data does 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 global banks from source countries with higher prevalence of household credit and weaker financial sectors. Also, the reallocation is more pronounced for credit to non-bank borrowers in advanced foreign economies and/or with investment grade sovereign rating. Our study provides evidence for the portfolio rebalancing channel in a cross-border context, thus adding to the evidence on domestic portfolio reallocation in DenHaan, Sumner, and Yamashiro (2007).

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 global banks actively use fund transfers between their head and foreign offices in response to monetary policy shocks. 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 is associated with acceleration of bank lending to foreign recipient countries.

Nonetheless, our paper also adds to the large literature on the push and pull determinants of cross-border banking flows. Although we highlight the role of monetary policies in reporting countries, we also account for typical macroeconomic factors at the reporting and counterparty countries 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 concludes.

2 Data Sources and Summary Statistics

2.1 Data sources

The Locational Banking Statistics (LBS) by residence, compiled by the Bank for International Settlements (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 (Bank for International Settlements, 2013). 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 to 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).³

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

³In 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 CDs), 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).

period between 1995:Q1 and 2014:Q2 for 29 reporting countries and 77 counterparty countries.⁴ We also exclude from our sample the BIS reporting countries that serve as offshore centers.⁵

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 (See Section 3). To illustrate the fixed effects estimation method, Figure 1 provides a schematic representation of the dyadic data. In this example, banks from three reporting countries have cross-border exposures to borrowers from five counterparty countries. Thus, the dyadic structure allows to disentangle changes in cross-border bank flows that are driven by supply factors specific to the reporting country from those arising from changes in the demand for credit from the counterparty country. Since multiple lending countries report claims on borrowers from the same counterparty country in one 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.⁶

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 (See 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

⁴Table 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.

⁵Offshore 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 makes their monetary policy irrelevant to the banking flow originated in these locations.

⁶Note that the currency composition 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 variation.

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

The LBS data does not break down banks’ claims by types of loans (such as residential or commercial mortgages, commercial & industrial loans, etc.), which prevents us from directly observing the portfolio reallocations from risky to safe assets. Therefore, we do so indirectly by controlling for the riskiness of the reporting and counterparty countries among which credit is reallocated, such as by controlling for the country-level status as advanced or investment-grade economies, for the share of household credit in non-financial private credit, or for the strength of the domestic financial sectors.

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 GDP growth, inflation, debt/GDP, and bank equity returns from multiple sources including Datastream, Haver, 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. As shown in the table, the quarterly *Cross-border flows: All* (bank and non-bank counterparties) averages 4.1 percent of the lagged outstanding claims

during our sample period. By type of counterparties, the flows to banks averaged around 9 percent, while the cross-border flows to non-banks averaged 4.8 percent. The flows to banks were 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 was only 2.3 percent and had 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 had 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 6. The average cross-border flows were 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 chart provides some suggestive evidence that higher monetary policy rates are associated with faster growth in cross-border claims than in domestic claims, which in essence the portfolio rebalancing 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 Specification for the role of monetary policy

The econometric analysis aims to estimate the effect of monetary policy in the reporting (source) countries on cross-border flows while controlling for changes in demand in the counterparty (recipient) countries. For this purpose, we estimate the following panel econometric specification with the quarterly cross-border flows as the dependent variable:

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

where i and j indicate the reporting ('source') and counterparty ('recipient') 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. Before constructing the dependent variable, 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.

Among the explanatory variables, we use the lagged nominal monetary policy rate *Lag policy rate rep_{it-1}* as the reference rate in our main specification.⁷ 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 with 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

⁷In section 4 we use shadow rates and OIS-LIBOR as alternatives.

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. Finally, because the reporting countries are typically large advanced economies, it is unlikely that credit demand in counterparty countries affects their monetary policy rates, which alleviates potential endogeneity concerns related to reverse causality.

