

KEY POINTS

- A sudden squeeze in United States (US) dollar funding liquidity associated with the unwinding of carry trades by non-US global banks could quickly spill over into emerging market borrowers, as evidenced during the global financial crisis.
- High-income Asian economies have expanded US dollar credits to emerging Asian economies, substituting European banks following the global financial crisis. During periods of financial distress arising from high US dollar funding costs, they may be forced to curtail lending to emerging Asian economies.
- We show empirically that economies with higher exposure to US dollar funding tend to be more vulnerable to stress in the US dollar funding market. This, in turn, can trigger nonresident investors to pull out their investments, raising concerns about financial stability in emerging market economies.
- The COVID-19 pandemic provides an opportunity for regional financial cooperation to regain reform momentum to address these structural issues over the long term.

COVID-19 Exposes Asian Banks' Vulnerability to US Dollar Funding¹

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INTRODUCTION

The unfolding coronavirus disease (COVID-19) pandemic has precipitated a sharp projected slowdown in the region's growth, raising the specter of financial instability. Past episodes of financial crisis highlighted the region's financial vulnerability given greater interconnectedness in global financial markets and institutions. The rapid globalization of financial markets, substantial short-term capital flows, uneven development of local capital markets, and deficient currency hedging mechanisms—combined with the region's continued reliance on foreign borrowing and investment and insufficient crisis control mechanisms—underpinned the unfavorable dynamics of financial volatility during times of economic uncertainty and stress.

The COVID-19 pandemic has yet again unraveled global financial markets, putting Asia's financial resilience to the test. As the economic losses associated with the pandemic are set to rise, Asian stocks have plunged and short-term portfolio flows reversed sharply in March 2020, putting local currencies under severe pressure. Amid flight to safety, global demand for the United States (US) dollar soared, risking the tightening of local financial conditions in emerging Asian economies which remain heavily exposed to US dollar funding risks. While multiple factors are behind the surge in demand, it is a global rush to unwind carry trades that have driven a rise in global US dollar funding costs. The London Inter-Bank Offered Rate (LIBOR)–Overnight Index Swap (OIS) spread,

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exhibiting a pattern similar to that of the global financial crisis, indicates that interbank money markets came under severe strain due to a spike in US dollar demand during the COVID-19 pandemic (Figure 1). The cross-currency basis swap widened for a number of emerging Asian currencies and to a much greater degree than it did for the euro, British pound, or Japanese yen (Figure 2). As in past financial crises, emerging Asian financial markets and currencies have borne the heaviest brunt, reflecting their underlying structural vulnerabilities to US dollar funding risks. Measures taken by the US Federal Reserve to establish swap lines and introduce a temporary repo facility helped arrest panic on the US dollar funding market.²

Despite the improved health of Asian banks relative to past crisis periods, fundamental weaknesses remain. Post-crisis reforms have improved banking and financial soundness across many economies in Asia, with stronger regulation and supervision. However, international activity at Asian banks has increased substantially over the past 2 decades, the majority of it denominated in foreign currency (primarily in US dollar)—

Figure 1. LIBOR–OIS Spread—Global Financial Crisis versus COVID-19 (basis points)

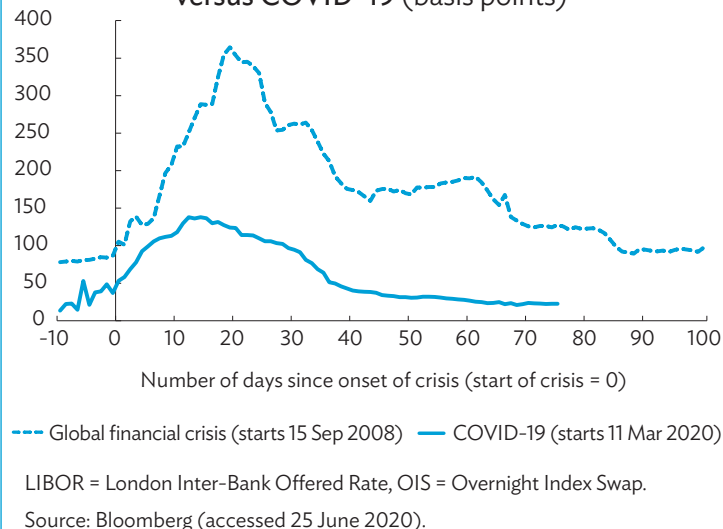
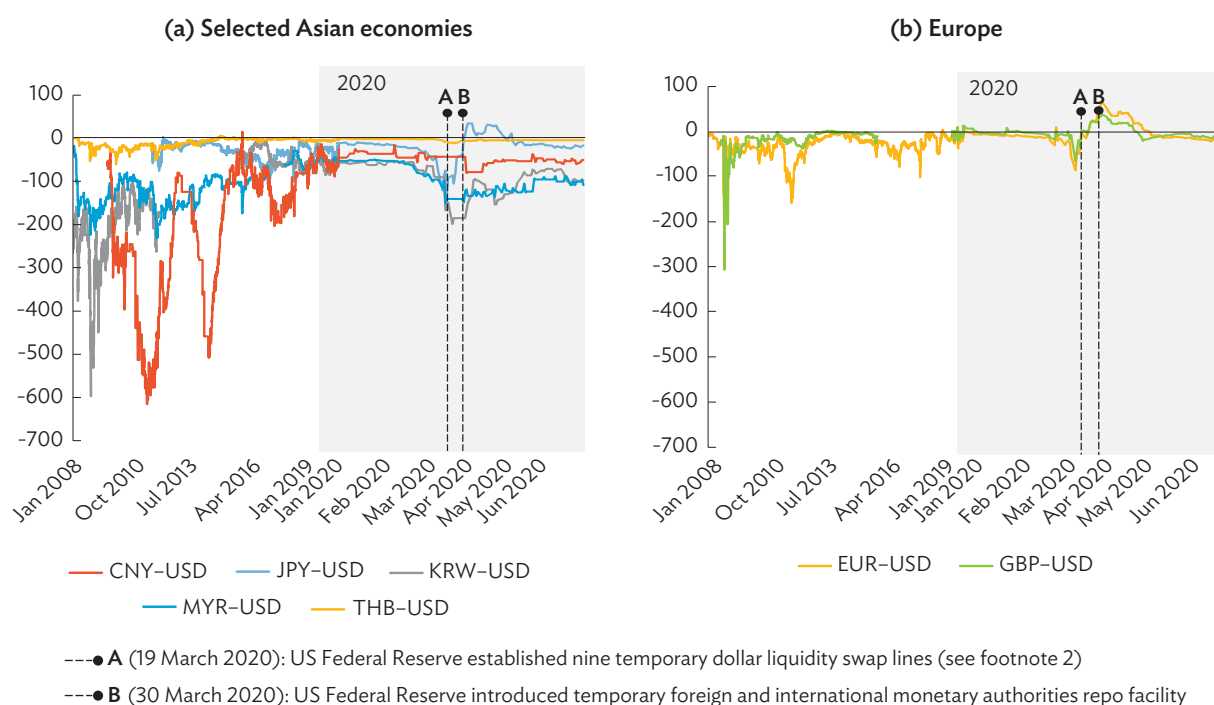


Figure 2. Cross-Currency Basis Swap (basis points)



² In addition to the US Federal Reserve's standing swap lines with major central banks, the establishment of nine temporary dollar liquidity swap lines (19 March 2020), including with regional central banks in Australia, New Zealand, the Republic of Korea, and Singapore, as well as the introduction of the temporary foreign and international monetary authorities repo facility (31 March 2020) to a broader group of foreign central banks and other international monetary authorities were effective in arresting panic on the US dollar funding market.

