Analytical Note

Monday, April 27, 2020

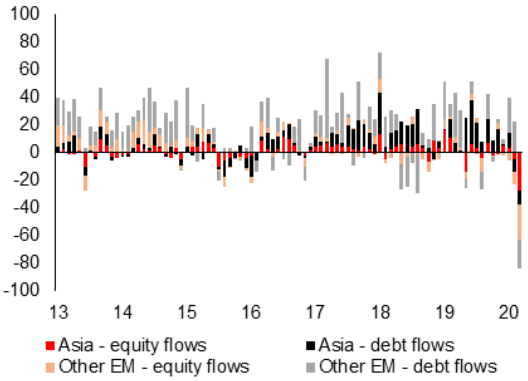
US DOLLAR FUNDING STRESS IN THE ASEAN+3 REGION[1]

I. Introduction

1. **Amid the global fallout from the Covid-19 pandemic, the market's perennial nemesis—US dollar funding stress—has reared its ugly head once again and added to the turmoil.** The premia on US dollar borrowing through exchange rate swap markets shot up as the sharp rise in global risk aversion led to a hoarding of US dollars, exacerbated by large asset redemption flows, especially from emerging markets (EMs) (Figure 1). In the three weeks through March 25, US and European corporates are estimated to have drawn at least USD 124 billion on their bank credit lines (Platt and others, 2020), while prime money market funds (MMFs)—the dominant buyers of short-term commercial paper—recorded outflows of almost USD 150 billion between March 11 and April 1, in favor of government MMFs, which received USD 750 billion (Figure 2). Capital outflows from EMs in March could have reached as much as USD 83 billion, the largest monthly outflow on record (Institute for International Finance, 2020).

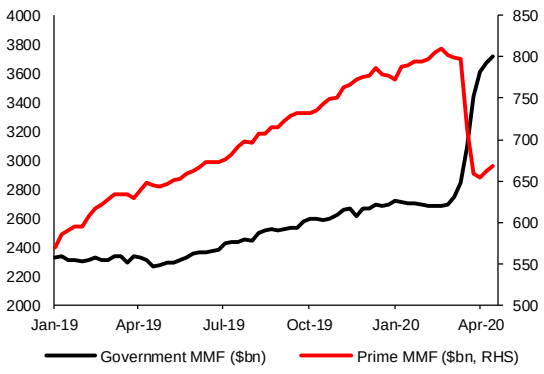
2. **The US Federal Reserve's (Fed's) injection of US dollar liquidity into the global economy alleviated the squeeze.** The central bank extended swap lines with selected central banks and created a temporary repo facility for foreign and international monetary authorities (FIMA) to enable central banks to temporarily exchange their US Treasuries held at the Fed for US dollars (Table 1). This US dollar liquidity could then be deployed to the financial systems in their respective jurisdictions to support market demand for the currency. Within the ASEAN+3 region, the US central bank also extended swap lines to the Bank of Korea and the Monetary Authority of Singapore of USD 60 billion each and granted a USD 60 billion repo line to Bank Indonesia.

Figure 1: Emerging Markets: Portfolio Flows, March 2020
(Billions of US dollars)



Sources: Institute for International Finance; and AMRO staff calculations.

Figure 2: Global Money Market Funds Flows
(Billions of US dollars)



Sources: Institute for International Finance; and AMRO staff calculations.

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Table 1. ASEAN+3: Holdings of US Treasury Securities as at end-February 2020
(Billions of US dollars)

(USD bn)	China	Hong Kong, China	Korea	Indonesia	Malaysia	Philippines	Singapore	Thailand
UST holdings (Total)**	1092.3	249.8	116.1	28.4	14.1	41.8	165.4	91.3
monthly change	*13.7*	*20.2*	*-5.0*	*1.1*	*0.1*	*1.3*	*4.7*	*-4.7*
UST holdings (Long-term)**	1088.9	230.1	111.4	25.2	14.0	41.0	156.3	74.2
monthly change	*15.7*	*14.4*	*-5.1*	*-1.1*	*0.1*	*1.2*	*3.5*	*-1.5*
UST holdings (Short-term)**	3.4	19.7	4.7	3.3	0.1	0.8	9.1	17.1
monthly change	*-2.1*	*5.8*	*0.1*	*2.2*	*0.0*	*0.0*	*1.1*	*-3.2*
Foreign Reserves	3226.7	445.7	409.2	130.4	103.4	88.2	283.0	229.5
monthly change	*-7.5*	*0.0*	*-0.5*	*-1.3*	*-0.8*	*1.3*	*4.4*	*-0.9*
UST holdings (share of FX reserves)	33.9%	56.1%	28.4%	21.8%	13.7%	47.4%	58.4%	39.8%

Source: US Department of Treasury.
Note: ** Not all of the reported amount for US Treasury holdings above are necessarily held by the respective economy's monetary authority which has access to the Fed's FIMA Repo Facility.