A positive estimate for α , the main coefficient of interest on the monetary policy rate, is consistent with global banks rebalancing their portfolios from more risky to less risky loans when monetary policy in the source country is relatively tighter. Traditionally, monetary policy may affect the supply of bank credit through a number of channels, such as the bank lending channel, the balance sheet channel, and the risk-taking 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 costs that are closely linked to current bank conditions, as contractionary monetary policy results in a higher 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)). Third, through the risk-taking channel, higher interest rates may result in higher risk premiums because the perception of risk increases or the risk tolerance falls, which may be due to traditional moral hazard/adverse selection mechanism, search for yield effects, and less perceived vulnerabilities to future economic shocks.⁸ As the suppliers of bank credit perceive/evaluate banks as more risky and charge higher risk premia, banks face higher funding costs and consequently lower credit supply.

In addition to these channels, we argue for the existence of a 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. Because the net worth of local borrowers decreases with

⁸Paligorova and Santos (2016) and Jimenez et al. (2014) provide empirical support of the risk-taking channel in the US and Spain, respectively.

tighter monetary policy, banks may reallocate lending to safer foreign borrowers, regardless of demand conditions. 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 safer foreign borrowers (with stronger net worth positions) when monetary policy is 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 $\times$ year-quarter fixed effects (γ_{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, our 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 $\times$ 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 empirical setup since the optimal monetary policy rates in some individual Eurozone members may have differed from those set for the euro area as a whole. For example, because the economies of euro area member states have been somewhat 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.⁹

We also include a set of reporting-country controls in $Xrep_{it-1}$ that have been found to affect the 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, as appreciating counterparty currencies may encourage cross-border flows denominated in the reporting country's currency, since appreciating foreign currencies would enhance borrowers' balancesheets. We also control for the financial center status of reporting countries (UK, US, Hong Kong, Singapore and Luxembourg). In addition, we consider whether the reporting country is part of the Eurozone, since these countries may be subject to common credit and business cycles, and hence may have 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 implemented unconventional monetary policy measures after their reference rate hit the zero lower bound, i.e., Japan, the United Kingdom, and the United States. 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 pair levels,

⁹The 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 United States). Also, Bruno and Shin (2015b) argue that one reason why U.S. monetary policy appears to be a key driver of cross-border flows is that 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 $\times$ year-quarter fixed effects, which do not allow us to control for time-varying factors, we use separately reporting $\times$ counterparty fixed effects and year $\times$ quarter fixed effects, with the latter controlling for the 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)).

$$\begin{aligned} Flows_{ijt}/Outstanding_{ijt-1} &= \alpha \text{Lag policy rate rep}_{it-1} + \theta \text{Lag policy rate cp}_{jt-1} + \\ &= \beta' Xrep_{it-1} + \mu' Ycp_{jt-1} + \gamma_{ij} + \phi_t + \epsilon_{ijt} \end{aligned} \quad (2)$$

This setup allows to separately identify ‘push’ factors from reporting countries $Xrep_{it-1}$ and ‘pull’ factors from counterparty countries (Ycp_{jt-1}) while controlling for a time-variant global factor.¹⁰ 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, ϕ_t , controls for the unspecified global factor, while the reporting-counterparty fixed effect γ_{ij}

¹⁰Calvo 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. This specification does not account for demand as tightly as equation (1), since it controls for demand only to the extent that the relevant counterparty country characteristics are included among the explanatory variables. However, it provides a useful robustness check to assess whether monetary policy in the source country is still a relevant driver when controlling for the 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 would be preserved.

3.3 Specification for portfolio rebalancing channel

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

$$Flows\ Differential_{ijt} = \alpha \text{Lag policy rate rep}_{it-1} + \beta' X \text{rep}_{it-1} + \gamma_{jt} + \epsilon_{ijt} \quad (3)$$

Flows Differential_{ijt} is the difference between *Flows_{ijt}/Outstanding_{ijt-1}* and *Flows Domestic Nonbank Credit_{it}/Outstanding_{ijt-1}*. Since we have available domestic credit to non-banks, we narrow the analysis to cross-border flows to non-banks as well. If portfolio rebalancing is present, α is positive, as 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 in connection with reporting countries deemed riskier (such as those with higher SRISK/GDP ratio, relatively more prevalent household credit, 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. Our conjecture is that more risky banking sectors are more concerned to safeguard their capital and hence more likely to shift to less risky assets in response to tighter monetary policy. It is worth noting that the level of bank riskiness should not be so high that it impedes banks lending activities.