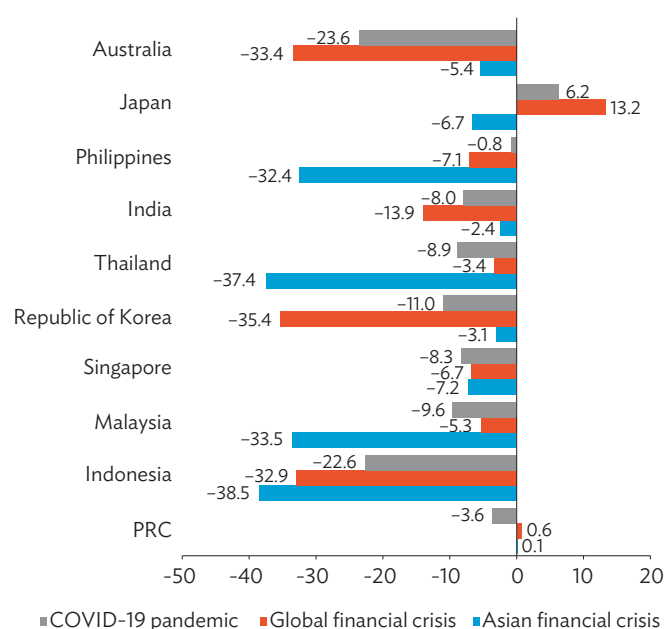
approximately 80% as of the third quarter (Q) of 2019. The cross-border banking operations of Asian banks have also led to an expansion on both the claims and liabilities sides. US dollar-denominated lending has increased across banks in high-income Asian economies while dollar-denominated borrowing ticked up across emerging Asian economies, underlining the growth in underlying US dollar funding needs of Asian banks through foreign exchange swap markets. While Asian banks' exposure to US dollar funding risks rises, currency hedging mechanisms and instruments remain underdeveloped in the region.

Emerging Asian economies' exposures to US dollar funding risks compound their external and financial vulnerabilities as a stronger US dollar increases the debt servicing costs of emerging market borrowers. The region's currencies have come under downward pressure, alongside tightening US dollar funding conditions. The COVID-19 outbreak put significant downward pressure on regional currencies, albeit at a lower magnitude than during the Asian financial crisis (Figure 3).

The region's currencies have depreciated substantially against the US dollar throughout the unfolding pandemic, registering a peak decline during the first 3 months of the pandemic of 23.6% in Australia, 22.6% in Indonesia, and 11.0% in the Republic of Korea. This poses a significant challenge to the region's financial stability. If the US dollar appreciates sharply due to its safe asset quality, emerging Asian borrowers will find it difficult and very expensive to repay their debt denominated in US dollars. A depreciation of the bilateral exchange rate against the US dollar is linked to a worsening of balance sheets of US dollar-indebted economies and tightening of financial conditions through a financial channel of the exchange rate (ADB 2017, 2019; Hoffmann, Shim, and Shin 2017, 2019).

Against this backdrop, it is fundamentally important to understand (and take action to address) Asian banks' vulnerability to US dollar funding to safeguard financial stability. The succeeding subsection of this policy brief examines the role of the US dollar as the dominant currency for international trade and financial transactions and how non-US banks would be exposed to US dollar funding risks for their financial activities. The brief then maps out the evolution of Asian banks' US dollar funding activities since the global financial crisis, assesses the implications of the US dollar funding exposure of Asian banks, and offers policy considerations for the region's policy makers.

Figure 3. Maximum Changes in Nominal Exchange Rates against the US Dollar during First 3 Crisis Months (%)



PRC = People's Republic of China.

Notes:

- Negative values indicate depreciation of local currency against the United States dollar.
- The chart reflects the largest percentage change in the foreign exchange rate during the first 3 months of a crisis. The periods are defined as follows: Asian financial crisis (2 July–2 October 1997), global financial crisis (5 September–5 December 2008), and COVID-19 pandemic (20 January–20 April 2020).

Source: Authors' calculations using data from CEIC (accessed 3 June 2020).

THE US DOLLAR REMAINS THE DOMINANT CURRENCY FOR INTERNATIONAL TRADE AND FINANCIAL TRANSACTIONS

Global reliance on short-term dollar funding proved to be the Achilles' heel of the international monetary and financial system more than a decade ago and it still is. With continuously growing international business and financial activities, non-US banks with active overseas operations (i.e., non-US global banks) have become major intermediaries of US dollar-denominated cross-border lending and international debt issuance. Given their limited access to a stable US dollar deposit base, non-US global banks tend to rely more on short-term and potentially volatile wholesale funding for their US dollar liquidity needs than global US banks.

Prior to the global financial crisis of 2008, European banks increased their US dollar-denominated lending to emerging market economies sharply. The Bank for International Settlements reports that European banks held cross-border assets denominated in US dollars reaching more than \$8 trillion in early 2008, which was 10 times more than US banks' assets denominated in European currencies (Baba, McCauley, and Ramaswamy 2009). They tapped short-term money markets for their US dollar financing needs, while their emerging market assets were not short term. When the Lehman Brothers bankruptcy hit money markets, European banks rushed to foreign exchange swap markets to turn their euro funding into US dollar funding using derivatives. The acute asymmetry in the foreign exchange swap markets in favor of the US dollar exacerbated the increase in US dollar funding costs. The subsequent massive deleveraging of European banks propagated financial stress from distressed lenders to emerging market borrowers.