II. Early Warnings

3. **The US dollar funding stress manifested in early March.** The contrast between the market movements in late February and early March show a shift from risk aversion to US dollar hoarding as uncertainty rose significantly, and the VIX rose from 40 at the end of February to 80 on March 16. *Were there incipient signs that the US dollar liquidity squeeze was forthcoming?*

4. In US markets, the price of borrowing US dollars provided clear warning of impending stress:

- The spread between the US London Interbank Offer Rate (LIBOR) and the US Overnight Index Swap (OIS) widened sharply beyond their long-term mean (of 32 basis points) in March, pointing to the rising cost of banks' US dollar borrowing in relation to the Fed's policy rate (Figure 3).[2] The LIBOR-OIS spread peaked at a massive 138 basis points on March 27.

- Concurrently, the yield spread between US Commercial Paper (CP) and comparable US Treasuries (UST) also widened in excess of its long-term average of 43 basis points, as US dollar demand increased among non-financial corporations facing missed payments amid disruptions to global supply chains (Du, 2020).[3] The CP-UST yield spread reached a maximum of 208 basis points on March 24.

Both the spreads eased as the Fed provided US dollar liquidity to markets through channels such as the Money Market Mutual Fund Liquidity Facility and Commercial Paper Funding Facility. However, they remain elevated, suggesting that credit and liquidity risks continue to linger within the US financial system. Although the initial phase of corporate stress was triggered by lockdown interruptions to the supply chain in Asia, the recent economic disruption in the US and Europe has so far prevented these spreads from normalizing to levels seen before March 2020.

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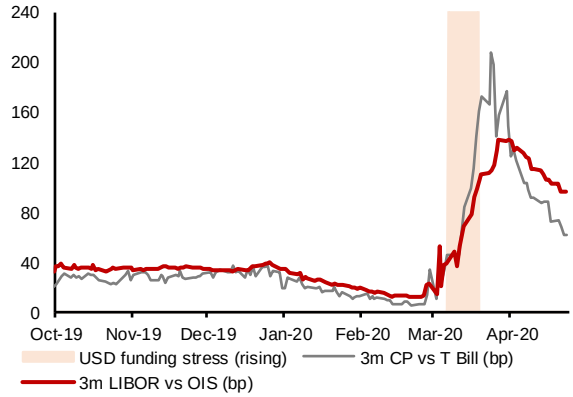
[2] The US dollar LIBOR represents banks' US dollar borrowing cost; the US OIS reflects market expectations around the future path of the Fed's policy rate.

[3] The CP-UST spread provides an indication of the premium that corporates are prepared to pay to raise short-term funds.

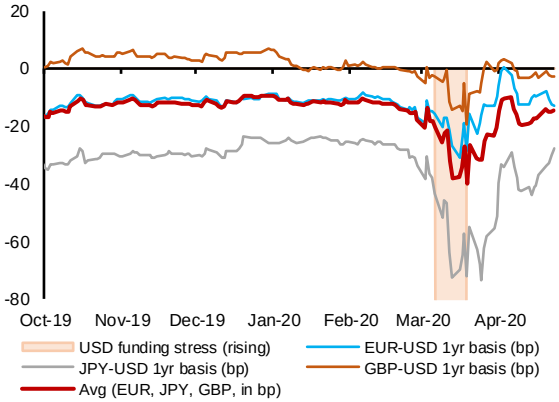
5. **In international markets, the behavior of the cross currency basis ("basis") is an early warning indicator of stress in US dollar funding.** Major currency markets (euro, Japanese yen, UK pound sterling) are typically well developed and liquid, so the basis turning even more negative for these currencies is a clear signal of US dollar shortage in the global financial markets (Figure 4).[4] During the March period, the average cross currency basis for these currencies fell below the long term mean (calculated since January 2007) of –22.6 basis points on March 9, and then to a low of –40.3 basis points on March 19, before gradually advancing above the long term mean on March 31.