4 Main results

This section reports four sets of results: the supply effect of monetary policy on cross-border credit, the role of the domestic economic environment in reporting countries, the role of global factors, and the effect of banks' exposure to U.S. monetary policy through the use of US 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 an additional 0.369 percentage point in flows to banks and 0.426 percentage point in flows 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 United States and other financial centers from the sample, thus confirming that our results are not driven by the U.S. monetary policy alone. Also, since we rely on counterparty $\times$ 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 to 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 and 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 subsample from 2007:Q2 onward, when sovereign risk increased for several reporting countries. Also, Eurozone countries have had 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 either the full sample (columns 1-3) or the period since 2007:Q2 (columns 4-6). The effect of monetary policy on cross-border flows is still positive and, with the exception of column 2, statistically significant. 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). The opposing effects of monetary policy and the LIBOR-OIS spread highlight the different channels through which they affect cross-border banking flows, i.e., portfolio rebalancing vs. bank lending channel.

With the monetary policy rates having persisted near the zero lower bound in much of 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 United States, the Euro area, Japan, and the United Kingdom. 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 environment in the reporting country.

4.2 Economic conditions in the source countries

Our analysis could be subject to the endogeneity concern that monetary policy and economic activity in the reporting country affect each other, 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 euro area as an empirical setup in which monetary policy may become misaligned with domestic economic conditions. Namely,

we examine whether the relationship between cross-border flows and monetary policy differs for the Eurozone vs. non-Eurozone reporting countries, since the Eurozone monetary policy may not accurately reflect the macroeconomic conditions in individual member countries. If the relationship between monetary policy and cross-border claims is not preserved for the Eurozone reporting countries, the outcome could reflect endogeneity between economic activity and monetary policy in the non-Eurozone sample.

In Table 5 we interact *Euro rep* with all control variables. Our focus is on the interaction term, *Lag policy rate rep* $\times$ *Euro rep*. Since the policy rate seems to be most synchronized for the German and French business conditions, as a robustness check we exclude them from columns (4)-(6), while they are in columns (1)-(3). 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.

Alternatively, we also examine whether the relationship between monetary policy and cross-border lending varies with economic conditions in the reporting countries. Figure 6 shows that the policy rate is similarly distributed across high- and low-GDP growth regimes, suggesting that the effect of monetary policy should be distinct 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 separate from that of GDP growth in the reporting country.

In Table 7 we report a similar exercise for periods of either currency appreciation or 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 economic conditions.

4.3 Global factors

Miranda-Agrippino and Rey (2015) and Rey (2013), among others, assert that capital flows are driven by a global factor that also affects the course of U.S. monetary policy. If this is the case, failing to account for the global factor could lead to omitted variable bias and overstate the effect of monetary policy on capital 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 both the source and destination countries, to explain the cross-sectional variation in capital flows, where the year-quarter fixed effect controls for the unobserved global factor. Second, similarly using fixed effects for reporting-counterparty pairs and year fixed effects, we include VIX among the explanatory variables, since VIX is found to be correlated with the global factor.

In Table 8, columns (1)-(3), we estimate specification (1) with reporting-counterparty and years-quarter fixed effects. Taking into account the effect of time-invariant unobserved effects within the reporting-counterparty country pairs, the additional year-quarter fixed effects controls for the quarterly global factor. In this specification, the coefficient on monetary policy rates reflects the impact of the monetary policy stance on capital flows. 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 rate is negative and statistically significant, suggesting that cross-border credit flows to countries with lower monetary policy rates. This finding corroborates our 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., where policy rates are relatively lower). 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 banking inflows. In the reporting country, high sovereign debt is also a barrier to cross-border credit abroad, likely because investors demand higher

returns. Finally, during the QE episodes when banks's liquidity is elevated, cross-border flows are higher compared to 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 that in counterparty countries has a negative impact on cross-border flows.¹¹ Finally, in columns (7)-(9), we use the monetary policy is measured by the the monetary policy rate differential between the reporting and counterparty countries. The negative coefficient on VIX and the positive coefficient on the monetary policy differential are still 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 United States as a reporting country from the sample, and add the ratio of banks' dollar-denominated cross-border liabilities over total cross-border claims for the source countries (*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 role of monetary policy is not driven by the U.S. monetary policy stance and the role of dollar funding for global banks.