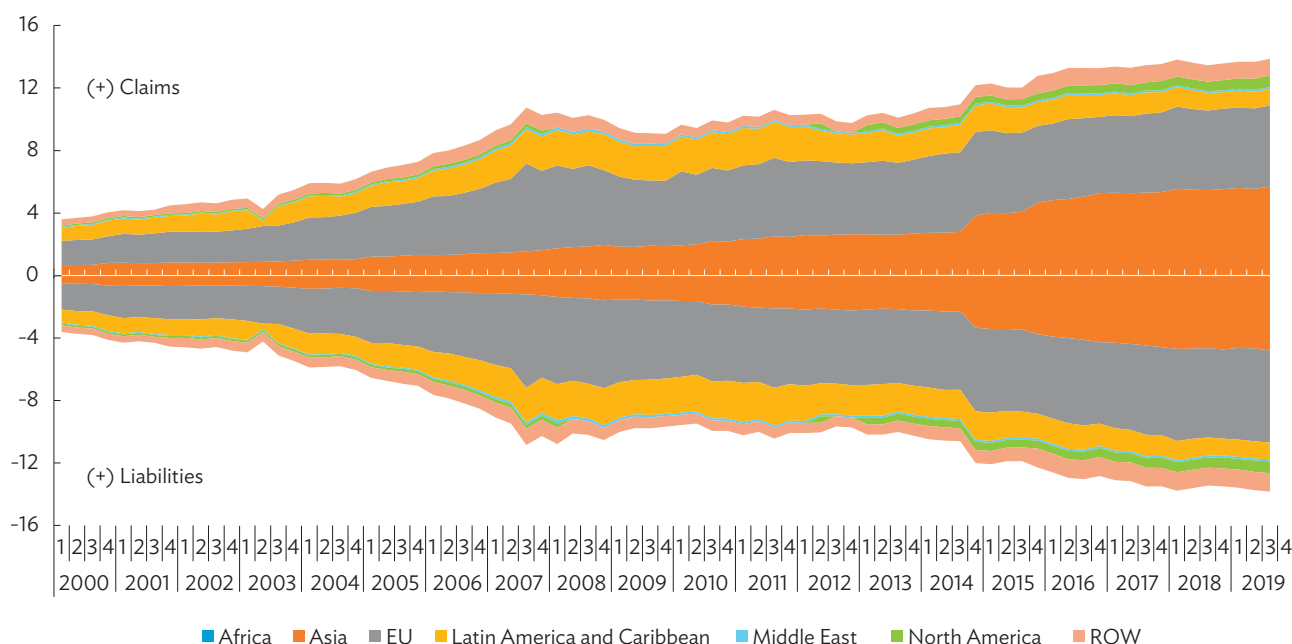
Fast forward to today, the US dollar continues to be the currency of choice for cross-border banking activity. Since the global financial crisis, non-US global banks have continued to expand their US dollar-denominated credits to governments and corporate borrowers around the world. In particular, an extended period of very low interest rates in advanced economies has reignited international lending in US dollars to emerging market borrowers. Cross-border banking activities of non-US banks have steadily increased over the past decade, with their dollar assets surpassing the precrisis peak of \$9.4 trillion in Q1 2008 to reach \$11.6 trillion in Q3 2019 (Figure 4).

The same mechanism whereby non-US global banks raise US dollar funding for cross-border lending remains a source of vulnerability for the global financial system, but the major players have changed. First, severely hit by the global financial crisis and the eurozone debt crisis, European banks have reduced their cross-border US dollar assets. Second, non-European, non-US banks—particularly in Australia, Canada, Japan, and Singapore—came to pick up the slack left by European banks (Remolona and Shim 2015;

IMF 2019). Figure 4 shows that since Q4 2016, Asia accounts for the highest share of cross-border claims denominated in US dollars by non-US global banks. Finally, as financial regulatory reforms after the global financial crisis have limited excessive risk taking and leverage of global banks, nonbank creditors have emerged to assume a greater share of dollar-denominated debt securities issued by emerging market governments and corporate borrowers. While these structural changes—combined with more stringent regulations—improved the balance sheet resilience of global banks in general, they have had unintended effects on US dollar funding markets and therefore on the vulnerabilities of emerging Asian economies, in particular.

Non-US global banks rely more on foreign exchange swap markets for US dollar funding, while prevailing currency and maturity mismatches facing them have been largely unresolved. The Bank for International Settlements estimated that foreign exchange swap contracts involving the US dollar reached around \$53 trillion at the end of June 2019, more than double the amount from the end of 2009 (Avdjiev, Eren, and McGuire 2020).

Figure 4. US Dollar-Denominated Cross-Border Bank Holdings by Non-US Banks (\$ trillion, Q1 2000–Q3 2019)



EU = European Union, ROW = rest of the world, US = United States.

Note: Africa includes South Africa (beginning in the third quarter [Q3] of 2009). Asia includes Australia; Hong Kong, China (beginning Q4 2014); India (beginning Q4 2001); Japan; the People's Republic of China (beginning Q4 2015); the Philippines (beginning Q4 2016); the Republic of Korea (beginning Q1 2005); and Taipei, China (beginning Q4 2000). EU includes Austria (beginning Q4 2013), Belgium, Cyprus (beginning Q4 2008), Denmark, Finland, France (beginning Q1 2010), Germany, Greece (beginning Q4 2003), Ireland, Italy (beginning Q2 2012), Luxembourg, the Netherlands (beginning Q4 2014), Portugal (beginning Q1 2012), Spain (beginning Q1 2014), Sweden, and the United Kingdom. Latin America and Caribbean includes the Bahamas, Brazil (beginning Q4 2002), Cayman Islands, Chile (beginning Q4 2002), Mexico (beginning Q4 2003), and Panama (beginning Q4 2002). Middle East includes Bahrain. North America includes Canada. ROW includes Bermuda (beginning Q4 2002); Guernsey (beginning Q4 2001); Isle of Man (beginning Q4 2001); Jersey (beginning Q4 2001); Macau, China (beginning Q4 2013); Norway (beginning Q1 2014); the Russian Federation (beginning Q4 2015); and Switzerland.

Source: Authors' calculations using data from Bank for International Settlements. Locational Banking Statistics by residence. <https://www.bis.org/statistics> (accessed April 2020).

