What Drives Cross-Border Flows?

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ABSTRACT

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This paper examines the drivers and impact of cross-border bank financial positions in a destination emerging market economy (the Philippines) for global banks using a unique dataset of disaggregated data for 55-58 internationally active banks during the period 2015 to 2020. The data allow us to analyze the cross-border asset position of banks in the destination country, as well as the cross-border liabilities, thus going beyond the traditional focus on cross-border liabilities only. We find that global risk appetite, real exchange rate movements, return on assets and the spread between the domestic policy rate and the US Fed funds rate influence cross-border financial positions. We also find, apparently for the first time in this type of study, that the domestic credit cycle for banks in the destination country affects the cross-border asset position of banks. This effect is stronger in foreign banks. A separate analysis of how cross-border financial positions affect the domestic credit cycle reveals that these have a significant positive impact for all banks.

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1. Introduction

The experience of emerging market economies has underscored the importance of stabilizing cross-border capital flows. While capital flows to emerging market economies can finance investment and promote economic growth, and increase welfare by facilitating consumption smoothing, its volatility raises major concerns. Extended periods of surges in capital inflows have been associated with overheating in credit markets, including property housing markets, and other financial and macroeconomic imbalances, such as excessive borrowing in foreign currencies, lower yields and foreign exchange market interventions that can complicate the conduct of monetary policy. Sudden stops or reversals of inflows can trigger financial crises and sharp declines in output. Coping with such reversals poses major challenges for policymakers.

Due to the importance of capital flows, a large body of literature has emerged to identify its major drivers. Starting in the 1990s a widely used empirical framework has classified drivers of capital flows as external, or "push" factors, and domestic or "pull" factors that affect the flow of capital, typically from advanced economies ("source countries" for capital flows) to emerging economies ("destination countries" for capital flows). (Koepke, 2019.)

Of particular interest to central banks has been the body of work that has emerged in the past decade that has focused on the drivers and, more recently the impact of cross-border *banking* flows[1]. The focus of the discussions on the impact of cross-border banking flows is how much of this is channelled into domestic credit through the internationally active banks. More recent studies point to significant evidence on cross-border transmission of monetary policy through bank lending and the sources of heterogeneity in the transmission across types of banks in emerging market economies. As banks' decisions play a central role in the effects and the effectiveness of domestic monetary policy, understanding the differences in banks' responses to monetary policy shocks is key as these capture the specific characteristics of banks (Kashyap and Stein 2000). These characteristics that seem relevant in the cross-border monetary policy transmission include banks' cross-border positions, their funding structures, and their levels of capitalization. We expect these to affect the supply of domestic credit, and consequently the domestic credit cycle.

In this paper, we add to this literature by first examining the drivers of cross border bank flows using data from the Philippines, an emerging market economy, specifically quarterly bank-level cross-border financial position of 55-58 internationally active Philippine banks from March 2015 to June 2020. To the best of our knowledge, this is the first time that analysis on cross border flows has used the source report on cross-border financial position using individual bank reports. The Bangko Sentral ng Pilipinas (BSP, the Philippine central bank) requires banks to report their cross-border financial positions starting in

[1] Defined as capital flows channeled through the internationally active banks.

September 2014[2] to provide the BSP with a comprehensive view of potential financial risks and transmission channels emanating from foreign counterparties of Philippine banks. Cross-border position refers to the asset and liability position vis-à-vis banks and non-banks located in a country other than the country of residence of the reporting banking office, which in this case is the Philippines. This definition is consistent with the definition of the Bank for International Settlements (BIS) in its international banking statistics which have been used in a number of studies. However, BIS statistics are aggregated and then reported by country, not by individual bank and traditionally focus only on bank liabilities. In contrast, sources and uses of bank-level gross liabilities are traced using this report. Gross financial position[3] of banks in our dataset has grown by an average of 9.3 percent from March 2016 to US$56.1 billion at June 2020. These exposures are relatively small, representing 15.6 percent as of end-December 2017 (from 15.9 percent at end-September 2014), and have not grown compared to total banking assets. [4]

Second, we estimate the relationship between bank flows and domestic credit cycles focusing on the differences in credit supply responses between internationally active domestic banks and foreign banks. Many emerging market economies do not have a high concentration of foreign banks. In the Philippines, foreign banks only account for 7.2 percent of the banking system's total loan portfolio prior to the March 2020 pandemic and 6.2 percent at end-December 2020. Nonetheless, experience in other countries shows that they can play an important role in supplying cross-border liquidity. Hence, we would like to know how the different banking groups – universal banks (UKBs), commercial banks (KBs) and foreign banks (branches and subsidiaries) (FBs) respond in terms of credit supply when domestic banks can also borrow externally during periods of strong international banking flows. Our study explores how domestic banks adjust their foreign lending to changes in domestic monetary policy, including their affiliates located in other countries, by looking at banks' cross-border asset position. We emphasize in our analysis the importance of specific bank features such as the capital and liquidity positions of individual banks in monetary policy transmission and how these factors affect bank lending.[5] The BSP's Financial Reporting Package allows us to analyze this between March 2015 and June 2020 that covers the universe of loans extended to the private sector by domestic banks, and thus both domestic and foreign banks.

[2] Circular No. 850 dated 8 September 2014 - Phase 1 implementation required universal and commercial banks, as well as thrift banks that are subsidiaries of U/KBs to report their cross border financial claims and liabilities to the BSP.

[3] Gross financial position is the sum of total claims and liabilities. The best way for management to obtain a picture of an international bank's overall exposure to foreign borrowers outside a bank's own organization is by measuring country exposure on a consolidated basis.

[4] Total assets of the banking system grew by 45.5 percent in December 2017 relative to September 2014 partly due to entry of new foreign banks. Hence, the share of cross-border to total banking asset remained at around 15.0 percent despite a 28.9 percent growth from September 2014 to December 2017.

[5] The study effectively takes an outward transmission of monetary policy perspective. In contrast, an inward transmission focuses on how monetary policy in major partner countries affect lending by domestic banks or foreign banks.

In many empirical studies, inter-linkages in the global economy, including those channeled through banks[6] in the form of cross-border financial flows, have contributed to the spreading of the Global Financial Crisis (GFC) in 2007 to 2008. Relative to nominal Gross Domestic Product t (GDP), cross-border bank flows to the Philippines have been rising faster than portfolio flows in the past four years.[7]

This study constructs three unique databases to help answer the research questions:

First, a quarterly database of Cross-Border Financial Position from March 2015 to June 2020 to determine the financial exposures of individual banks to counterparties such as non-financial corporations as well as to advanced and emerging market economies.

Second, a database of bank-specific characteristics from the Financial Reporting Package (FRP) such as asset size, loan portfolio, loan loss reserves, non-performing loan ratio, deposits, investments, annualized net income or loss, return on assets, net interest margin. It also includes data on prudential performance such as capital adequacy ratio (CAR), liquidity coverage ratio (LCR).

Finally, a database containing information on the BSP's overnight policy rate, bank reserve requirements against deposit liabilities and deposit substitutes, waves of foreign exchange reforms, and sterilization episodes. It also includes macroeconomic data such as real Gross Domestic Product (GDP), inflation, exchange rates, and credit cycles.

Our results may be summarized as follows:

First, both external or "push" and domestic "pull" factors drive cross-border financial positions. External factors include measure of global risk appetite and average real GDP growth of advanced economies, while domestic factors include real exchange rate movements, return on assets and liquidity and capital buffers. In between the external and domestic factors is the interest rate gap or the difference between the BSP policy rate and Fed funds rate.

Second, domestic universal banks (UKBs) drive changes in cross-border financial position. Foreign banks play a much smaller role.

Third, we are able to make statements about how domestic monetary policy affects bank decisions in the destination country to invest abroad. As expected, we find that in the Philippine case, local monetary policy affects domestic universal banks' decision to invest abroad but that this is not so for foreign banks.

Fourth, cross-border bank flows are affected by domestic credit cycles. However, in this setting, the impact of foreign banks' credit cycles is also positive and significant than that of domestic universal banks.

[6] For instance, the Report of the Committee on International Economic Policy and Reform (2012) confirmed that the vast bulk of cross-border debt is intermediated through the domestic banking system based on the Bank for International Settlements (BIS) data.

[7] Based on the BSP Balance of Payments data at end-March 2021.

Fifth, external factors make the biggest contribution to cross-border asset positions, while domestic factors have the larger impact on cross-border liability positions. However, contributions of both factors decline during the initial phase of the global pandemic.

Finally, the domestic credit cycle in a destination country is also influenced by domestic drivers as well as directly by the cross-border asset position of banks.

The rest of this study is organized as follows. Section 2 briefly reviews empirical findings of the studies on drivers of cross-border banking and their implications for domestic credit. Section 3 discusses databases used and empirical methodology, while Section 4 highlights the main findings of the paper. Section 5 concludes.

2. Survey of Empirical Findings

This paper is related to research in international finance on the drivers of capital flows, and the implications of capital flows for the credit cycle. Recent research on the drivers of cross-border banking flows is of particular interest as it highlights the mechanisms by which monetary policy or other shocks affecting international banks are transmitted across borders. One channel is the cross border risk-taking channel. Under this channel, in the source country an increase in the US policy rate (Fed funds rate) raises financing costs, lowers bank risk tolerance and willingness to lend to emerging economies. Along with reduced cross border financing, the rise in the US policy rate would tend to depreciate the currency in destination countries, reducing the net worth of domestic banks with foreign currency liabilities, and their willingness to lend. In an empirical analysis, Bruno and Shin confirm that a higher Fed funds rate reduces bank leverage, which in turn reduces cross-border bank flows. (See Bruno and Shin 2015a and 2015b).