¹¹Instead of year-quarter, we use year fixed effects in order to estimate the impact on VIX that varies at the quarterly frequency.

5 Portfolio Rebalancing Channel

This section reports tests of the portfolio rebalancing channel. Specifically, we examine whether cross-border credit goes to riskier destinations, whether domestic credit is less sensitive to the monetary policy compared to foreign credit, and whether the riskiness of the reporting country matter.

5.1 Is cross-border credit reallocated toward safer counterparties?

The portfolio rebalancing channel suggests that cross-border flows increase toward relatively less risky counterparty countries when monetary policy tightens in the reporting country. To test whether the relationship between cross-border credit and monetary policy depends on counterparty risk, we interact the reporting country's policy rate with *Speculative grade cp*, which takes the value of one if the counterparty country has a speculative grade rating for sovereign risk in a given year-quarter and zero otherwise. In Table 10, the coefficient on the monetary policy rate alone is still positive and statistically significant. However, the negative coefficient on the interacted term indicates relatively lower cross-border credit growth to speculative-grade countries for any given level of the monetary policy rate. Also, the sum of *Lag policy rate rep* and *Lag policy rate rep* $\times$ *Speculative grade cp* is not statistically significant, except for non-bank borrowers in column (3). The result confirms that in response to tighter monetary policy at home cross-border flows increase to bank borrowers in investment-grade counterparties, which is consistent with portfolio rebalancing. Interestingly, cross-border flows increase to non-banking borrowers in both investment and speculative grade counterparty countries (column 3). One potential explanation for this result is that cross-border credit to non-banks typically takes the form of syndicated loans to large multinational corporations, whose credit rating is high and hence less sensitive to local economic conditions.

As an alternative measure of counterparty country risk, we use information on whether a country is classified as an emerging market or an advanced economy. In Table 11 we report the results from the interaction of *EME cp* with each variable in the cross-border flows regression. Our coefficients of interest are *Lag policy rate rep* and *Lag policy rate rep* $\times$ *EME cp*.

The positive significant sign on the former term and the negative sign on the latter term (except for non-bank borrowers) corroborate our conclusion from the previous table that cross-border credit is reallocated to less risky counterparty countries (i.e., advanced economies) when monetary policy is tightened in the reporting country. Once again, cross-border flows increase to non-bank borrowers in both emerging market and advanced economies.

Overall, these findings are consistent with the portfolio rebalancing channel for cross-border flows to bank borrowers, in which cross-border flows only increase in less risky counterparty countries when monetary policy in the reporting country is tightened.

5.2 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. The specification allows 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 observations where the dependent variable measures 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 tightened. 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.¹²

¹²A more direct test of the portfolio rebalancing channel is based on individual banks' portfolios, which would allow to test whether banks change the portfolio weights of domestic and foreign credit. However, such test is not obtainable given that we use cross-country data.

5.3 Is cross-border credit reallocated away from riskier source 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 more involved 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 12.¹³ 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.¹⁴

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.

6 Conclusion

As 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 generate for both creditors and borrowers. This paper focuses on the role of monetary policy in source countries as a driver of cross-border bank flows.

¹³The number of observations in column (3) drops due to the availability of the SRISK.

¹⁴The 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.

We use information from the BIS Locational banking statistics, as well as a novel dataset with information on banks' claims on the domestic non-bank sector. The dyadic structure of these data allows us to control for factors affecting the demand for cross-border flows, which helps in the identification of 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 source countries with relatively weaker financial sectors. Third, banks reallocate credit mainly toward foreign borrowers in safer economies, such as advanced economies or economies with investment grade ratings for sovereign debt.

Our results have a number of policy implications. To the extent that an economy relies on foreign credit, such as Canada for example, the question arises as to whether the sudden dry-up of foreign credit would make the financial system more vulnerable. Another question is whether banking and portfolio flows display positive co-movement and/or are affected by similar drivers. Finally, given the different effect of monetary policy, the appropriate policy response in recipient countries may also differ across the two types of flows, i.e., countercyclical capital buffers for banking flows and liquidity management for portfolio flows.