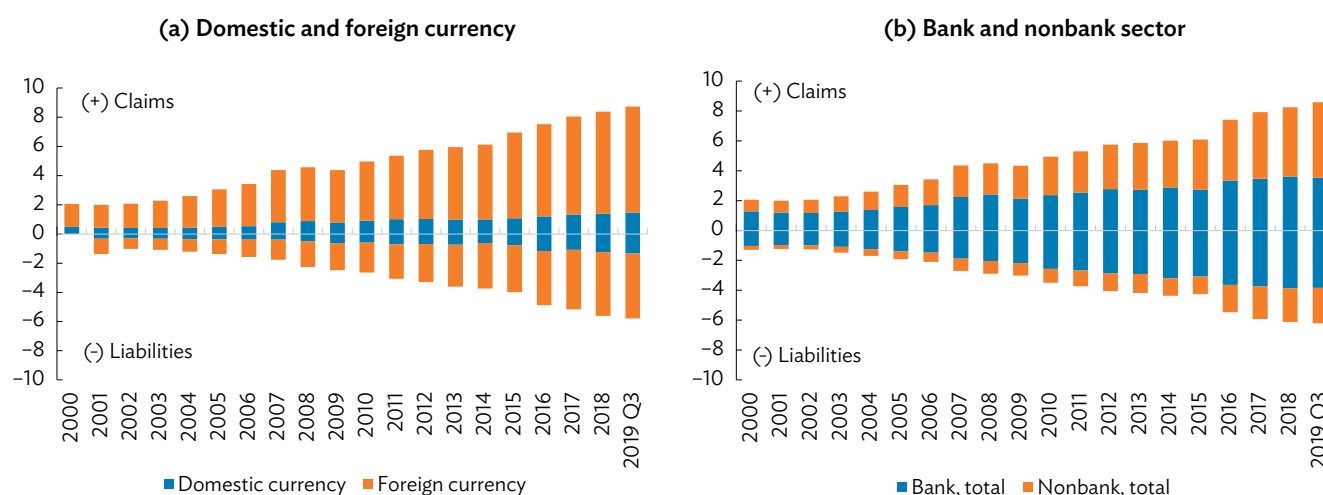
ASIAN BANKS' US DOLLAR FUNDING ACTIVITIES HAVE GROWN SINCE THE GLOBAL FINANCIAL CRISIS

More than 2 decades after the Asian financial crisis, Asian economies have reduced their reliance on external funding, one of the underlying causes of that crisis. At the root of the crisis were twin mismatches—(i) a currency mismatch as the de facto US dollar peg in crisis-affected economies triggered excessive US dollar borrowing and added to the misplaced confidence that US dollar loans could easily be repaid out of local currency earnings; and (ii) a maturity mismatch as rising foreign capital flows were primarily short term (below 1 year), unhedged with a high reliance on bank lending, and subsequently invested in long-term domestic projects, such as real estate and unproductive sectors (ADB 2017, Park et al. 2017). Asia has steadily enhanced its financial stability in the intervening years as reflected in its limited reliance on external debt and the development of long-term local currency bond markets to mobilize a domestic investor base. External debt (as percentage of gross domestic product [GDP]) has been kept low, at 21.4% as of 2006 and 25.1% as of 2019. Deeper local currency bond markets in the region underpin this strength. While these markets were only nascent before the Asian financial crisis, their sizes (as a percentage of GDP) were as much as 34.1% of GDP in the Philippines, 70.8% in Thailand, and 133.8% in the Republic of Korea as of March 2020.³

Nonetheless, Asian banks' cross-border assets and liabilities have risen considerably since the aftermath of the global financial crisis, underscoring their exposure to international US dollar funding markets. From Q4 2013 to Q3 2019, Asian banks' gross external assets nearly doubled to \$14.9 trillion (from \$7.6 trillion), while liabilities grew to \$12.3 trillion (from \$6.0 trillion).⁴ The net external asset position of Asian banks consequently improved by \$2.9 trillion during this period, with Australia; Hong Kong, China; Japan; and the People's Republic of China representing the largest contributors. Cross-border bank claims also increased considerably, by nearly \$1 trillion over the period, underpinning Asian banks' increased activity on a global scale.⁵ Japan is the largest contributor to growth in cross-border bank claims, accounting for two-thirds of the increase, underpinning the growing international importance of Japanese banks.

Asian banks have also maintained a high share of cross-border bank claims and liabilities, about 80%, denominated in foreign currency (primarily in US dollar) as of Q3 2019. Cross-border banking activities increased on both the claims and liabilities sides of Asian banks (Figure 5a). Banks in high-income Asian economies have increased their dollar-denominated international lending, while banks in emerging Asian economies have borrowed in US dollars. While some disparities are observed at the economy level, Asian economies are an aggregate net borrower in foreign currency, implying substantial rollover risks for Asian banks when US dollar funding markets freeze up.

Figure 5. Gross Cross-Border Bank Claims and Liabilities in Asia (\$ trillion)



Notes: Asia includes Australia; Hong Kong, China; India; Indonesia; Japan; Malaysia; the People's Republic of China (PRC); the Philippines; the Republic of Korea; Singapore; and Taipei, China. Data for the PRC beginning 2015, India beginning 2001, Indonesia beginning 2010, Malaysia beginning 2007, the Philippines beginning 2016, and the Republic of Korea beginning 2005. For total claims, domestic currency for Hong Kong, China (2000–2012) and Malaysia were deduced by subtracting foreign currency claims from total claims. For total liabilities, domestic currency for Hong Kong, China (2000–2012); Malaysia; and Singapore were deduced by subtracting foreign currency liabilities from total liabilities.

Source: Bank for International Settlements. Locational Banking Statistics. <https://www.bis.org/statistics> (accessed 26 March 2020).

³ Based on data from Asian Development Bank. *AsianBondsOnline*. <https://asianbondsonline.adb.org> (accessed 1 June 2020).

⁴ For 13 Asian economies with available data for both Q4 2008 and Q3 2019: Armenia, Australia, Bangladesh, Cambodia, Fiji, Georgia, India, Japan, Kazakhstan, Kyrgyz Republic, New Zealand, the Republic of Korea, and Timor-Leste.

⁵ Additional information on Asian economies' cross-border banking activities is available online in Appendix 1: <https://aric.adb.org/usd-funding-appendix>.

This also implies a substantial increase in underlying US dollar funding needs for Asian banks through foreign exchange swap markets.

In line with global trends, Asian banks have also been increasingly engaged with nonbank counterparts in cross-border banking activities. In Q3 2019, 58% of Asian banks' claims and 40% of their liabilities were on nonbanks (Figure 5b). While the amount of cross-border activities vis-à-vis foreign banks remained largely stable in recent years, activities with nonbanks have ballooned. This in turn exposes vulnerabilities of the Asian banks, in that large global nonbank investors may pull out capital from emerging market economies suddenly during periods of financial turbulence. Globally, banks are generally healthier as banking regulations have been tightened since the global financial crisis including the implementation of Basel III standards on capital adequacy, stress testing, and liquidity risk management. But nonbank financial institutions are not subject to the same standard prudential regulation and supervisory framework, and their activities and risk profiles remain unclear to financial regulators. Therefore, it might be more difficult to monitor their financial decisions.

IMPLICATIONS OF ASIAN BANK EXPOSURE TO US DOLLAR FUNDING

High and growing exposure—both in nominal and relative terms—to US dollar funding by global non-US banks remains a source of structural financial vulnerability in the global banking system. Maggiori, Neiman, and Schreger (2019) document a global surge in US dollar use and simultaneous decrease in the use of the euro following the global financial crisis. This pattern of growing US dollar dominance and attendant decline of the euro is evident across multiple dimensions of international currency use. This includes in the denomination of internationally traded corporate and sovereign bonds, in the invoicing of international trade, in the trading volume of foreign exchange, in the currency composition of central bank reserves, and as an anchor or reference currency for countries with pegged or managed exchange rates. McCauley, McGuire, and Sushko (2015) also point to the rapid ascent of US dollar credit among emerging market economies, highlighting the emergence of a “dollar mountain” or growing stock of US dollar credit among non-US banks.