Further insights on the risk-taking channel are provided by Correa et al (2021). The authors analyze the impact of monetary policy tightening using BIS international banking statistics. They find that in response to monetary policy tightening in source countries (1) global banks increase cross-border lending by more than domestic lending, so loan portfolios are rebalanced toward foreign borrowers (2) the result is stronger for banks with relatively lower capital (3) there is an overall increase in cross-border lending (4) consistent with the risk-taking channel, as tightening increases the relative riskiness of domestic borrowers, banks reallocate their portfolios toward safer destinations abroad.

Correa et al (2021) add to the literature by combining data on cross-border lending with data on bank credit to the domestic non-bank sector (both from the BIS), and also with data on bank credit to the domestic public sector (also from the BIS). They are thus able to analyze how cross-border and domestic bank flows respond to monetary policy, indicating international portfolio rebalancing. They also examine how these responses vary with the capitalization of banks in source economy, and with the risk characteristics of recipient characteristics, which are elements of the international risk-taking channel.

Correa et al (2021) also discuss the theories on how the monetary policy stance affects banks' credit supply through the risk-taking and bank lending channels. The risk-taking channel focuses on the quality of credit supplied by banks rather than its quantity. Correa et al (2021) estimate the effects of the three components of risk-taking channel: the portfolio channel, the risk-shifting channel, and the franchise value channel. Under the portfolio channel, banks rebalance loan portfolios toward relatively safer assets in response to tighter monetary policy, and rebalance toward risky assets in response to easier monetary policy. This rebalancing of portfolio can be due to a reduction in the borrowers' collateral values, income, and net worth following an increase in interest rates. However, the extent of banks' risk-taking behavior may depend on their capitalization level. On the one hand, the risk-shifting channel can mitigate the portfolio channel, particularly for banks with relatively low capital. These banks may be more willing to tolerate risk during episodes of a tighter monetary policy due to their limited liability incentive, which shields banks' shareholders from bearing losses in full. On the other hand, a franchise value (the present value of banks' future rents) effect may mitigate the portfolio channel for banks with relatively high capital. These banks may be more willing to tolerate risk as they incur lower franchise values, weaker incentives to monitor investments due to relatively high capital requirements. Correa et al (2021) argue that the overall effect of the risk-taking channel is driven by the portfolio channel theory, which states an unambiguous negative relation between interest rates and risk taking. The effect of monetary policy on risk taking conditional on banks' capital levels is ambiguous, as on net, the risk-shifting and franchise value incentives may complement the portfolio channel effect for banks depending on their capital positions.

Under the bank lending channel, a monetary tightening affects the supply of credit through the banks' cost of funding.[8]As monetary tightening encourages banks to substitute reservable deposits with uninsured liabilities, banks encounter higher costs of funding and reduce their overall supply of credit (Kashyap and Stein 2000). In an international context, Cetorelli and Goldberg (2012) explore the bank lending channel. They find that it is driven by the joint effects of the global financial cycle and the monetary policy cycle.

Recent studies shed further light on implications of capital flows for domestic credit in destination countries. Baskaya et al (2017) study how capital flows affect the local credit supply in emerging markets, and the mechanisms behind this international credit channel. They use credit register data for Turkey for 2005–2013, which contains all bank loans to firms in Turkey, and which allows them to control for credit demand via firm x quarter fixed effects (to capture time-varying unobserved firm shocks). Their findings indicate that reduced capital flows would reduce credit supply in larger more capitalized banks in the destination country with higher non-core liabilities (which is associated with greater risk-

[8] Disyatat (2011) reformulates the bank lending channel by stressing emphasizing that loans drive deposits, reserve requirements are not binding and that there is no exogenous constraint on the supply of credit. A monetary tightening increases the external finance premium that banks are required to pay and that this mechanism causes banks to reduce their lending.

taking, (Hahn et al 2013) and that these effects are stronger for domestic banks. Thus, large domestic (and not just foreign banks) that rely on non-core financing, transmit global cycles and shocks, with possible implications for macroprudential regulation.

Our paper is motivated by renewed interest on drivers of bank flows following the GFC by drawing on the literature on the bank lending and risk-taking channels. There are broad similarities with Correa et al (2021) and Baskaya et al (2017). We look at the universe of internationally active banks located in the Philippines to examine the drivers of bank flows by examining the cross-border financial positions and how these influence the domestic credit cycles using a disaggregated cross-border financial report. We extend the traditional analysis focusing on cross-border liability position to include the cross-border asset position. We predict that domestic lending by banks could withstand changes in monetary policy stance for those which have additional funding source, while policy is transmitted through international lending for countries that are more crucial to the business model of each bank (Cetorelli and Goldberg 2012). By matching the cross-border report with bank-specific characteristics from Financial Reporting Package, we estimate the influence in credit supply responses between internationally active domestic banks and foreign banks. We also provide initial insights on the impact of the global pandemic on cross-border financial positions.

We differ in the estimation approach used in Correa et al (2021) and Baskaya (2017). Our disaggregated dataset allows us to employ a panel Generalized Method of Moment (GMM) to address the endogeneity issue and to control for the banking system's unobserved component of credit supply that can be related to credit demand. We are able to extract a banking system credit cycle from the Financial Reporting Package instead of focusing only on bank credit. Using a large sample of countries, Correa et al (2021) used fixed-effects estimation in analyzing the international transmission of risk-taking channel from the source countries by looking at the impact of monetary policy on cross-border bank flows. They extend the analysis by also looking at first banks' decision to reallocate their loan portfolios across domestic and foreign borrowers and second, by examining the relative strength of the risk-shifting and franchise value effects in shaping the risk-taking channel. Baskaya et al (2017) also use fixed-effects estimation to analyze the international credit channel and show the importance of external borrowing for domestic banks' credit growth.

Factors Affecting Cross-Border Bank Flows

Following the global financial crisis in 2008, the Philippines sought to improve the resilience of the economy and financial system in the face of globalized finance. Major components of these measures include a set of reforms in the foreign exchange regulatory framework

starting in 2007, the formal shift in the monetary operations of the BSP to an interest rate corridor (IRC) system in June 2016, and the adoption of strategic financial sector reforms.[9]

Eleven waves of foreign exchange liberalization reforms have been introduced since 2007. In November 2014, Republic Act (RA) No 10641 was approved, providing the legal basis for BSP to regulate and supervise the entry and operation of foreign banks in the country. In April 2020, the BSP eased the asset cover requirement on banks with expanded/foreign currency deposit units (E/FCDU) to provide these units with greater flexibility to manage their foreign currency exposures by allowing E/FCDU to offset any deficiency in the asset cover incurred on one or more days of the week with the excess cover that they may hold on other days of the same week and the immediately succeeding week. The previous regulation required banks to maintain a 100 percent asset cover for their foreign currency liabilities in the E/FCDUs at all times to ensure they have sufficient foreign currency-denominated assets to service withdrawals of deposits and meet payments denominated in foreign currency.[10]

Moreover, RA No. 10574 was implemented to allow infusion of foreign equity in rural banks' capital. As of end-December 2020, there are 29 foreign banks that were authorized by the BSP to operate in the Philippines. Since the implementation of RA No. 10641, the BSP has approved 12 foreign bank applications (10 branches and 2 subsidiaries).[11] There are also four foreign banks which entered in the Philippines in the form of representative office. Most of the FBs and subsidiaries originated from the Asia-Pacific region (Taiwan and South Korea) or 73.3 percent of the total number of FBs.

The BSP also pushed for a broad set of strategic reforms in the financial system to better promote financial stability, preserve the institutional safety and soundness of individual banks, and protect the public. More capital-based measures and disclosure standards have been implemented since 2008 due in part to the implementation of the Basel III requirements. The BSP adopted the Basel III capital rules for U/KBs and their subsidiary banks on 1 January 2014. UKBs are required to comply with the 10-percent total capital adequacy ratio (CAR)[12], the leverage ratio of 5 percent in July 2018 and the

[9] The IRC is a system for guiding short-term market rates towards the BSP policy interest rate which is the overnight reverse repurchase (RRP) rate. The primary aim of the adoption of the IRC is to improve the transmission of monetary policy.

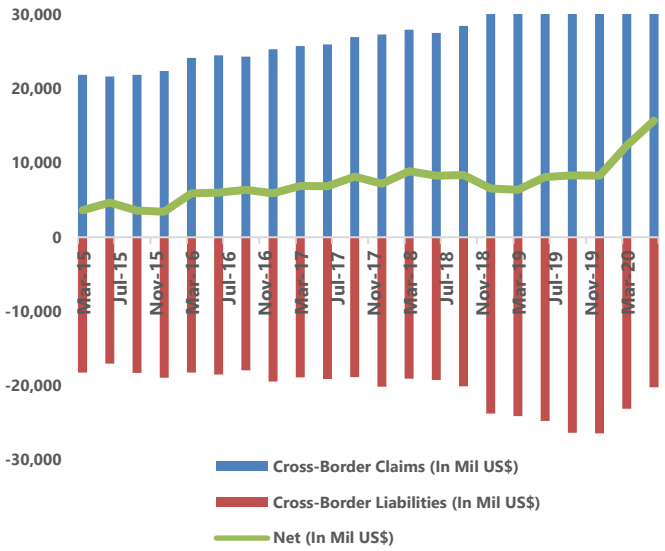
[10] The BSP also approved the alignment of the licensing process for applications for E/FCDU authority with the risk-based licensing framework being implemented by the BSP.

[11] In December 2019, the BSP approved an application to establish a rural bank with a purely digital platform and majority owned by a foreign non-bank financial institution (NBFI).

[12] The BSP also adopted the 6.0 percent common equity Tier 1 (CET1), 7.5 percent Tier 1 and the capital conservation buffer (CCB) of 2.5 percent.

framework on the countercyclical capital buffer in December 2018. However, simpler standards are applied to thrift banks (TBs) and rural and cooperative banks (R/CBs) that are not subsidiaries of commercial banks. Finally, the BSP adopted the international framework for dealing with domestic systemically important banks (D-SIBs), requiring staggered implementation of higher capital buffers starting in January 2017 and enhanced the framework in 2019. As of December 2020, bank capital ratios were stable despite a pick-up in risk-weight assets and were well above the minimum thresholds set by BSP (10 percent) and the Bank for International Settlements (8 percent). These measures were complemented by an increase in the risk weight on non-deliverable forward (NDF) transactions in 2013.