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Figure 1: Structure of BIS Locational Banking Statistics

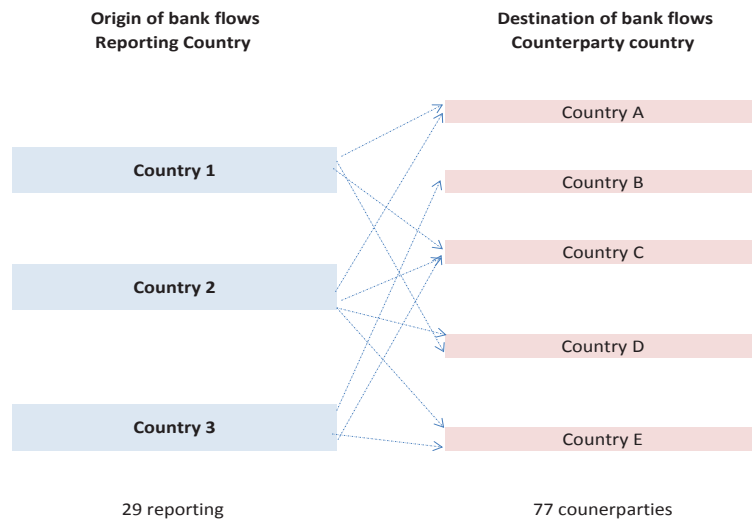
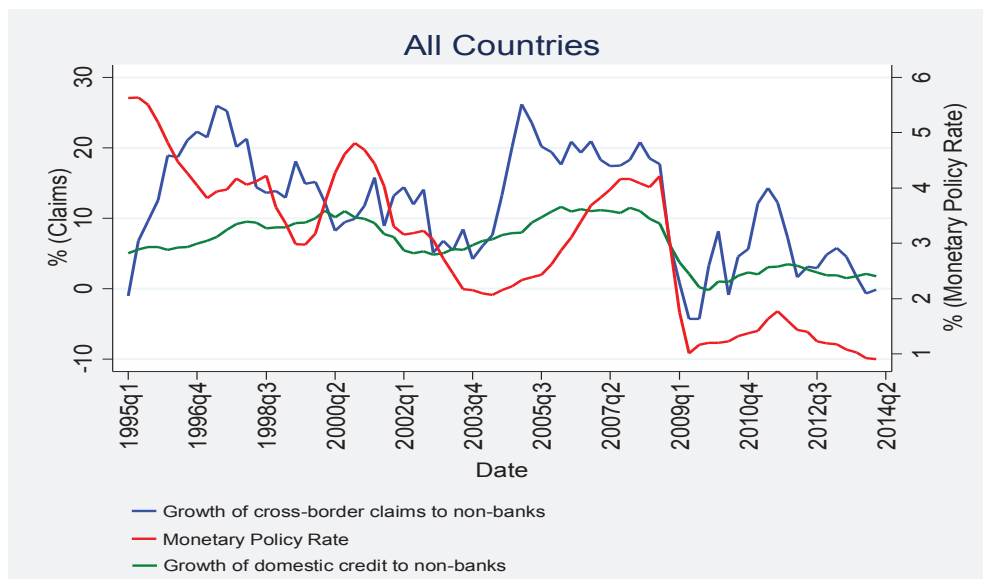
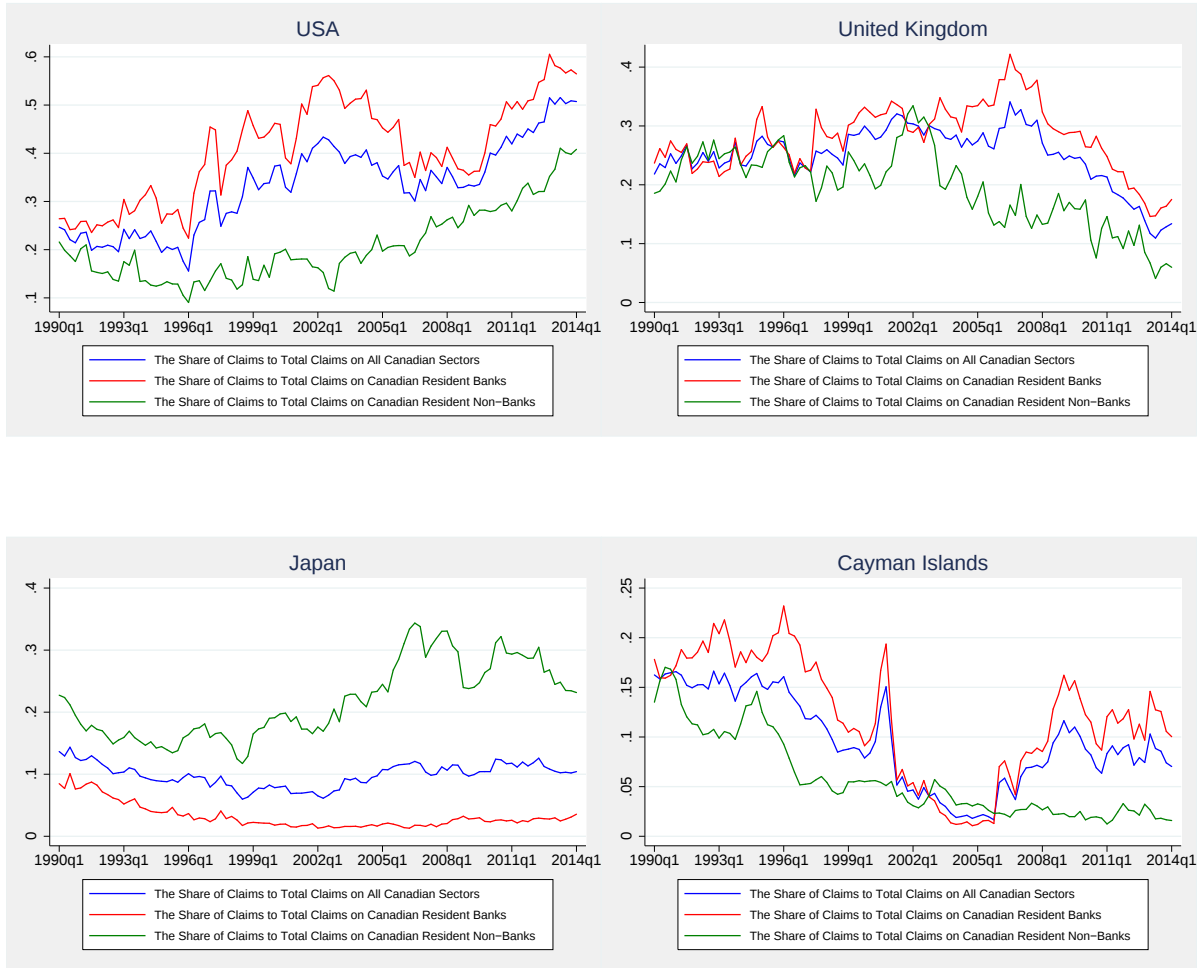