Figure 3: United States: Indicators of Funding Stress in Markets
(Basis points)



Sources: Bloomberg Finance L.P.; and AMRO staff calculations.
Note: bp = basis point.

Figure 4: Major Currencies: Cross Currency Basis
(Basis points)



Sources: Bloomberg Finance L.P.; and AMRO staff calculations.
Note: bp = basis point.

6. **Funding stress in ASEAN+3 markets has not been as easy to gauge.** The lack of liquid cross currency basis in regional markets (bar Japan and Korea) increases the difficulty in determining the extent of the US dollar liquidity squeeze. An approximation based on Covered Interest Rate Parity could be made using foreign exchange forwards to estimate the implied premium for US dollar funding.[5] During periods of US dollar shortage, the implied interest rate on the US dollar moves higher and the dollar's forward price relative to the local currency falls in relation to the spot. The implied US dollar funding premia as of March 19 suggest that the rise in funding costs had affected most regional currencies—the impact has been largest for the Korean won, Indonesian rupiah, Malaysian ringgit and Philippine peso (Figure 5);[6] and greater on the shorter tenor (3-month) compared to the longer one (1-year) (Figure 6).

7. **The sell-off in foreign exchange and regional equity markets accelerated in March as a result of the US dollar liquidity squeeze.** US dollar funding stress is

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4 A negative basis signifies that borrowing US dollar through FX swaps has a premium over USD interbank borrowing. See Avdjiev, Eren, and McGuire (2020) for a detailed discussion on the factors driving the basis in the negative territory after the global financial crisis.

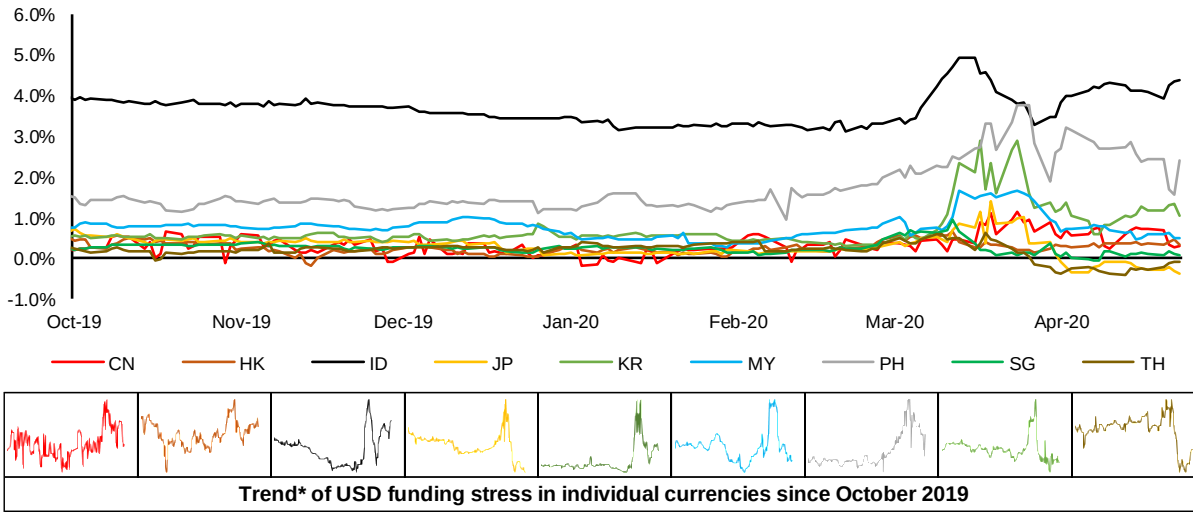
5 Though conceptually similar, this indicator is not as reliable as the cross currency basis owing to the different ways in which the two markets operate; forward points can be volatile and influenced by factors other than US dollar funding, which could distort the findings.