Figure 1: Rising Cross-Border Bank Claims



Source: Cross-Border Financial Position Report, DSA-FSS.

The BSP also introduced liquidity standards which require banks to maintain highly liquid assets to ensure their ongoing ability to meet short-term obligations, the banking system maintains sufficient buffers to meet liquidity and funding requirements as the LCR are way above the BSP's current regulatory threshold of 100 percent. Another liquidity standard is the Net Stable Funding Ratio (NSFR) that aims to promote resilience over a longer time horizon by creating incentives for banks to fund their activities with more stable sources of funding on an ongoing basis. The general objective is to support financial stability by ensuring that funding shocks do not significantly increase the probability of distress for individual banks, a potential source of systemic risk. In March 2019, stand-alone TBs, R/CBS and non-banks with quasi-banking functions (NBQBs) were required to adopt the minimum liquidity ratio (MLR). As a result, banks opted to increase their issuances of fixed-income securities, including bonds and long-term negotiable certificates of time deposits (LTNCTDs) to better manage their funding costs. The BSP also laid down the proactive financial surveillance and reporting towards a dynamic banking system such as in supervision of conglomerates, cross-border risks and vulnerabilities tools as well as enhanced reports.

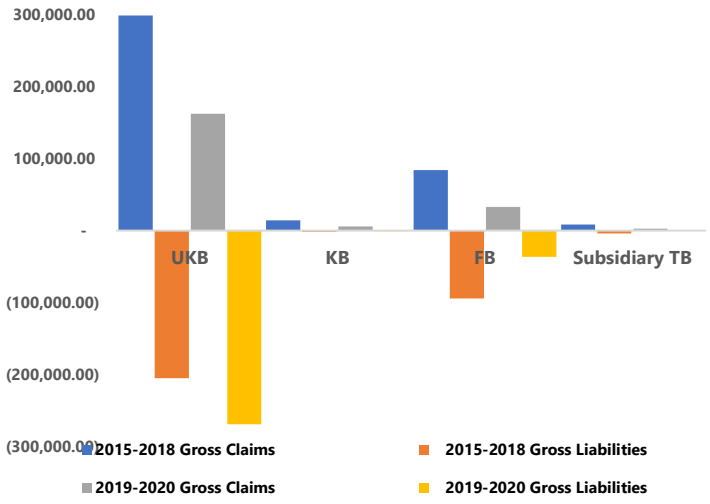
Recent trends in cross-border bank financing

The Cross-Border Financial Position Report (CBFR) of the BSP reveals how the exposures of the financial system to international spillovers are reflected in bank financial positions. The

average share of bank-level total cross-border exposures (claims and liabilities) is about 19 percent of bank assets and liabilities, mostly to service corporates and overseas Filipino workers. One factor that has affected these trends are the regulations targeting exposures to FX risks. These are regulated with separate licensing requirements to conduct FX transactions and strict limits to both positive (overbought) and negative (oversold) FX position.[13] Banks have maintained minimal overbought FX position.[14] This means that banks' FX position is primarily used to serve clients' FX requirements such as hedging for international trade businesses, and not for futures and options reselling.

About 76 percent of gross claims and liabilities have been driven by large domestic UKBs while foreign banks (FBs) account for around 20 percent (Figure 2).[15] Total liabilities from common lenders as of end-June 2020 particularly those counterparties from the United States (US) and Hong SAR fell from end-December 2019 level, based on the Common Lender Index.[16] By contrast, funding from counterparties in Japan, Euro Area, United Kingdom and Mainland China continued until June 2020. Although slower than previous quarters' year-on-year (YoY) growth rates, liabilities particularly from Mainland China grew by 28.1 percent in June 2020, following the resumption of flows largely meant to finance the Build Build Build programs by the Government.

Figure 2: Gross Cross-Border Flows Driven by Large Domestic Banks (In Mil US$)



Source: Authors; DSA-FSS.

[13] The BSP is proposing a new limit on banks' net open FX positions or overbought and oversold positions to ensure market liquidity and to discourage speculative activity. The proposal is that bank's consolidated net open FX position should not exceed 25 percent (from current rate of 20 percent) of its qualifying capital or $150 million (from the current US$50 million), whichever is lower.

[14] From December 2012 to December 2020, the net FX position to unimpaired capital of UKBs averaged 0.3 percent (overbought) (BSP 2nd Semester 2020 Report on the Philippine Financial System, BSP).

[15] Baskaya et al (2017), using credit register data for Turkey, find that large domestic banks are a main channel for transmitting shocks from capital flows to domestic credit supply.

[16] The Common Lender Index is measured using the Herfindahl-Hirschman Index (HHI). The HHI is calculated as the sum of squared market shares of squared market shares of common lenders reporting cross-border liabilities vis-à-vis Philippine banks. The Philippine banks' common lenders include the United States, Japan, United Kingdom, Euro Area (France, the Netherlands, Germany, Spain and Italy), Mainland China and Hong Kong.

Effects and responses to Covid-19 Pandemic

The data also allow us to briefly review developments prior to the Covid-19 outbreak and its impact on cross-border positions and on financial markets from March 2016 to June 2020. Strong global risk appetite and a drop in US Treasury yields supported cross-border lending to the Philippines. YoY growth of bills payable on interbank loans, repurchase and securities agreements reached its peak at 37.0 percent in September 2019. Lending to non-financial corporations grew by 32.6 percent YoY and investment in dollar-denominated debt securities increased by 47.1 percent YoY in September 2019. In March 2020, majority of Philippine UKBs' counterparties did not extend maturity period of their exposures, mainly in the form of repurchase agreements following strains in offshore dollar funding markets. This led to a reduction in cross-border financing as bills payable fell by 32.4 percent and liabilities in US dollars by 22.3 percent in June 2020. However, debt securities subject to marked-to-market valuation grew by 70.9 percent YoY while claims on non-financial sector by 8.1 percent YoY.

Some adjustments were seen in the exchange rate. The Peso-dollar rate appreciated to PhP 49.85/US$ from around PhP 51.0/US$ prior to an announcement of the enhanced community quarantine (ECQ) due to market optimism, perceived slowdown in the number of Covid-19 cases, slower inflation rate as well as the BSP's moves to ensure sufficient liquidity in the financial system following the reduction in the bank reserve requirements that started in the third quarter of 2019.[17]

However, developments in cross-border financial position affected banks' overall balance sheet. Annualized net income dropped by 33 percent in 2020, after increasing by the same rate in 2019. Foreign bank branches and subsidiaries suffered the most as average net income fell by 137 percent compared to an average decline of 20 percent for domestic banks. Both net interest income and trading income continued to post strong growth. However, impairment losses for loans and financial assets surged by 430.6 percent for all banks, weighing heavily on bank profitability. The increase in loan loss provision is expected as banks anticipate an increase in non-performing loans due to the pandemic.

Nevertheless, banks maintained their underlying resilience. Banks adjusted their total weighted assets which grew by 5.5 percent in June 2020 following a decline in assets for market risk by 18.8 percent.[18] Capital buffers remain relatively ample as bank-level CARs were above the minimum regulatory threshold. Lower capital buffers were recorded in June 2020 due to lower risk-taking activities by both domestic and foreign banks.

[17] Report on Economic and Financial Developments, 2nd Quarter 2020, BSP.

[18] Risk-weighted asset (RWA) is a bank's assets or off-balance-sheet exposures, weighted according to risk. This calculation is used in determining the capital requirement for a financial institution. In the Philippines, the RWA is the sum of credit risk-weighted assets, market risk-weighted assets, and operational risk-weighted assets.

Bank resilience also benefitted from the BSP measures to calm the short-term funding markets and from the range of initiatives to help support the flow of credit to households and business (Bayangos et al 2020). Uncertainty over the severity of the pandemic prompted market participants to shift to cash. This resulted in large sales of government securities, and a sharp increase in their yields: the five-year rate rose by 90 basis points in March 2020 from February 2020 and daily volume fell to a trading low prior to the imposition of the quarantine. The lack of buying interest in the debt paper market was also reflected in the poor market participation in the Bureau of Treasury's (BTr) auctions during the first two weeks of the ECQ (Boelsch et al 2020).

The BSP eased monetary policy and operations. From February to June 2020, the BSP reduced the overnight reverse repurchase facility (RRP) facility rate by a total of 175 basis points and reserve requirements by 400 basis points. The BSP also reduced the scale of its liquidity absorption through its open market operations (Robleza et al 2020). The BSP suspended its auctions for all tenors of the Term Deposit Facility (TDF) scheduled between 18 March 2021 and 8 April 2021, scaled back the overnight RRP volume offerings on 8 April 2020. These measures were slowly reconfigured on 15 April 2020 following the resumption of the 7-day TDF while the 14-day TDF auctions resumed on 10 June 2020 and the 28-day TDF auctions on 1 July 2020. There were also adjustments in government securities purchases in the secondary market, temporary reduction in the term spread on rediscounting loans relative to the overnight policy rate to zero. The BSP also extended extraordinary liquidity support to the National Government's (NG's) efforts to soften the impact of the pandemic on the economy in line with the provision of its Charter in the form of provisional advances to NG. All these helped ease market functioning. These were complemented by measures that enabled the BSP supervised financial institutions to extend financial relief to their borrowers in the form of more flexible and favorable lending terms, including loan restructurings.[19]

3. Data and Empirical Strategy

The three unique sets of data on bank-level cross-border financial position and balance sheet based on supervisory reports allow us to pose a number of questions. Tables 2 to 10 in Annex A present the variables and variable names used in the study. The databases are briefly described here.