While emerging market economies increasingly issue bonds denominated in domestic currency, risks of currency mismatches have been transferred to international lenders and therefore prevail. Emerging market economies have shifted toward local currency bonds in long maturities for their financing needs over the past couple of decades, largely motivated by government efforts to overcome an inability to borrow in local currency from

abroad—the “original sin”—at the root of the emerging market economy financial crises of the 1990s (Eichengreen, Hausmann, and Panizza 2005). Despite this shift, emerging market economies have been subject to sudden stops in capital flows and sharp depreciation of their currencies under subsequent crisis episodes, including the unfolding COVID-19 pandemic. Hoffmann, Shim, and Shin (2020) note that local currency bonds now dominate the share of outstanding bonds in emerging market economies.⁶ Moreover, they point to the emergence of an “original sin redux” as foreign ownership in local currency bonds has risen. As emerging market corporate borrowing from international lenders is increasingly in local currencies, the risk of currency mismatch is now transferred to the lender's balance sheet. The currency mismatch arises as lenders with foreign currency assets maintain obligations in local currency (for instance, pension funds). This is also because global investors often choose not to hedge against currency risks when investing in emerging market economy local currency bonds in expectation that appreciating emerging market economy currencies during favorable economic conditions would amplify gains. The flipside of this is that a depreciating emerging market currency erodes the capital gains of foreign investors, and may trigger capital outflows, which would deteriorate domestic financial conditions through increased emerging market local currency bond spreads. This vulnerability across emerging market economies is rooted in a very narrow and weak local institutional investor base, which leads to these economies' heavy reliance on foreign investment.

In the event of a global US dollar liquidity shortage, higher US dollar funding costs have implications for financial stability, while emerging market borrowers can be vulnerable to the stress in the global US dollar funding market through cross-border banking networks. The International Monetary Fund (2019) highlights how these factors played a role in the lead-up to the global financial crisis. And this high volume of US dollar lending by banks outside of the US and the heavy reliance on short-term and volatile wholesale funding have continued. In the event of global US dollar liquidity shortage, one emergency facility would be to tap cross-currency swaps. In the cross-currency basis swap contract,⁷ the party that borrows US dollars (the non-US counterpart) often pays a premium, reflecting the excess demand for US dollars and thus a deviation from the covered interest rate parity condition. The cross-currency basis swap widens during times of financial stress, reflecting the high premium associated with excess demand for US dollars. Higher dollar funding costs imply lower bank profitability, deteriorating financial conditions in domestic banking sectors, a reduction in the ability of banks to provide US dollar credit, and higher banking sector default, among other things. The negative effect of tighter US dollar funding conditions on financial stability

⁶ Maggiori, Neiman, and Schreger (2018) note that investors hold a substantial share of their bond portfolios in domestic currency as corporates increasingly issue bonds in local currencies. However, foreigners tend to invest in bonds that are denominated either in their own domestic currency or in US dollars.

⁷ A cross-currency basis swap agreement is a contract between A and B in which A borrows one currency from B and simultaneously lends the same value of another currency, at current spot rates, to B. For example, at the start of the contract, A borrows US dollars (USD) from and lends euros (EUR) (the same value to USD at the spot exchange rate) to B. During the contract period, A receives EUR Libor+ α from and pays USD Libor to B, where α is the price of the basis swap, agreed upon by the counterparties at the start of the contract. When the contract expires, A returns USD to B, and B returns EUR to A, at the same spot exchange rate as of the start of the contract.

can be amplified in those economies with greater exposure to US dollar funding (IMF 2019). Financial stress for global non-US banks can also spill over to emerging market borrowers via cross-border banking networks.⁸ Emerging market economies are particularly exposed to the vulnerabilities accompanying declining US dollar cross-border lending, as their access to other sources of US dollar borrowing or to alternative currencies is limited (IMF 2019).⁹

An empirical analysis not only reveals that the exposure of the domestic banking system to US dollar funding is significantly and positively associated with a widening cross-currency basis

swap, but it also amplifies the effect of financial stress on the cross-currency basis swap. Against the backdrop of a rising cross-currency basis swap premium during the COVID-19 pandemic, we estimate the determinants of 19 currencies' cross-currency basis swap.¹⁰ Table 1 suggests that emerging market economies, in general and in combination with crisis episodes, pay a higher premium in the cross-currency basis swap. The results show the significantly positive coefficients of the financial stress index¹¹ on the cross-currency basis swap in all model specifications, implying that an increase in financial stress leads to higher US dollar funding costs. We also find that the US dollar-denominated shares of liabilities

Table 1. Impact of US Dollar Share in Banking Activities on Cross-Currency Basis Swaps (Regression 1)

| Dependent variable: Cross-currency basis swap (negative) | | | | | | | |
|--|-----------------------|-----------------------------------|-----------------------|-----------------------|-----------------------|--------------------------|-----------------------|
| | | USD Share in Assets + Liabilities | | USD Share in Assets | | USD Share in Liabilities | |
| Regressors | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| GDP growth | -0.263 (0.679) | -0.313 (0.687) | -0.383 (0.706) | -0.281 (0.678) | -0.183 (0.678) | -0.352 (0.673) | -0.559 (0.708) |
| FSI | 6.073*** (1.731) | 6.057*** (1.755) | 5.769*** (1.664) | 6.218*** (1.749) | 6.138*** (1.764) | 5.963*** (1.739) | 5.504*** (1.551) |
| USD bank holding variable (see above) | | 3.354* (1.796) | 5.556** (2.209) | 2.174 (1.560) | 3.818** (1.758) | 3.493* (1.983) | 5.490** (2.440) |
| FSI * USD bank holding variable (see above) | | | 5.040** (2.032) | | 3.541*** (1.159) | | 4.991** (2.517) |
| EME | 114.460*** (7.241) | 114.780*** (7.238) | 119.470*** (6.915) | 114.270*** (7.246) | 117.630*** (7.263) | 115.150*** (7.203) | 119.280*** (6.957) |
| Crisis | -0.440 (4.881) | -0.972 (5.832) | -6.170 (6.770) | -2.356 (5.268) | -6.146 (5.452) | -0.828 (5.803) | -5.214 (6.698) |
| EME * crisis | 37.274*** (12.684) | 35.396*** (12.845) | 38.454*** (13.124) | 37.321*** (12.662) | 39.828*** (12.767) | 35.345*** (12.839) | 37.704*** (12.924) |
| Constant | -5.385** (2.148) | -3.484 (2.636) | -4.939** (2.481) | -3.372 (2.791) | -4.593* (2.738) | -4.354* (2.354) | -5.433** (2.261) |
| Currency fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| R-squared | 0.672 | 0.675 | 0.682 | 0.672 | 0.676 | 0.675 | 0.684 |
| Observations | 788 | 782 | 782 | 788 | 788 | 783 | 783 |

EME = emerging market economy, FSI = financial stress index, GDP = gross domestic product, USD = United States dollar.