6 The rise in forward prices for the Indonesian rupiah and Philippine peso are attributable to the lack of US dollar funding in spot markets, which pushes investors to hedge their US dollar exposures by buying US dollars forward against the domestic currency. Consequently, forward prices rise in relation to spot prices, which contrasts with the typical reaction of forward points. Hence, the forward implied yield is a more appropriate indicator to analyze.

associated with broad US dollar strength as the short supply of US dollars not only makes it more expensive but also tightens the supply of USD credit (Bruno and Shin, 2015; Avdjiev, Eren, and McGuire, 2020).[7] As a result, the US dollar rally in March intensified the depreciation of regional currencies, which were already under pressure in late February. The sell-off in regional equity also accelerated in March. Regional bonds and the Japanese yen (and gold), which had strengthened in late February, weakened (Figure 7). The price action was broadly in line with historical episodes of US dollar funding stress, which tended to be associated with the underperformance of Asian equity and foreign exchange markets. The relationship is evidenced by the high correlation between Asian exchange rate returns and the US dollar funding premia (Figure 8), while the performance of debt markets has been mixed (Appendix I).

8. **In a vicious cycle, the portfolio outflows aggravated the US dollar funding stress and depreciated the currencies further.** It led to more outflows as investors are incentivized to liquidate their portfolios and hold US dollars (Figure 9). In March alone, total portfolio outflows from ASEAN and Korea amounted to a record USD 27 billion, compared to total inflows of USD 22 billion for all of 2019.

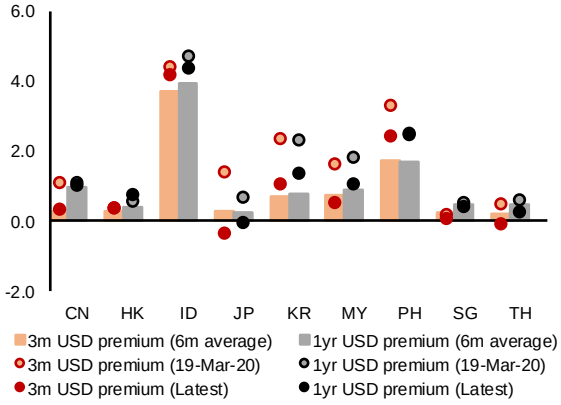
Figure 5: ASEAN+3: Trends in US Dollar Funding Premia over the Past Six Months
(Percentage points)



Sources: Bloomberg Finance LP; and AMRO staff calculations.
Note: The US dollar funding premium is calculated by deducting US LIBOR and US dollar appreciation (versus the local currency in forward price against spot) from domestic interbank rates. For Indonesia and Philippines, we look only at the US dollar appreciation against the local currency in forward price against spot. * The trend charts don't have y-axis starting at 0 and the scales across countries are different.

[7] See Appendix I, Appendix Figures 1 and 4.

Figure 6: ASEAN+3 Currencies: Estimated US Dollar Funding Premia, March 20 and Latest
(Percentage points)



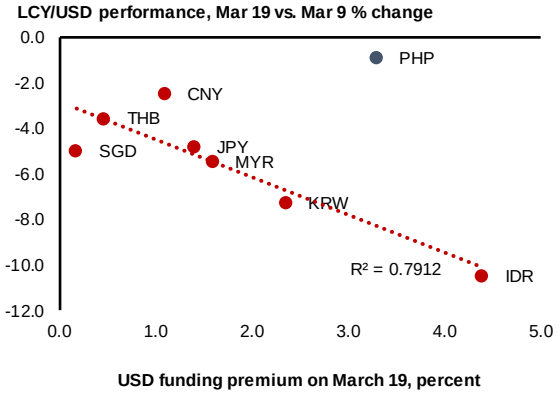
Sources: Bloomberg Finance L.P.; and AMRO staff calculations.

Figure 7: ASEAN+3: Market Performance around US Dollar Funding Stress Period, March 2020

	19-Feb to 9-Mar			9-Mar to 19-Mar		
	FX (vs USD,%)	Equity (%)	10yr yield (bp)	FX (vs USD,%)	Equity (%)	10yr yield (bp)
CN	1%	-1%	-35	-2%	-9%	20
HK	0%	-10%	-68	0%	-14%	53
ID	-5%	-14%	57	-10%	-22%	97
JP	8%	-17%	-12	-7%	-17%	24
KR	-1%	-12%	-28	-6%	-29%	33
MY	-1%	-7%	-7	-5%	-15%	72
PH	0%	-16%	-43	-1%	-31%	88
SG	1%	-14%	-65	-5%	-19%	75
TH	-1%	-18%	-30	-4%	-18%	92
	Oil	Gold	Comm Idx*	Oil	Gold	Comm Idx*
Commodity	-54%	4%	-19%	-19%	-13%	-13%