Bank-level cross-border financial positions. Data are based on quarterly Report on Cross-Border Financial Position (CBFP) of 55-58 internationally active Philippine banks during the period March 2015 to June 2020. In the dataset, there are 58 respondent banks as of June 2020, 14 domestic universal or large banks (UKBs), 7 commercial banks (KBs), 26 foreign banks (FBs) and 11 subsidiary thrift banks/quasi banks (SBs). This database compiles major accounts of cross-border claims and liabilities, by counterparties and by currency. As

[19] For instance, for banks availing regulatory relief, loans of affected borrowers are excluded from the past-due and non-performing classification from 8 March 2020 until 31 December 2021.

mentioned in the previous section, the BSP requires banks to report their cross-border financial positions starting in September 2014 to provide the BSP with a comprehensive view of potential financial risks and transmission channels emanating from foreign counterparties of Philippine banks. Cross-border position refers to the asset and liability position vis-à-vis banks and non-banks located in a country other than the country of residence of the reporting banking office, which in this case, the Philippine banks. This definition is consistent with the definition of the Bank for International Settlements (BIS) in its international banking statistics. Sources and uses of bank-level gross liabilities are traced using this report. In short, the CBFP allows us to distinguish factors driving both the borrowing side (liabilities) and lending side (claims) and by type of bank or banking group.

Table 1. Summary of Descriptive Statistics, March 2015-June 2020

Variable	Description	Mean	Median	Maximum	Minimum	Std. Dev.	25th percentile	50th percentile	75th percentile
PCA	Share of gross claims to total assets	0.140	0.080	5.240	0.000	0.247	0.014	0.080	0.189
PLL	Share of gross liabilities to total bank liabilities	0.349	0.074	95.386	0.000	2.804	0.004	0.074	0.333
VIX	CBOE Volatility Index	0.248	-0.063	2.905	-0.458	0.749	-0.229	-0.063	0.502
ADVG	Average Real GDP growth of advanced economies	0.015	0.023	0.025	-0.045	0.020	0.016	0.023	0.024
OGAP	Output gap	0.997	0.986	1.136	0.882	0.063	0.946	0.986	1.053
PRD	Overnight RRP rate-Fed funds rate	0.242	0.225	0.375	0.125	0.077	0.200	0.225	0.300
RLE	Real bank lending rate	0.034	0.035	0.062	-0.006	0.017	0.020	0.035	0.045
RREP	Residential Property Price Index	1.000	0.998	1.025	0.970	0.012	0.992	0.998	1.010
REE	Real effective exchange rate (advanced economies)	0.008	0.013	0.092	-0.067	0.052	-0.044	0.013	0.060
ROA	Return on Assets	0.024	0.009	24.332	-0.428	0.712	0.002	0.009	0.013
LCR	Liquidity coverage ratio gap	3.286	1.000	243.520	-1.000	12.255	0.355	1.000	2.135
CETG	Common Equity Tier 1 ratio gap	0.384	0.066	64.378	-0.664	2.376	0.024	0.066	0.228
CCY	Credit cycle gap	1.023	1.014	1.108	0.950	0.050	0.977	1.014	1.076
PLOA	Share of cross-border loans & receivables to total assets	0.138	0.000	11.739	0.000	0.538	0.000	0.000	0.006
PDEP	Share of cross-border deposits to total liabilities	0.029	0.004	3.453	0.000	0.113	0.000	0.004	0.028

Source: Authors

Table 1 shows the descriptive statistics of the variables used in the final estimation. The main variables of interest are the shares of cross-border asset position to total bank assets (PCA) and cross-border liability position to total bank liabilities (PLL). Average PLL is higher (34.9 percent) and is significantly more volatile than average PCA (14.0 percent). The more volatile behavior of PLL can be due to abrupt movements in major sources of cross-border funding such as bills payable and deposits. Among the bank-specific characteristics, the liquidity coverage ratio gap (LCR gap or the difference between the actual LCR and LCR requirement of 100 percent) is the most volatile followed by Common Equity Tier 1 (CET)

gap (CET gap or the difference between the actual CET and the BSP regulatory threshold of 10 percent). We see large variations in the LCR gap as banks reallocate resources to comply with the LCR requirement while adjustments are made in CET gap following the outbreak of the pandemic.

Vector of controls. This dataset includes bank-specific characteristics, macro-financial indicators, and the BSP policy actions. The bank-specific data include quarter-end data on the size of a bank (relative to total bank assets), credit growth, liquidity coverage ratio (LCR), liquid assets relative to total assets, capital ratios using capital adequacy ratio (CAR) and Common Equity Tier 1 ratio to total assets, funding composition using outstanding deposits relative to total liabilities, profitability of banks using annualized net income or loss, net interest margin (NIM) and Return on Assets (ROA), and quality of bank loans using non-performing loans ratio (NPL), non-performing assets ratio (NPA), non-performing loans coverage ratio, and loan loss reserves (LLR). In the study, we consider both the actual ratios and the gap from regulatory thresholds such as in liquidity coverage ratio (gap from 100 percent regulatory threshold) and capital adequacy ratio (gap from the 10 percent regulatory threshold). In the regression exercise, we use financial reporting data on solo basis. We also include dummy variables for banks' business model or banking group.

The macro-financial indicators include changes in real GDP, inflation, monetary policy rate or overnight policy rate, bank lending rate, banking system credit cycle based on one-sided and two-sided Hodrick Prescott (HP) filter, nominal peso-dollar rate, real effective exchange rates, Chicago Board Options Exchange Volatility Index (VIX), Federal funds rate, 10-year US Treasury Notes.

Measures of BSP policy actions. This database compiles monetary policy actions by the BSP. These policy actions include adjustments in monetary policy and reserve requirements. An index of episodes of sterilization is also included. A dummy variable is assigned to a value of one (1) when an increase in gross international reserves is accompanied by a decline in net domestic assets or an increase in the BSP monetary operations and, 0 otherwise. Another measure is an index of easing policy actions on the BSP Foreign Exchange (FX) regulations. A dummy variable is assigned to a value of one (1) if the measure eases the existing FX regulations and, 0 otherwise. The measures are computed as quarterly average to match the frequency of the dependent variables in the models. In the final regression results, only the measures on FX liberalization are significant.

Estimation method. To date, there is no generally accepted framework for analyzing the drivers of cross-border bank flows and the consequent impact on domestic credit cycles. Many studies explored the use of instrumental variables and Vector Auto Regression (VAR) with a variable ordering assumption to address such a problem. Moreover, the results are sensitive to the details of model specification, notably the choice of control or instrument variables. In this study, the parameters in the models are estimated using unbalanced panel Generalized Method of Moment (GMM). This is a more appropriate empirical methodology to address the endogeneity between cross-border claims and liabilities and credit cycles with bank-specific characteristics and macroeconomic indicators. To handle cross-section

fixed effects, data are transformed into first difference and data are converted into ratios. Moreover, residuals are clustered by banks.

Robustness checks. Descriptive diagnostics tests are used to check the stability of indicators used in the study, including claims and liabilities. To check the robustness of the results, the paper used Hansen's overidentification test and the Arellano–Bond test of no second-order autocorrelation. Hansen's overidentification test checks whether the instrumental variables used in the regression are valid, since GMM uses instrumental variables. Hence, if the null hypothesis is not rejected then the instruments used in the GMM regression are valid. The Arellano–Bond test of no second-order autocorrelation tests if lags of the dependent variable or any instruments are endogenous, which would make them inappropriate instruments. Hence, if there is no second-order autocorrelation, then the instruments used are valid. We used 1 percent, 5 percent, and 10 percent levels of significance.

Empirical analysis. Equation (1) is the empirical model of the drivers of cross-border financial positions . On the left hand side, $Y_{b,t}$ represents either gross cross-border claims as share of total assets of bank b during quarter-end *t.* (see Annex A, Table 2, column 1 for results) or gross cross-border liabilities as fraction of total liabilities of bank (column 2) . On the right hand side, *External* is a vector of variables representing external conditions or push factors with lag *t-j*, and *Domestic* a vector of variables representing domestic or pull factors with lag *t-j*. There are some variables that are represented as the relative differential between global versus domestic counterparts, and thus can be regarded as a combination of push and pull factors. This group includes variable like the interest rate differential vis-à-vis the United States. Table 2 reports the results for equation (1) that exclude the domestic credit cycle variable *Ccy*, Table 5 reports results that include it. The *Ccy* is specified as the deviation of the banking system's credit from one-sided HP filter credit trend.

$$Y_{b,t} = a_b + \beta_1 External_{\,b,t-j} + \beta_2 Domestic_{\,b,t-j} + \beta_3 Ccy_{b,t-j} + \varepsilon_{b,t} \,. \qquad (eq.\ 1)$$

$Y_{b,t}$ is either the cross border liabilities of domestic banks or PLL (second column of results in Table 2), such as bond payables, bills payables, deposits and derivatives or cross-border claims of domestic banks or PCA (first column of Table 2), including investments in debt securities, loans, and liabilities such as bond payables, bills payables, deposits, derivatives. The two variables, PLL and PCA, do not control for valuation effect. A Granger causality test shows that cross-border claims and liabilities have bilateral causality, or that past movements of these two indicators help predict their future movements. All components are fraction of total assets and total liabilities. To control for credit demand that may be generated by capital flows, we include an instrumental variable on the share of cross-border loans and receivables to total bank assets in cross-border liability position (column II in Table 2) and the share of cross-border deposits to total bank liabilities in cross-border asset position (column I in Table 2).

External includes indicator of global market uncertainty or global risk aversion such as Volatility Index (VIX) of the Chicago Board Options Exchange which has proved to be an

important "push" factor of international capital flows (Bruno and Shin, 2014; Rey, 2015). We expect VIX to have a negative impact on both claims and liabilities relative to bank assets and liabilities. If the VIX increases, market sentiment deteriorates, international banks may be reluctant to lend while domestic banks may be averse to invest abroad. A recent paper by Correa et al (2021) that focuses on the risk-taking channel note that global banks that are reluctant to lend because of tightening market conditions may shift their lending to lower risk countries. This effect, however, is not explicitly considered in this specification.