Notes: USD-denominated bank holdings refer to the total cross-border and local USD-denominated bank holdings. The dependent variable is the cross-currency basis swap between the local currency and US dollar, in basis points multiplied by -1, covering 19 currencies. The FSI measures the degree of financial stress in four financial markets—banks, foreign exchange, equity, bonds—in each country. Each USD bank holding variable is standardized across the sample set. If data for USD bank holdings share are not available, data for foreign currency bank holdings share are used. Crisis refers to the crisis periods across the sample period. Additional information on the underlying data is provided online in Appendix 2: <https://aric.adb.org/USD-funding-appendix>. Columns (1) – (7) are estimated by pooled ordinary least squares. The sample period is from Q4 1998 to Q3 2019 for columns (1), (4)–(5), and Q2 2000 to Q3 2019 for (2) – (3), and (6) – (7). Numbers in parentheses are robust standard errors. The asterisks denote significance levels: *** at 1%; ** at 5%; and * at 10%.

Source: Authors' calculations.

⁸ Relatedly, Park and Shin (2020) find that financial volatility in advanced economies during the global financial crisis spilled over to emerging market economies through interbank contagion.

⁹ Further evidence of the linkages between dollar funding conditions and macrofinancial conditions are documented in Bruno and Shin (2015); Hui, Lo, and Chau (2018); Hofmann, Shim, and Shin (2017); and ADB (2019).

¹⁰ We use 19 currencies with cross-currency basis swap data against the US dollar, 8 of which are currencies of economies in Asia, namely: Australian dollar, Hong Kong dollar, Indian rupee, peso (the Philippines), ringgit (Malaysia), Singapore dollar, yen (Japan), and won (the Republic of Korea). Non-regional currencies are the following: Brazilian real, Canadian dollar, Danish krone, euro, Mexican peso, Norwegian krone, pound sterling (the United Kingdom), Russian ruble; South African rand, Swedish krona, and Turkish lira.

¹¹ The financial stress index is a composite index that measures the degree of financial stress in financial markets. It is composed of five components: banking sector beta (a measure of banking sector stress); equity market returns; equity market volatility; sovereign debt spreads; and exchange market pressure index. See Park and Mercado (2014).

(column 6) or both assets and liabilities combined (column 2) in the domestic banking system are associated with a higher cross-currency basis swap premium even as financial stress is controlled for. What is more, for a given level of financial stress, a higher exposure to US dollar funding risks amplifies the effect of the financial stress index on the respective economy's US dollar funding costs, as captured by the significantly positive interaction effect of the two variables (columns 3, 5, and 7). The findings also show that the US dollar-denominated share of the liabilities amplifies the effect of the financial stress index on the cross-currency basis swap marginally more than that of the assets, suggesting higher vulnerability of emerging market borrowers to the US dollar funding risks.

A widening in the cross-currency basis swap is also significantly and positively related to nonresident capital outflows, especially driven by debt and bank flows.

An empirical analysis of 39 economies¹² to assess the effects of the cross-currency basis swap on nonresident capital outflows reveals a statistically significant and positive association, with debt and bank outflows being particularly affected by a widening cross-currency basis swap. The results suggest global investors withdraw capital from economies that face higher US dollar funding costs, particularly when global US dollar liquidity conditions deteriorate. For debt and bank outflows, the effects are significant even when key push and pull factors in capital flows are controlled for.

Table 2. Impact of Cross-Currency Swap Basis on Nonresident Capital Outflows (Regression 2)

| Regressors | Dependent variable: Nonresident capital outflows | | | |
|--------------------------------------|--|----------------------|----------------------|----------------------|
| | All (1) | Debt (2) | Equity (3) | Bank (4) |
| Cross-currency basis swap (negative) | 0.274*** (0.0900) | 0.364*** (0.0700) | 0.0450 (0.0005) | 0.259*** (0.0900) |
| Pull Factors | | | | |
| GDP growth | -0.028*** (0.006) | -0.021*** (0.006) | -0.025** (0.011) | -0.016** (0.007) |
| Inflation | -0.027*** (0.007) | 0.012* (0.006) | 0.001 (0.007) | -0.027*** (0.008) |
| Interest rate differential | 0.326 (0.530) | 0.240 (0.640) | 0.094 (0.510) | 0.655 (0.670) |
| Exchange rate | -0.479** (0.236) | -1.034*** (0.259) | 0.709*** (0.239) | -0.176 (0.281) |
| Push Factors | | | | |
| US GDP growth | 0.013 (0.015) | 0.085*** (0.019) | 0.036*** (0.014) | 0.004 (0.016) |
| US debt spread | -0.170 (0.125) | -0.002 (0.122) | -0.337*** (0.109) | -0.060 (0.136) |
| VIX | 0.016*** (0.006) | 0.006* (0.004) | 0.015*** (0.004) | 0.015** (0.007) |
| Constant | 0.081 (0.222) | 0.172 (0.257) | -0.828*** (0.213) | -0.102 (0.274) |
| Country fixed effects | Yes | Yes | Yes | Yes |
| R-squared | 0.195 | 0.171 | 0.439 | 0.057 |
| Observations | 2,081 | 1,959 | 1,994 | 1,939 |

GDP = gross domestic product, US = United States, VIX = Chicago Board of Exchange Volatility Index.

Notes: The dependent variables are standardized across the sample set and multiplied by -1. They are (i) the sum of portfolio and other investment nonresident capital flows, (ii) the portfolio debt nonresident capital flows, (iii) the portfolio equity nonresident capital flows, and (iv) the bank nonresident capital flows. Cross-currency basis swap refers to the cross-currency swap between the local currency and US dollar, in basis points x 100, multiplied by -1. Interest rate differential refers to the difference between the domestic policy rate and US policy rate, multiplied by 100. Exchange rate refers to the bilateral exchange rate between the US dollar and the local currency. An increase denotes an appreciation of the domestic currency. US debt spread refers to the difference between the 10- and 2-year government bonds. Additional information on the underlying data is provided online in Appendix 2: <https://aric.adb.org/usd-funding-appendix>. Columns (1) – (4) are estimated by pooled ordinary least squares. The sample period is from Q3 1998 to Q4 2019 and consists of 39 economies. Numbers in parentheses are robust standard errors. The asterisks denote significance levels: *** at 1%; ** at 5%; and * at 10%.

Source: Authors' calculations.