Figure 2: Monetary Policy Rates and Cross-Border Claims on Non-banks



Note: The graph shows the average growth rates of cross-border claims to non-banks, domestic credit growth and monetary policy rates.

Figure 3: The Four Largest Foreign Bank Claims on Canada



Note: These plots show the share of outstanding claims (a reporting country share to total outstanding in a given year-quarter) for all sectors, bank and non-banks in Canada (counterparty). USA, United Kingdom, Japan and Cayman Islands are the largest foreign lenders.

Table 1: **Sample Characteristics**

This table reports summary statistics for cross-border 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 Flows and Monetary Policies in the Reporting Countries

The dependent variables are cross-border flows growth 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 Policies in the Reporting Countries: Before/After the Global Financial Crisis (GFC)

The dependent variables are cross-border flows growth 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	-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-squared	0.12	0.12	0.12	0.11	0.11	0.10

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

The dependent variables are cross-border flows growth 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.

	LIBOR-OIS							
	All	Banks	Non-Banks	All	Banks	Non-Banks	All	Shadow Rates
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
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]
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]	0.023 [0.050]	0.104 [0.078]
Lag shadow rates rep								0.063 [0.053]
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]	-0.007 [0.020]	-0.008 [0.011]
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]	0.006 [0.011]	0.007 [0.020]
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]	0.167 [0.100]	-0.092 [0.210]
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]	-0.007 [0.005]	-0.023*** [0.007]
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]	-0.124 [0.270]	0.330 [0.486]
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]	0.106* [0.057]	0.178* [0.096]
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]	-1.062 [0.659]	-3.239*** [1.016]
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]	-0.924** [0.397]	-1.366 [0.912]
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]	1.849*** [0.498]	1.895 [1.151]
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]	0.800 [0.619]	1.610 [1.248]
Observations	61,903	59,717	61,297	29,013	27,886	28,687	72,249	69,854
R-squared	0.13	0.13	0.12	0.12	0.12	0.10	0.12	0.12
								0.418*** [0.118]

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

The dependent variables are cross-border flows growth 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 excluding Germany and France	Banks	Non-Banks
	(1)	(2)	(3)	(4)	(5)	(6)
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 cross-border flows growth 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-squared	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 cross-border flows growth 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 $\times$ <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 $\times$ <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 $\times$ <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 $\times$ <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 $\times$ <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 $\times$ <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 $\times$ <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 $\times$ <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 $\times$ <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 $\times$ <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 $\times$ <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-squared	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 cross-border flows growth 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-squared	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 cross-border flows growth 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 all 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	-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-squared	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 cross-border flows growth 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*** [0.064]	0.539*** [0.082]	0.457*** [0.148]
Lag policy rate rep× <i>Speculative grade cp</i>	-0.266** [0.117]	-0.709** [0.279]	-0.035 [0.172]
Lag credit growth rep	0.055 [0.061]	0.107 [0.091]	0.109* [0.061]
Lag credit growth rep× <i>Speculative grade cp</i>	-0.141 [0.094]	-0.061 [0.224]	-0.182* [0.106]
Lag bank equity returns rep	-0.013 [0.014]	-0.020 [0.022]	-0.013 [0.014]
Lag bank equity returns rep× <i>Speculative grade cp</i>	0.028 [0.021]	0.057 [0.058]	0.024 [0.020]
Lag real GDP growth rep	0.147 [0.114]	0.033 [0.266]	0.017 [0.177]
Lag real GDP growth rep× <i>Speculative grade cp</i>	0.348 [0.330]	-0.307 [0.697]	0.817* [0.403]
Lag Debt/GDP rep	-0.010** [0.005]	-0.024*** [0.008]	-0.006 [0.007]
Lag Debt/GDP rep× <i>Speculative grade cp</i>	0.008 [0.008]	0.002 [0.018]	-0.000 [0.008]
Lag inflation rep	-0.149 [0.302]	0.443 [0.557]	0.303 [0.399]
Lag inflation rep× <i>Speculative grade cp</i>	0.435 [0.369]	-0.197 [0.971]	-0.348 [0.237]
Exchange Rate Growth	0.122* [0.071]	0.219** [0.106]	0.133 [0.080]
Exchange Rate Growth× <i>Speculative grade cp</i>	-0.120 [0.092]	-0.326* [0.186]	-0.113 [0.118]
Financial Center rep	-1.715* [0.848]	-4.155*** [1.368]	-1.724 [1.048]
Financial Center rep× <i>Speculative grade cp</i>	1.609* [0.830]	2.371 [2.071]	0.684 [1.175]
Euro rep	-0.808 [0.490]	-1.168 [0.928]	-1.600** [0.691]
Euro rep× <i>Speculative grade cp</i>	-0.872 [0.618]	-2.326 [1.746]	-0.632 [0.804]
QE indicator rep	1.696*** [0.538]	1.786 [1.323]	1.543* [0.826]
QE indicator rep× <i>Speculative grade cp</i>	-1.811 [1.444]	-3.648 [2.967]	-0.784 [0.910]
Observations	69,232	67,050	67,646
R-squared	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 cross-border flows growth to all sectors (banks and non-banks), banks and non-banks. *EME cp* takes one if the counterparty is classified as a 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-squared	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 Rebalancing**

The dependent variables are cross-border flows growth 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	-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-squared	0.11	0.11	0.12
Joint	0.118		0.9
t-statistic	2.24		3.100