Domestic includes macro-financial indicators such as growth, inflation, exchange rates, BSP policy rate and market interest rates. The cross-border liability position of banks in the destination country is expected to rise with higher domestic interest rates vis-a-vis the lender country, other things equal. Stronger growth in home country is the most prominent "pull" factor and is expected to increase the flow of cross-border loans to the country. Meanwhile, a weaker currency in the destination country may reduce the cross-border loans because it reduces the expected rate of return measured in the lender's currency – a depreciating currency makes it more difficult for borrowers to repay their external loans. By contrast, a stronger currency increases the expected rate of return measured in the lender's currency and makes it easier for borrowers to repay their external loans. It may in turn attract more inflows. In many studies, greater country risk also appears to reduce all types of capital flows considered, although the evidence is not as robust and there are some exceptions for those country risk measures that reflect increased financing needs, such as a widening current account deficit and outstanding foreign debt relative to nominal Gross Domestic Product (GDP) and a measure of macroeconomic uncertainty such as the Credit Default Swap (CDS) spread.[20]

Bank-specific characteristics, such as total assets, deposits, loan portfolio, profitability, asset quality as well as liquidity and capital buffers can be seen as indicators of the health of individual banks in the destination country. All bank-specific indicators are in shares or ratios and deviation from the regulatory thresholds such as in liquidity coverage ratio (gap from 100 percent regulatory threshold), common equity Tier 1 and capital adequacy ratio (gap from the 10 percent regulatory threshold).

We implemented a number of tests to highlight some of the factors affecting cross-border bank positions. They are posed as questions listed below.

First, does the domestic credit cycle Ccy influence the cross-border liability or asset position of domestic banks? (see Table 5). On the liability side, we expect that if financing for domestic credit is insufficient, banks will seek to supplement domestic retail and

[20] The push and pull factors applied to cross-border bank positions may be compared to explanatory variables identified in the general literature on drivers of capital flows (Koepke, 2019). With regard to external "push factors", increases in global risk aversion and in interest rates in the source countries for capital flows generally lower cross- border banking flows. Declining economic growth in these source countries lower portfolio flows (equity or debt), but the effect on banking flows is not clear. As for domestic "pull factors" it has been found that increases in domestic output growth or asset returns, and reductions in country risk indicators in the destination countries increase capital flows to these countries.

wholesale deposits by increasing funding from abroad (that is, their cross-border liability position). On the asset side, banks may decide to channel some of their available funds abroad, which may increase their cross-border assets abroad. We further expect that risks are lower to keep banks' risk-weighted assets unchanged.[21] However, a lower risk often leads to compression of risk spread.

The test is on the overall significance of β_3 in equation 1, which is implemented in Table 5. To the best of our knowledge this is the first attempt to include the domestic credit cycle as a driver of cross-border bank positions. We find *Ccy* has bilateral Granger causality with cross-border asset and liability positions. As mentioned in the previous section, the *Ccy* is specified as the deviation of the banking system's credit from one-sided HP filter credit trend. We are aware of the criticisms against the use of HP filter as a technique for determining long-run trend (Drehmann and Yetman, 2018). We use other types of filter to check the robustness of *Ccy* in the absence of a clear and conclusive technique to measure trend.

Using a decomposition of the *Ccy* [22], we remove the idiosyncratic component from *Ccy* that is related to credit demand such as riskiness of foreign borrowers, financial constraints. To control for credit demand that may be generated by capital flows, we include an instrumental variable on the share of cross-border loans and receivables to total bank assets in cross border liability position (column II in Table 5). We also use the share of cross-border deposits to total bank liabilities in cross-border asset position as an instrument variable (column I in Table 5).

In the cross-border liability position (column II), *Ccy* is assumed to be a "pull" factor that indicates the health of the banking system. A *Ccy* higher than 1 implies actual credit to be lower than the trend, an indicator that the banking system is sound as actual credit is not excessive. This may attract more bank flows and increase in cross-border liability position of banks. *Ccy* becomes a driver of the cross-border asset position. A *Ccy* higher than 1 indicates greater ability or willingness of the banking system to expand lending abroad. We complement this measure of domestic credit cycle with bank-level liquidity coverage ratio gap and CET gap to measure the health of individual banks and their viability to extend credit (Bruno and Shin, 2015a).

Second, do movements in cross-border bank flows differ by banking group? International capital flows become pervasive influences on the behavior of banks and hence on credit dynamics. On the asset side, banks in such an environment have a choice between domestic and international lending and securities. On the liability side, banks can supplement domestic retail and wholesale deposits with much greater cross-border supply, so that even for domestic banks, lending need not be constrained. We look at the response

[21] A higher risk will lead to higher risk-weighted assets and additional capital, assuming no changes in other risk components of RWA.

[22] The decomposition technique segments the series into the observed, trend, seasonal, and random (idiosyncratic) components of the series.

among domestic universal or large banks, commercial, foreign banks and subsidiary thrift banks/quasi banks to movements in cross-border flows.

Banking group *Bank* is introduced in equation (1). The test is on the overall significance of the interaction cross-border flows $Y_{b,t}$ and banking group *Bank* (UKBs and FBs) (Tables 3 and 4). The vector of controls includes external and domestic indicators driving cross-border claims and liabilities.

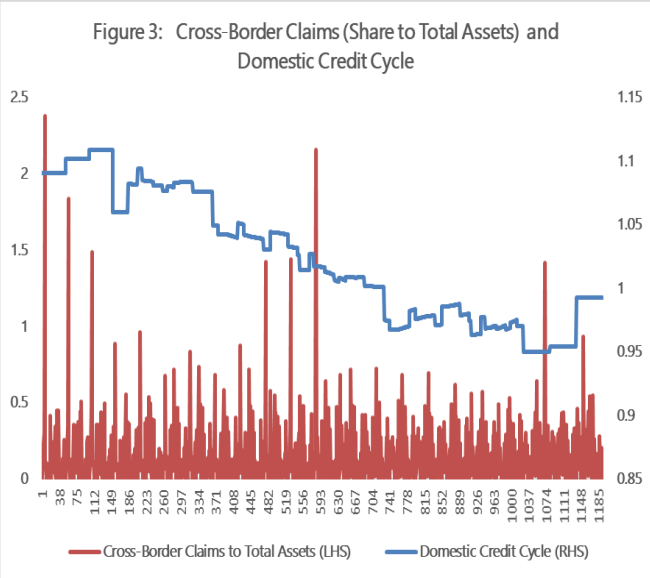
The shares of cross-border claims to total assets and cross-border to liabilities to total liabilities vary across banking groups. Overall, the share of cross-border liabilities to total liabilities (PLL) have been consistently higher than cross-border claims to total assets (PCA), indicating that cross-border bank flows have been a stable source of funding for the Philippines. From an average share of 8.2 percent from March 2015-December 2018, UKBs' total flows to total assets and liabilities went up to 16.9 percent in 2019, before it fell to 14.0 percent in June 2020. For FBs, the share dropped to 29.6 percent in 2019 from 33.9 percent in March 2015 to December 2018 to 25.3 percent in June 2020. By banking group, UKBs and FBs are the biggest intermediaries of bank flows. The share of UKBs' cross-border liabilities to total liabilities are slightly lower than share of claims to total assets while for FBs, the share of liabilities to total liabilities are higher.

By composition, 20 percent of bank claims are loans and receivables to non-financial corporations and 20 percent are investments in foreign government securities, based on latest data in June 2020. About 85 percent of bank claims are denominated in US dollars and 78 percent are claims to advanced economies while 18 percent to emerging economies. Cross-border deposits and bills payable are major sources of funding for banks. They comprise about 51 percent of total liabilities, majority of these liabilities are denominated in US dollars.

Our main motivation in this question is to capture banks' decision to allocate resources across borrowers abroad following changes in domestic monetary policy stance (BSP policy rate) and in Fed funds rate. Results show that the BSP overnight policy rate and Fed funds rate have a bilateral Granger causality and that the differential rate between the two Granger causes the cross-border asset position from March 2015 to June 2020. The average differential rate between the BSP policy rate and the Fed funds rate is about 0.24 percent from March 2015 to June 2020 (Table 1). We expect that banks will react differently to monetary policy changes. From a destination country (of bank flows), changes in domestic monetary policy stance typically depend on the impact of these changes on both the short-term funding costs paid by banks and the liquidity constraints banks face. A rise in domestic interest rate allows banks to reduce reservable deposits, if reserve requirements are binding. Banks also raise the interest rate paid on non-deposit financial instruments. Following a decline in the supply of deposits, banks may opt to cut lending or investment decisions, if access to alternative sources of funding are limited. In turn, lending and aggregate demand drop - domestically and internationally (Buch et al 2018).

The test is on the overall significance of the coefficient on the difference between the BSP policy rate and Fed funds rate in Tables 3, 5 and 7 in Annex A. We expect a negative estimate for the main coefficient of interest which implies that banks reduce claims abroad in response to a higher differential rate between the BSP policy rate and Fed funds rate.

$$Ccy_{b,t} = a_b + \beta_1 External_{b,t-j} + \beta_2 Domestic_{b,t-j} + \beta_3 Y_{b,t-j} + \varepsilon_{b,t} \qquad (eq.\ 2)$$



Source: Authors.

Third, does cross-border bank position affect domestic credit cycle? The motivation behind this question is to determine the influence of cross-border financial position Y (cross-border asset position) in shaping the dynamics of the domestic credit cycle.