¹² Data of 39 economies are analyzed, 10 from Asia—Australia; Hong Kong, China; India; Japan; Malaysia; New Zealand; the Philippines; the Republic of Korea; Singapore; and Thailand. Non-regional economies are Austria, Belgium, Brazil, Canada, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Mexico, the Netherlands, Norway, Portugal, the Russian Federation, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Turkey, and the United Kingdom.

As shown above, this is particularly relevant for financial stability in emerging market economies during crisis episodes with elevated US dollar exposure.

A squeeze in the global US dollar liquidity conditions can elevate the risks to financial stability in emerging Asian economies. A sudden squeeze in US dollar funding liquidity associated with unwinding of carry trades by non-US global banks can quickly spill over to emerging market borrowers, as evidenced during the global financial crisis. As discussed above, the empirical findings confirm that those countries with higher exposure to US dollar funding tend to be more vulnerable to stresses in the global US dollar funding market, as proxied by the cross-currency basis swap. An increase in US dollar funding costs may also trigger an increase in capital outflows by nonresident investors, underpinning how the exposure of Asian banks' to US dollar funding exacerbates capital flow and exchange rate volatility in emerging Asia (Figure 6).

During periods of financial stress, emerging market borrowers are typically vulnerable to capital flow and exchange rate volatility. A depreciating local currency against the US dollar further decreases an economy's balance sheet capacity, due to an increase in the

value of (US dollar-denominated) liabilities relative to the asset side, tightening local financial conditions.

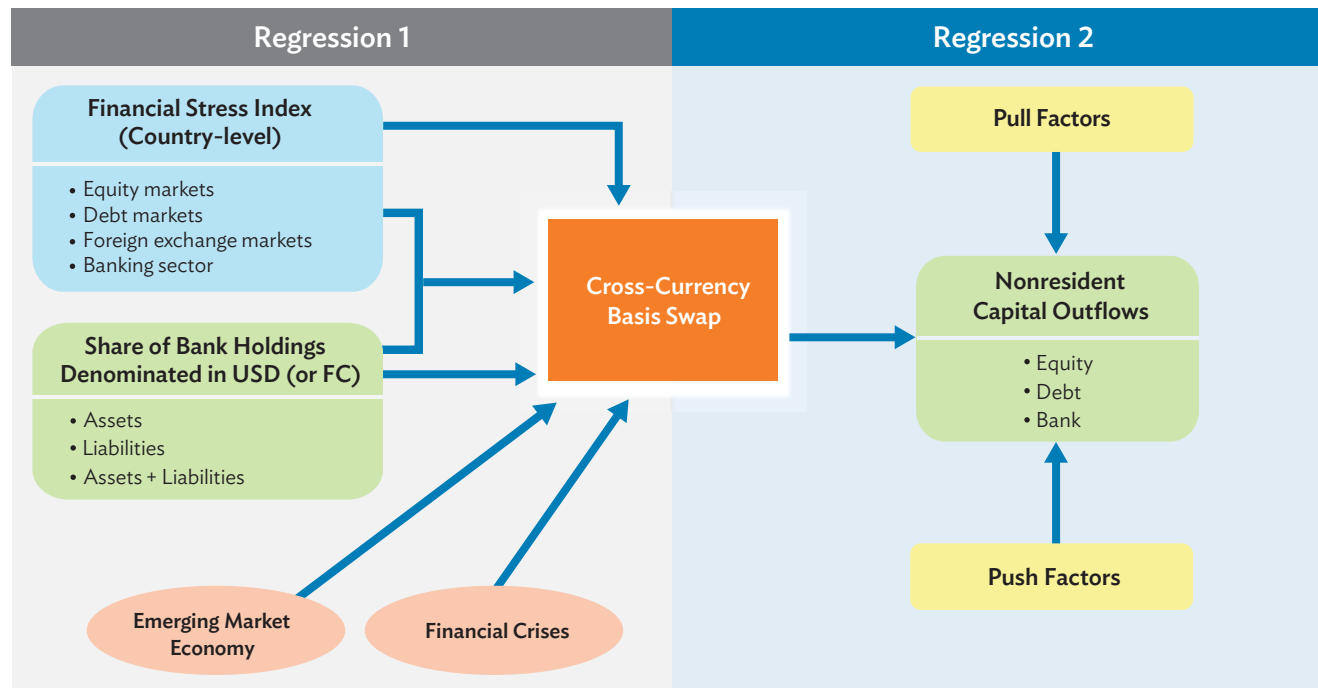
Finally, some high-income Asian economies have now substituted European banks in US dollar credit expansion to emerging Asian economies. When high-income Asian economies face financial distress arising from high US dollar funding costs, they might be forced to curtail their lending to emerging Asian economies, amplifying and propagating financial shocks to the regional economies.

POLICY CONSIDERATIONS FOR ASIA

Regional policy makers need to remain vigilant against the potential impact of COVID-19 on financial stability through better management of macrofinancial policies and strengthening of global and regional financial safety net arrangements.

First, the current policy priority is to sustain market confidence and ensure adequate liquidity. Containment efforts and stimulus packages by central banks and governments of large scale can help significantly decrease the probability of recession.¹³

Figure 6. Determinants of the Cross-Currency Basis Swap and Effect on Nonresident Capital Outflows



FC = foreign currency, USD = United States dollar.

Source: Authors' compilation.

¹³ ADB estimates the global impact of COVID-19 would range between \$5.8 trillion and \$8.8 trillion (6.4% to 9.7% of global GDP), with Asia accounting for about 30% of the overall decline in global output, depending on the length of containment measures. It also shows that policy interventions can significantly soften the impact of COVID-19—reducing it by 30%–40% (Park et al. 2020).

Maintaining macrofinancial policies that are supportive of the economy and markets is key. To mitigate the stress on the banking sector and credit markets, central banks must be ready to provide ample liquidity and take necessary actions to avoid massive defaults, especially by small businesses and household sectors. Some Asian central bankers have already intervened in the repo market or purchased domestic bonds to provide liquidity, including bond purchase programs in the Philippines and Thailand.

Second, while the region's macrofinancial positions remain sound, policy makers should remain vigilant against the risk of financial turmoil.

Across the region, reforms after the Asian financial crisis and global financial crisis have contributed significantly to the adoption of sound macroeconomic policies and adequate foreign exchange reserves, which has helped maintain economic and financial stability during the COVID-19 crisis. However, multiple risks remain that can lead to a financial crisis, including rising debt and debt-servicing burdens on household and corporate sectors, a buildup of financial fragility in the banking system, disruptions in global US dollar funding markets, sudden stops in capital flows, and a sharp rise in public spending and collapse in revenues. Authorities should continue monitoring the development of macrofinancial conditions in their respective economies with sound macroprudential policies in place and keep inflation expectations well anchored. Maintaining adequate foreign exchange reserves also helps support market confidence and financial stability, while bilateral swap lines with the Fed also help arrest market panic at a time of extreme financial volatility.