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, IMF, 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 Fed, 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 (US, US, 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, CEIC

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

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

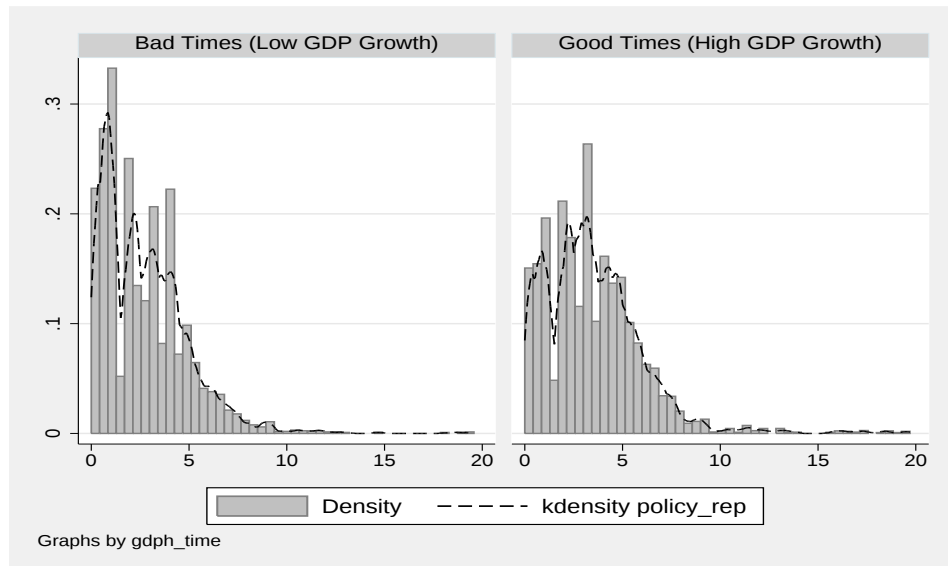
USD CB liabilities/CB liabilities rep is the ratio of US dollar denominated foreign claims over US dollar denominated liabilities

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

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

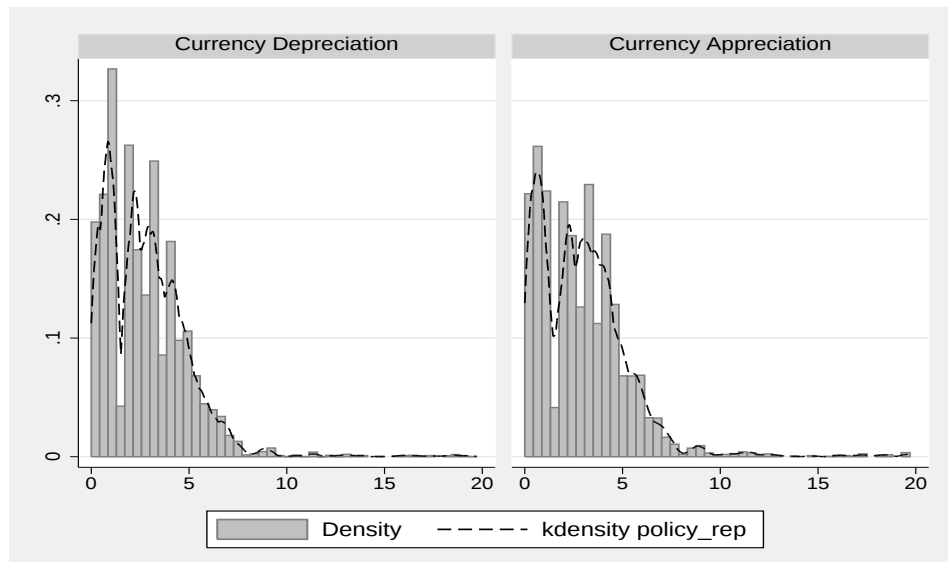
Appendix 2

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



Note: The graphs shows the distributions of monetary policy rate for period 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 Period



Note: The graphs shows the distributions of monetary policy rate for periods of currency appreciation and currency depreciation.

Appendix 3

Table A3: A List of Reporting and Counterparty Countries

EME_rep (EME_cp) takes one if the reporting (counterparty) 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