Figure 3 shows a snapshot of the PCA and domestic credit cycle.[23] Credit is about 53 percent of banks' total assets as of December 2020. Results from a Granger causality test from March 2015 to June 2020 show a bilateral causality between cross-border asset position and domestic credit cycle. We see that monitoring the course of actual credit and credit cycle plays a vital role in identifying aggregate credit risk buildup through the economic cycle. It is relevant to think about the growing evidence that cross-border component of credit has the tendency to outgrow the purely domestic one during financial booms, especially those that precede financial strains (Borio, 2014). This is particularly important for highly leveraged banks and financial firms that are more vulnerable to shocks. Given the significant share of banking assets to GDP at 100.4 percent in 2020, attention to the credit cycle and its key attributes is also an important task for central banks. Our dataset can explain this as internationally active Philippine banks lend directly to non-financial corporations (NFCs) abroad. About 31 percent of banks' total cross-border claims are lending to NFCs based overseas. There is an indirect channel where domestic banks' borrowing abroad can be used to lend to non-financial borrowers. This indirect channel is not part of this specification.

We include other key attributes of domestic credit cycle (Borio 2014). These include the output gap (OGAP) (derived as the ratio of potential real GDP based on two-sided HP filter and actual real GDP), fiscal deficit relative to GDP, residential property price index (RREP), real bank lending rate (RLE), liquidity (LCR) and capital adequacy (CETG) buffers. All

[23] The PCA is unadjusted. In the final estimation, we adjust the PCA for outliers.

these variables have bilateral Granger causality with *Ccy* from March 2015 to June 2020. The test is on the overall significance of β_3 in equation (2) (Table 10 in Annex A). Domestic macroeconomic variables such as OGAP, RREP, RLE and fiscal deficit to GDP ratio are likely to affect credit through both supply and demand channels. However, we assume here that domestic macroeconomic variables mostly reflect demand factors while movements in bank characteristics are assumed to capture changes in credit supply factors. In this exercise, we include measures of bank liquidity and solvency or capital adequacy as major bank characteristics. More liquid and better capitalized banks are expected to be less constrained in their ability to expand credit.

Similar to equation 1, we adjust the idiosyncratic component of domestic credit cycle that is related to credit demand through a decomposition. We also include an instrument variable on the share of cross-border deposits to total bank liabilities in cross-border asset position.

4. Results

Tables 2 (column I on claims and column II on liabilities), 3 and 4 in Annex A present the results of the baseline scenario. Table 5 (column I on claims and column II on liabilities) shows the results with the domestic credit cycle in regression equation. In Table 10, the results present the domestic credit cycle as the dependent variable with cross-border asset (claims) position as a driver of domestic credit cycle. In the dataset, the majority of international borrowers are foreign banks and domestic commercial banks while majority of universal banks and foreign bank subsidiaries are international lenders.

In all regressions, we control for the impact of foreign exchange liberalization measures from 2015 to 2020 (*DFX).* The coefficients of *DFX* in the final regressions are positive and significant, indicating that liberalization reforms help increase cross-border financial positions. The ongoing implementation of the ASEAN Banking Integration Framework (ABIF) and the emergence of the Philippine brand in international trade are expected to complement the ongoing easing of foreign exchange regulations by the BSP.[24]

The coefficients of *DCOV* which controls for the initial effects of Covid-19 pandemic from March-June 2020 and *DST* which controls for periods of sterilization are both negative and not significant. This indicates that in the case of *DCOV*, the effects of the pandemic could be temporary. We remove these from the final regressions. We also include dummies *S1, S2, S3, S4* to account for seasonality.

Following the diagnostics and robustness checks, the results give us a number of insights on drivers of cross border bank flows and the implications of bank flows for domestic credit cycle.

[24] Report on the Philippine Financial System, 2nd Semester 2019, BSP.

First, both external or "push" and domestic "pull" factors drive cross-border liabilities and claims. Table 1, first column, shows that cross-border liabilities, real exchange rate appreciation, average real GDP growth of advanced economies[25], liquidity and capital buffers are positively related to the share of claims to total bank assets. However, the interest rate gap (the difference between the BSP overnight policy rate and Fed funds rate) has a *negative* impact on claims. This finding suggests that domestic monetary policy matters particularly for domestic UKBs in their decision to invest or lend abroad.

With regards to the share of cross-border liabilities to total bank liabilities (PLL) in Table 1, second column, VIX has a negative impact on cross-border bank liabilities (PLL). This confirms other studies' findings such as those of Choi and Furceri (2018) that global factors affect sources of bank funding. Cross-border bank liabilities are also affected by real exchange rate appreciation as well as the health of individual banks as seen in the significant coefficients of return on assets, liquidity, and capital buffers.

In the initial regressions, the CDS spread and ROA are included as drivers of PCA, however, these are excluded from the final regression as the coefficients turn out to be insignificant. Meanwhile, real GDP growth and inflation are exogenous in all regression results while VIX is exogenous in PCA.

Second, as expected, domestic universal banks drive changes in cross-border financial position. In both Tables 3 and 4, the total coefficients[26] for UKBs are consistently significant compared to FBs. Some cross-country level evidence suggests that foreign bank participation in the domestic banking sector is associated with less provision of bank credit. Foreign banks tend to have difficulties in lending to borrowers that lack the hard information to prove their creditworthiness (Cull and Peria 2010). In the case of the Philippines, the share of loans by foreign bank branches and subsidiaries to total loan portfolio of the banking system has declined from 7.2 percent in 2019 to 6.2 percent in December 2020 to 6.0 percent in February 2021.

Third, both "push" and "pull" factors drive cross border asset position. Intuitively and based on the literature, the cross-border position reflects supply of cross-border assets from Philippine banks. Results in Table 5 show that banks adjust their global portfolios by considering the relative stance of domestic monetary policy (BSP policy rate) compared to that of foreign economy (Fed funds rate). Banks, particularly Universal Banks (UKBs), reduce their portfolio abroad following increases in domestic monetary policy stance (Table 7). As mentioned in the previous section, about 85 percent of Philippine banks' cross-border claims are in US dollars and are largely channeled to advanced economies. We also find that higher differential rates between the BSP policy rate and the Fed funds rate are associated with higher bank funding cost of domestic UKBs from 2015 to 2019.[27] Average funding cost

[25] Average real GDP growth of advanced economies are based on the International Monetary Fund's World Economic Outlook (Database) which was released in April 2021.
[26] Sum of the coefficient of either PCA or PLL, DFB or DUKB and interaction term either PCA/PLL and DFB/DUKB.
[27] Defined as the ratio of interest expenses to the average interest-bearing liabilities.

of domestic UKBs increased from 1.1 percent in 2015 to 1.4 percent in 2018 to 1.9 percent in 2019 following the rise in differential rate (which peaked at 0.34 percent in 2019) between the BSP policy rate and Fed funds rate during the same period. However, FBs' average funding cost at 0.9 percent in 2019 was relatively stable and lower than that of domestic UKBs. Moreover, compared to FBs, UKBs' alternative source of funding is limited.

Meanwhile, a higher *Ccy* implies greater ability of the banking system to expand lending abroad. Bank-specific characteristics such as liquidity and capital buffers have a positive impact on asset position. Push factors such as increases in the average real GDP growth of advanced economies *(ADVG*) induce asset position of banks to increase.

Fourth, domestic credit cycles vary with cross-border claims. Results in column I in Table 6 show that domestic credit cycle has a positive influence on claims. It also reveals that the domestic cycle of foreign banks is positive and significant compared to that of domestic UKBs, an indication that the foreign banks' role as supplier of credit is important too due to relationship with their parent banks and their vast economic network abroad. Our finding differs with Baskaya et (2017) although they look at the impact of bank flows on domestic banks' lending.

Fifth, "push" factors have the biggest contribution to cross-border asset position while "pull" factors to cross-border liability position. But the contributions of both factors have declined during the early phase of the pandemic. We estimate equation (1) prior to the pandemic (2015Q1 to 2019Q4). Table 8 presents the results. We then summarize the estimates (or Beta coefficients) in Table 9 to see the relative contributions of the drivers of cross-border asset and liability positions during the pandemic (Table 5) and prior to the pandemic.

The average real GDP growth of advanced economies has the biggest influence in cross-border asset position and real exchange rate appreciation in the liability position. Among the domestic factors, capital buffer has the largest contribution in asset position prior to the pandemic and real exchange appreciation in liability position. A notable result is that the relative contribution of the interest differential declines during the initial phase of the pandemic due to the series of reduction in the BSP policy rate that started during the last quarter of 2019.

Sixth, cross-border claims have a significant positive impact on domestic credit cycle for all banks. In Table 10, results show that domestic drivers affect domestic credit cycle as well as directly by cross-border asset position of all banks. This indicates that cross-border bank flows are an important factor in shaping the dynamics of the domestic credit cycle. This also implies that the monitoring of domestic credit cycle should not only include movements of cross-border liability position but also the asset position of banks.

5. Conclusion

This paper examines the drivers and impact of cross border bank financial positions on the Philippines using a unique dataset for 55-58 internationally active banks during the period March 2015 to June 2020. The dataset allows us to go beyond the traditional focus on cross border liabilities only to include the cross-border asset position of banks in the Philippines. We find that global risk appetite, GDP growth of advanced economies, real exchange rate movements, return on assets and the spread between the domestic policy rate and the US Fed funds rate influence cross-border financial positions. We also observe that external factors have the biggest contribution to cross-border asset position while domestic factors dominate in influencing to liability position. However, contributions of both sets of factors have declined during the early phase of the pandemic. A new finding in our research is that the domestic credit cycle of the banking system in the Philippines affects the cross-border asset position of banks. This effect is stronger in foreign banks. A separate analysis of how cross border asset position affects the domestic credit cycle reveals a significant positive impact for all banks.

Our results confirm the influence of global factors in driving cross-border flows to emerging market economies. This finding implies that cross-border financial positions are open to potentially disruptive spillovers. The evidence in this paper also suggests that there is a role for conventional monetary policy when it comes to decisions by banks on portfolio rebalancing. The monetary authorities should continue to take cognizance of the effects of changes in their policy stance on portfolio decisions by different banking groups – domestic universal and commercial banks as well as foreign banks.