Third, an orderly exit from fiscal and monetary stimulus is as important as the stimulus itself to maintain financial stability.

Governments and international organizations need to design and implement an exit strategy to carefully navigate the transition from extra stimulus to normal economies in an orderly way to ensure economic and financial stability. As the pandemic is contained and financial conditions of distressed firms and households normalize, an orderly exit from the emergency financial relief should be carefully managed to avoid large corporate debt overhang and excessive burdens on the banking sector. Large fiscal stimuli and increased borrowing in developing countries can be a source of financial instability in the post-COVID-19 period. There should be a careful review of debt sustainability and a gradual unwinding of extraordinary policy support and budget expansion over the medium to long term.

Fourth, Asian economies need to deepen regional cooperation to strengthen regional financial safety nets and improve financial resilience.

Reforms after the Asian financial crisis and regional cooperation efforts under the ASEAN+3 initiatives contributed to stronger regional financial safety nets through (i) the Chiang Mai Initiative Multilateralization to provide emergency dollar liquidity, (ii) the ASEAN+3 Macroeconomic Research Office for macrofinancial surveillance; and (iii) deepening of local currency capital markets. Expanding and strengthening the Chiang Mai Initiative Multilateralization and its capacity can shore up defense against US dollar liquidity shortages. The surveillance capacity of the ASEAN+3 Macroeconomic Research Office can also be strengthened to help detect and prevent any buildup of financial vulnerabilities.

Fifth, the region should continue developing and nurturing vibrant local currency bond markets to help address the currency and maturity mismatches of Asian financial systems.

The ASEAN+3 Asian Bond Markets Initiative has helped promote the development of regional capital markets. Greater availability of local currency long-term securities can reduce short-term US dollar funding needs. Under the initiative, authorities have significantly improved national regulatory frameworks, developing market infrastructure, and promoting the issuance of—and demand for—bonds denominated in local currencies. Further efforts should be made to increase the size of and liquidity in secondary markets, refine and upgrade supporting market infrastructure, broaden the institutional investor base, and facilitate cross-border issuance, trading, and settlements for more integrated regional capital markets (Park 2017).

Finally, persistent and big demand for US dollar funding by non-US banks reveals fundamental issues in the current international monetary system.

The use of a single national currency (the US dollar) as an international reserve currency is inherently unstable. The global rush for the US dollar at any sign of market turbulence will easily swamp global US dollar funding markets, no matter how big daily foreign exchange swap transactions can be. Efforts to redesign the global financial architecture should embrace renewed discussion of the reform of the international reserve system to include multiple currency units down the road.

REFERENCES

- Asian Development Bank (ADB). 2017. *Asian Economic Integration Report 2017: The Era of Financial Interconnectedness—How Can Asia Strengthen Financial Resilience?* Manila.
- . 2019. Exchange Rates Affect Domestic Financial Conditions through Trade and Financial Channels. In ADB. *Asian Development Outlook 2019: Strengthening Disaster Resilience*. Manila.
- Avdjiev, S., E. Eren, and P. McGuire. 2020. Dollar Funding Costs during the COVID-19 Crisis through the Lens of the FX Swap Market. *BIS Bulletin*. No. 1. Basel: Bank for International Settlements.
- Baba, N., R. McCauley, and S. Ramaswamy. 2009. US Dollar Money Market Funds and Non-US Banks. *BIS Quarterly Review*. March. Basel: Bank for International Settlements.
- Bruno, V. and H.S. Shin. 2015. Capital Flows and the Risk-Taking Channel of Monetary Policy. *Journal of Monetary Economics*. 71: 119–132.
- Eichengreen, B., R. Hausmann, and U. Panizza. 2005. The Mystery of Original Sin. In B. Eichengreen and R. Hausmann, eds. *Other People's Money: Debt Denomination and Financial Instability in Emerging Market Economies*. Chicago: The University of Chicago Press.
- Hoffmann, B., I. Shim, and H.S. Shin. 2017. Sovereign Yields and the Risk-Taking Channel of Currency Appreciation. *BIS Working Papers*. No. 538. Basel: Bank for International Settlements.
- . 2019. Bond Risk Premia and the Exchange Rate. *BIS Working Papers*. No. 775. Basel: Bank for International Settlements.
- . 2020. Emerging Market Economy Exchange Rates and Local Currency Bond Markets amid the COVID-19 Pandemic. *BIS Bulletin*. No. 5. Basel: Bank for International Settlements.
- Hui, C.H., C.F. Lo, and P.H. Chau. 2018. Exchange Rate Dynamics and US Dollar-Denominated Sovereign Bond Prices in Emerging Markets. *The North American Journal of Economics and Finance*. 44: 109–128.
- International Monetary Fund (IMF). 2019. Banks Dollar Funding: A Source of Financial Vulnerability. In IMF. *Global Financial Stability Report: Lower for Longer*. Washington, DC.
- Maggiori, M., B. Neiman, and J. Schreger. 2018. International Currencies and Capital Allocation. *NBER Working Paper*. No. 24673. Cambridge: National Bureau of Economic Research.
- . 2019. The Rise of the Dollar and Fall of the Euro as International Currencies. *AEA Papers and Proceedings*. 109: 521–526.
- McCauley, R., P. McGuire, and V. Sushko. 2015. Dollar Credit to Emerging Market Economies. *BIS Quarterly Review*. December. Basel: Bank for International Settlements.
- Park, C.Y. 2017. Developing Local Currency Bond Markets in Asia. *Emerging Markets Finance and Trade*. 53 (12): 2826–2844. <https://doi.org/10.1080/1540496X.2017.1321539>.
- Park, C.Y., J. Lee, J. Villafuerte, and P. Rosenkranz. 2017. 20 Years after the Asian Financial Crisis: Lessons Learned and Future Challenges. *ADB Briefs*. No. 85. Manila: Asian Development Bank.
- Park, C.Y. and R. Mercado Jr. 2014. Determinants of Financial Stress in Emerging Market Economies. *Journal of Banking and Finance*. 45 (C): 199–224.
- Park, C.Y. and K. Shin. 2020. Contagion through National and Regional Exposures to Foreign Banks during the Global Financial Crisis. *Journal of Financial Stability*. 46. <https://doi.org/10.1016/j.jfs.2019.100721>.
- Park, C.Y., J. Villafuerte, A. Abiad, B. Narayanan, E. Banzon, J. Samson, A. Aftab, and M.C. Tayag. 2020. An Updated Assessment of the Economic Impact of COVID-19. *ADB Briefs*. No. 133. Manila: ADB.
- Remolona, E. and I. Shim. 2015. The Rise of Regional Banking in Asia and the Pacific. *BIS Quarterly Review*. September. Basel: Bank for International Settlements.

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