The results highlight the significance of using the bank-level cross-border financial position in assessing the financial performance of banks. Also, the findings underscore the use of gross bank flows between countries in determining financial conditions, rather than net flows (Borio and Disyatat 2011). Gross flows, and in particular measures of banking sector liabilities should be an important source of information for risk premiums and hence financial sector vulnerability.

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Annex A

Table 2. What Drives Cross-Border Bank Flows?

Independent variables	Dependent variable (I) Cross-Border Claims/Bank Assets (PCA)		Dependent variable (II) Cross-Border Liabilities/Bank Liabilities (PLL)	
	Coefficient	Standard error	Coefficient	Standard error
VIX (*CBOE Volatility Index*) [1/]			-0.076	(0.026) **
PCA (*Share of gross claims to total assets)*			0.091	(0.036)***
PLL *(Share of gross liabilities to total bank liabilities)*	0.067	(0.006)***		
ADVG *(Average real GDP growth of advanced economies)*	0.108	(0.203)**		
PRD (*Overnight RRP rate-Fed funds rate)*	-0.256	(0.149)*		
REE (*Real effective exchange rate)*			0.241	(0.423)***
REE(-1)	0.277	(0.136)**		
ROA (*Return on assets)*			0.151	(0.288)***
LCR (*Liquidity coverage ratio gap)*	0.005	(0.001)***		
LCR(-1)			0.045	(0.008)***
CETG (*CET 1 gap)*	0.207	(0.041)***	0.167	(0.128)***
DFX (*Dummy for FX reforms)*	0.007	(0.017)*	0.011	(0.100)*
Instrument variables (all lagged dependent and independent variables)				
Other macro-financial	Yes		Yes	
Other bank-specific characteristics	No		Yes	
Diagnostics				
Adjusted R^2	*0.618*		*0.626*	
Sample period	*2015Q1-2020Q2*		*2015Q1-2020Q2*	
Banks	*55-58*		*55-58*	
Seasonality effects	*Yes*		*Yes*	
Clustering	*Bank level*		*Bank level*	
No of observations	*1,198*		*1,198*	
Serial correlation test [2]	*0.267*		*0.119*	
Hansen test [3]	*0.012*		*0.009*	

Notes: Robust standard errors are reported in brackets. The symbols *, **, and *** represent significance levels of 10%, 5% and 1% respectively. [1] In the initial specifications, CDS spread is used. However, it was dropped from final regressions as the coefficient proved insignificant. [2] Reports p-values for the null hypothesis that the errors in the first difference regression exhibit no second order serial correlation. [3]Reports p-values for the null hypothesis that the instruments used are correlated with the residuals.

Source: Authors.

Table 3. Do movements in cross-border flows differ by banking group?

Independent variables	Dependent variable (I-FBs) Cross-Border Claims/Bank Assets (PCA)		Dependent variable (II-UKBs) Cross-Border Claims/Bank Assets (PCA)	
	Coefficient	Standard error	Coefficient	Standard error
PLL *(Share of gross liabilities to total bank liabilities)*	0.067	(0.056)***	0.211	(0.017)***
ADVG *(Average real GDP growth of advanced economies)*	0.098	(0.122)*	0.082	(0.215)*
DUKB *(Dummy for universal and commercial banks)*			0.018	0.118
DFB *(Dummy for foreign banks)*	*0.151*	*0.017*		
PLL*DUKB *(Interaction term)*			0.143	(0.018)***
PLL *DFB *(Interaction term)*	*0.141*	*0.018*		
PRD *(Overnight RRP rate-Fed funds rate)*	-0.256	0.149	-0.148	0.135
REE(-1) *(Real effective exchange rate)*	0.293	(0.119)**	0.289	(0.118)**
LCR *(Liquidity coverage ratio gap)*	0.004	(0.001)***	-0.003	(0.002)***
CETG *(CET 1 gap)*	0.192	(0.043)***	0.187	(0.042)***
DFX *(Dummy for FX reforms)*	0.005	0.015	0.005	0.015
Instrument variables (all lagged dependent and independent variables)				
Other macro-financial controls	Yes		Yes	
Other bank-specific characteristics	Yes		Yes	
Diagnostics				
Adjusted R^2	*0.296*		*0.302*	
Sample period	*2015Q1-2020Q2*		*2015Q1-2020Q2*	
Banks	*55-58*		*55-58*	
Seasonality effects	*Yes*		*Yes*	
Clustering	*Bank level*		*Bank level*	
No of observations	*1,198*		*1,198*	
Serial correlation test [1]	*0.252*		*0.200*	
Hansen test [2]	*0.002*		*0.011*	

Notes: Robust standard errors are reported in brackets. The symbols *, **, and *** represent significance levels of 10%, 5% and 1% respectively. [1]Reports p-values for the null hypothesis that the errors in the first difference regression exhibit no second order serial correlation. [2]Reports p-values for the null hypothesis that the instruments used are correlated with the residuals.

Source: Authors.

Table 4. Do movements in cross-border flows differ by banking group?

Independent variables	Dependent variable (I-FBs) Cross-Border Liabilities/Bank Liabilities (PLL)		Dependent variable (II-UKBs) Cross-Border Liabilities/Bank Liabilities (PLL)	
	Coefficient	Standard error	Coefficient	Standard error
VIX *(CBOE Volatility Index)*	-0.015	0.011	-0.056	(0.027)***
PCA (*Share of gross claims to total assets)*	-0.058	(0.137)***	0.186	(0.352)***
DUKB *(Dummy for universal banks)*			0.078	0.017
DFB *(Dummy for foreign banks)*	0.181	0.289		
*PCA*DUKB (Interaction term)*			*0.110*	*(0.413)**
*PCA *DFB (Interaction term)*	0.041	0.153		
REE *(Real effective exchange rate)*	0.477	(0.184)***	0.191	(0.460)**
ROA *(Return on Assets)*	0.067	(0.199)***	0.168	(0.366)***
LCR(-1) *(Liquidity coverage ratio gap)*	0.143	(0.184)***	0.043	(0.009)***
CETG *(CET 1 gap)*	0.179	(0.133)***	0.150	(0.212)***
DFX *(Dummy for FX reforms)*	0.005	0.015	-0.067	0.043
Instrument variables (all lagged dependent and independent variables)				
Other macro-financial controls	Yes		Yes	
Other bank-specific characteristics	Yes		Yes	
Diagnostics				
Adjusted R^2	*0.801*		*0.783*	
Sample period	*2015Q1-2020Q2*		*2015Q1-2020Q2*	
Banks	*55-58*		*55-58*	
Seasonality effects	*Yes*		*Yes*	
Clustering	*Bank level*		*Bank level*	
No of observations	*1,198*		*1,198*	
Serial correlation test [1]	*0.252*		*0.271*	
Hansen test [2]	*0.002*		*0.011*	

Notes: Robust standard errors are reported in brackets. The symbols *, **, and *** represent significance levels of 10%, 5% and 1% respectively. [1]Reports p-values for the null hypothesis that the errors in the first difference regression exhibit no second order serial correlation. [2]Reports p-values for the null hypothesis that the instruments used are correlated with the residuals.

Source: Authors.

Table 5. Does the domestic credit cycle influence the cross-border liability or asset position of domestic banks?

Independent variables	Dependent variable (I) Cross-Border Claims/Bank Assets (PCA)		Dependent variable (II) Cross-Border Liabilities/Bank Liabilities (PLL)	
	Coefficient	Standard error	Coefficient	Standard error
PLL (*Share of gross liabilities to total bank liabilities*)	-0.010	(0.011)***		
PCA (*Share of gross claims to total assets)*			0.142	(0.512)**
VIX *(CBOE Volatility Index)*			-0.055	(0.028) **
Ccy *(Banking system credit cycle gap)*	0.015	(0.090)*	0.078	(0.017)**
ADVG *(Real GDP growth of advanced economies)*	0.356	(0.160)**		
PRD *(Overnight RRP rate-Fed funds rate)*	-0.024	(0.119)**		
REE *(Real effective exchange rate)*			0.168	(0.252)***
LCR(-1) *(Liquidity coverage ratio gap*)	0.008	(0.013)**	0.018	(0.129)**
CETG (-1) *(CET 1 gap)*	0.090	(0.150)*	0.135	(0.107)***
DFX *(Dummy for FX reforms)*	0.014	0.016	0.079	(0.042)**
Instrument variables (all lagged dependent and independent variables)				
Other macro-financial controls	Yes		Yes	
Other bank-specific characteristics	Yes (Share of cross-border deposits/total bank liabilities)		Yes (Share of cross-border loans and receivables/total bank assets)	
Diagnostics				
Adjusted R^2	*0.486*		*0.512*	
Sample period	*2015Q1-2020Q2*		*2015Q1-2020Q2*	
Banks	*55-58*		*55-58*	
Seasonality effects	*Yes*		*Yes*	
Clustering	*Bank level*		*Bank level*	
No of observations	*1,198*		*1,198*	
Serial correlation test [1]	*0.113*		*0.309*	
Hansen test [2]	*0.018*		*0.009*	

Notes: Robust standard errors are reported in brackets. The symbols *, **, and *** represent significance levels of 10%, 5% and 1% respectively. [1]Reports p-values for the null hypothesis that the errors in the first difference regression exhibit no second order serial correlation. [2]Reports p-values for the null hypothesis that the instruments used are correlated with the residuals.

Source: Authors.

Table 6. Does the domestic credit cycle influence the cross-border liability or asset position of domestic banks?

Independent variables	Dependent variable (I) Cross-Border Claims/Bank Assets (PCA)		Dependent variable (II) Cross-Border Liabilities/Bank Liabilities (PLL)	
	Coefficient	Standard error	Coefficient	Standard error
PLL (*Share of gross liabilities to total bank liabilities*)	0.090	0.211		
PCA (*Share of gross claims to total assets)*			0.012	(0.389)**
VIX *(CBOE Volatility Index)*			-0.088	(0.081) **
ADVG *(Real GDP growth of advanced economies)*	0.101	(0.210)*		
Ccy (Banking system credit cycle gap)	*0.015*	*(0.090)**	*0.108*	*0.006*
DUKB (Dummy for UKBs)	*-0.014*	*(0.218)***	*-0.005*	*(0.021)**
DFB (Dummy for FBs)	*0.001*	*(0.110)**	*0.010*	*(0.011)**
*Ccy*DUKB (Interaction term)*	*0.089*	*0.038*	*-0.043*	*0.036*
*Ccy*DFB (Interaction term)*	*0.103*	*(0.213)**	*0.019*	*(0.103)**
PRD *(Overnight RRP rate-Fed funds rate)*	-0.092	(0.102)**		
REE *(Real effective exchange rate)*	0.154	(0.112)*	0.103	(0.338)***
LCR(-1) *(Liquidity coverage ratio gap*)	0.108	(0.147)**	0.040	(0.011)**
CETG (-1) *(CET 1 gap)*	0.059	(0.189)*	0.165	(0.135)***
DFX *(Dummy for FX reforms)*	0.008	0.211	0.068	0.046
Instrument variables (all lagged dependent and independent variables)				
Other macro-financial controls	Yes		Yes	
Other bank-specific characteristics	Yes (Includes control for share of cross-border deposits/total bank liabilities)		Yes (Includes control for share of cross-border loans and receivables/total bank assets)	
Diagnostics				
Adjusted R^2	*0.612*		*0.687*	
Sample period	*2015Q1-2020Q2*		*2015Q1-2020Q2*	
Banks	*55-58*		*55-58*	
Seasonality effects	*Yes*		*Yes*	
Clustering	*Bank level*		*Bank level*	
No of observations	*1,198*		*1,198*	
Serial correlation test [1]	*0.109*		*0.201*	
Hansen test [2]	*0.043*		*0.005*	

Notes: Robust standard errors are reported in brackets. The symbols *, **, and *** represent significance levels of 10%, 5% and 1% respectively. [1]Reports p-values for the null hypothesis that the errors in the first difference regression exhibit no second order serial correlation. [2]Reports p-values for the null hypothesis that the instruments used are correlated with the residuals.

Source: Authors.

Table 7. Does the domestic credit cycle influence the cross-border asset position of domestic banks?

Independent variables	Dependent variable (I-UKBs) Cross-Border Claims/Bank Assets (PCA)		Dependent variable (II-FBs) Cross-Border Claims/Bank Assets (PCA)	
	Coefficient	Standard error	Coefficient	Standard error
PLL *(Share of gross liabilities to total bank liabilities)*	-0.002	0.117	-0.004	(0.050)***
ADVG *(Real GDP growth of advanced economies)*	0.188	(0.182)**	0.123	(0.312)**
Ccy *(Banking system credit cycle gap)*	0.008	(0.323)*	0.033	(0.081)**
PRD *(Overnight RRP rate-Fed funds rate)*	*-0.380*	*(0.179)**	*-0.157*	*(0.267)***
DUKB *(Dummy for universal banks)*	*0.056*	*0.142*		
DFB *(Dummy for foreign banks)*			*-0.031*	*(0.435)**
PRD*DUKB *(Interaction term)*	*-0.216*	*(0.267)**		
PRD*DFB *(Interaction term)*			*0.125*	*(0.212)***
REE *(Real effective exchange rate)*	0.068	0.101	0.117	(0.201)***
LCR(-1) *(Liquidity coverage ratio gap)*	0.012	(0.105)**	0.019	(0.289)**
CETG (-1) (*CET 1 gap)*	0.088	(0.210)*	0.023	(0.113)***
DFX *(Dummy for FX reforms)*	0.090	(0.107)*	0.023	(0.112)*
Instrument variables (all lagged dependent and independent variables)				
Other macro-financial controls	Yes		Yes	
Other bank-specific characteristics	Yes (Includes control for share of cross-border deposits/total bank liabilities)		Yes (Includes control for share of cross-border loans and receivables/total bank assets)	
Diagnostics				
Adjusted R^2	*0.317*		*0.398*	
Sample period	*2015Q1-2020Q2*		*2015Q1-2020Q2*	
Banks	*55-58*		*55-58*	
Seasonality effects	*Yes*		*Yes*	
Clustering	*Bank level*		*Bank level*	
No of observations	*1,198*		*1,198*	
Serial correlation test [1]	*0.249*		*0.267*	
Hansen test [2]	*0.032*		*0.009*	

Notes: Robust standard errors are reported in brackets. The symbols *, **, and *** represent significance levels of 10%, 5% and 1% respectively. [1]Reports p-values for the null hypothesis that the errors in the first difference regression exhibit no second order serial correlation. [2]Reports p-values for the null hypothesis that the instruments used are correlated with the residuals.

Source: Authors.

Table 8. What drives the cross-border liability and asset position of banks prior to the pandemic?

Independent variables	Dependent variable (I) Cross-Border Claims/Bank Assets (PCA)		Dependent variable (II) Cross-Border Liabilities/Bank Liabilities (PLL)	
	Coefficient	Standard error	Coefficient	Standard error
PLL (*Share of gross liabilities to total bank liabilities*)	0.157	(0.269)***		
PCA (*Share of gross claims to total assets)*			0.187	(0.290)**
VIX *(CBOE Volatility Index)*			-0.095	(0.042) **
ADVG *(Real GDP growth of advanced economies)*	0.276	(0.056)**		
Ccy *(Banking system credit cycle gap)*	0.148	(0.280)*	0.117	(0.104)**
PRD *(Overnight RRP rate-Fed funds rate)*	-0.202	(0.031)**		
REE *(Real effective exchange rate)*			0.185	(0.102)***
LCR(-1) *(Liquidity coverage ratio gap*)	0.025	(0.005)**	0.047	(0.070)**
CETG (-1) *(CET 1 gap)*	0.098	(0.009)*	0.106	(0.125)*
DFX *(Dummy for FX reforms)*	0.018	(0.064)*	0.047	(0.041)**
Instrument variables (all lagged dependent and independent variables)				
Other macro-financial controls	Yes		Yes	
Other bank-specific characteristics	Yes (Share of cross-border deposits/total bank liabilities)		Yes (Share of cross-border loans and receivables/total bank assets)	
Diagnostics				
Adjusted R^2	*0.503*		*0.692*	
Sample period	*2015Q1-2019Q4*		*2015Q1-2019Q4*	
Banks	*55-58*		*55-58*	
Seasonality effects	*Yes*		*Yes*	
Clustering	*Bank level*		*Bank level*	
No of observations	*1,198*		*1,198*	
Serial correlation test [1]	*0.185*		*0.280*	
Hansen test [2]	*0.002*		*0.009*	

Notes: Robust standard errors are reported in brackets. The symbols *, **, and *** represent significance levels of 10%, 5% and 1% respectively. [1]Reports p-values for the null hypothesis that the errors in the first difference regression exhibit no second order serial correlation. [2]Reports p-values for the null hypothesis that the instruments used are correlated with the residuals.

Source: Authors.

Table 9. Relative Influence of Drivers of Cross-Border Asset and Liability Position, Pre-Pandemic vs During Pandemic Period

Variables	Pre-Pandemic Period (2015Q1-2019Q4)		With Pandemic Period (2015Q1-2020Q2)	
	PCA	PLL	PCA	PLL
	(I)	(II)	(III)	(IV)
"Push" or external factors	**0.433**	**0.092**	**0.346**	**0.087**
PLL (*Share of gross liabilities to total bank liabilities*)	0.157		-0.010	
PCA (*Share of gross claims to total assets)*		0.187		0.142
VIX *(CBOE Volatility Index)*		-0.095		-0.055
ADVG *(Average real GDP growth of advanced economies)*	0.276		0.356	
"Pull" or domestic factors	**0.123**	**0.338**	**0.098**	**0.321**
REE *(Real effective exchange rate)*		0.185		0.168
LCR(-1) *(Liquidity coverage ratio gap*)	0.025	0.047	0.008	0.018
CETG (-1) *(CET 1 gap)*	0.098	0.106	0.090	0.135
Interest rate differential				
PRD *(Overnight RRP rate-Fed funds rate)*	-0.202		-0.024	
Credit cycle				
Ccy *(Banking system credit cycle gap)*	**0.148**	**0.117** [a]	**0.015**	**0.078** [a]

Source: Authors.

a/ In the regression, CCY is interpreted as a "pull" factor driving the cross-border liability position.

Table 10. Do cross-border bank flows affect domestic credit cycles?

Independent variables	Dependent variable Credit Trend Based on One-Sided HP Filter/Actual Outstanding Loans of the Banking System (Ccy)	
	Coefficient	Standard error
PCA *(Share of gross claims to total bank assets)*	0.028	(0.123)**
RREP(-1) *(Residential Property Price Index)*	0.175	(0.185)**
RLE(-1) *(Real bank lending rate)*	-0.023	(0.158)**
OGAP(-1) *(Output gap based on HP-filtered potential output)*	0.058	(0.008)**
CETG (*CET 1 gap)*	0.029	(0.502)***
Instrument variables (all lagged dependent and independent variables)		
Other macro-financial indicators	Inflation, real effective exchange rate, fiscal deficit/GDP	
Other bank-specific characteristics	Yes (Share of cross-border deposits to total bank liabilities)	
Adjusted R^2	*0.789*	
Sample period	*2015Q1-2020Q2*	
Banks	*55-58*	
Seasonality effects	*Yes*	
Clustering	*Bank level*	
No of observations	*1,198*	
Serial correlation test [1]	*0.269*	
Hansen test [2]	*0.008*	

Notes: Robust standard errors are reported in brackets. The symbols *, **, and *** represent significance levels of 10%, 5% and 1% respectively. [1]Reports p-values for the null hypothesis that the errors in the first difference regression exhibit no second order serial correlation. [2]Reports p-values for the null hypothesis that the instruments used are correlated with the residuals.

Source: Authors.