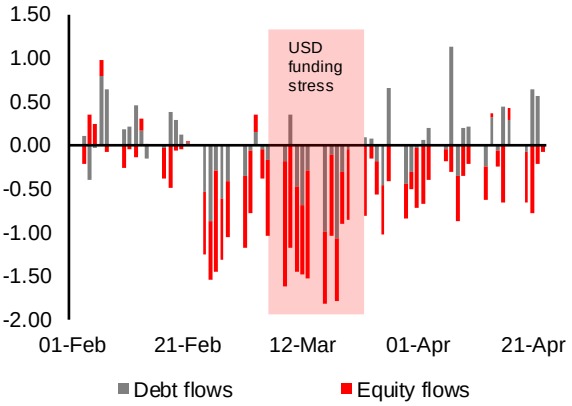
Sources: Haver Analytics; and AMRO staff calculations.
Note: * Comm Idx refers to CRB Commodity Index.

Figure 8. ASEAN+3: Exchange Rate Performance and US Dollar Funding Premium



Sources: Bloomberg Finance L.P.; and AMRO staff calculations.
Note: The Philippine Peso was the outlier in the March sell-off as its held its ground during the US dollar funding pressures, supported by lower incidences coronavirus cases (at that time), perceptions of limited disruption to supply chains, lower oil prices, robust government spending and the BSP's easing bias.

Figure 9. ASEAN-5, Vietnam and Korea: Nonresident Portfolio Investment Flows
(Billions of US dollars)



Sources: Bloomberg Finance L.P.; and AMRO staff calculations.
Note: Both equity and debt data are available for Korea, Indonesia, Malaysia, and Thailand; only equity data are available for the Philippines and Vietnam.

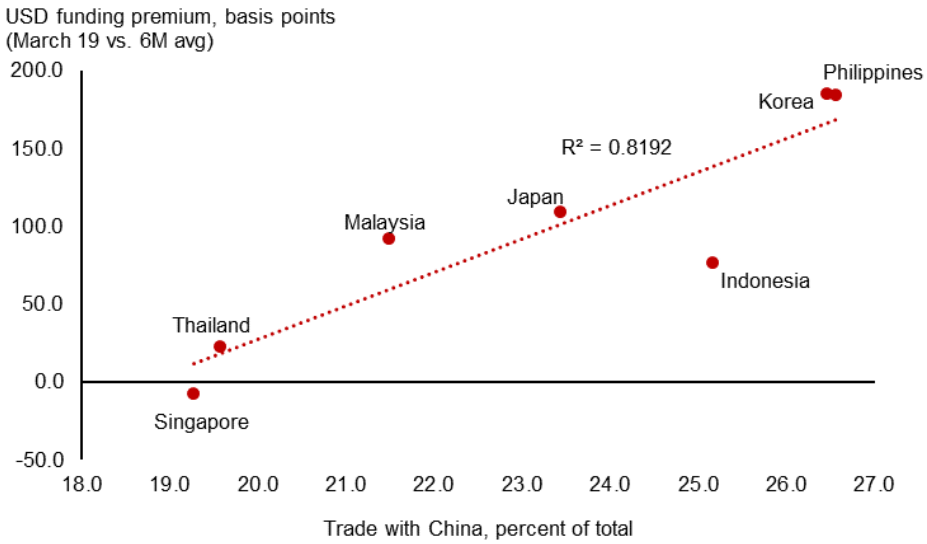
III. Regional Characteristics

9. **Regional economies with greater economic exposure to China saw a sharper rise in US dollar funding stress.** Specifically, economies that have relied more heavily on trade with China have been more affected, likely because the necessary containment measures taken by Chinese authorities inadvertently disrupted export receipts from regional supply chains, resulting in cash shortfalls (Figure 10). The sudden stop in production in China would have left its Asian suppliers of raw materials and intermediate goods with less cash to cover their costs due to missed payments. At the same time, it would have also

forced some businesses in the region that rely on key parts and materials from China to halt or scale back their production, resulting in a sharp reduction in export earnings.[8]

10. **Trade finance is another important cause of US dollar funding stress in Asia.** Missed payments by a firm to its suppliers can easily cascade along the supply chain, resulting in spikes in credit risks for banks involved in trade finance. This issue is particularly relevant for the Asian region, where bank-intermediated trade finance is used quite intensively. Indeed, financing for China, Hong Kong, and Korea is estimated to range between 29 to 56 percent of their merchandise trade (Committee on the Global Financial System, 2014). Local and regional banks are typically the primary suppliers of trade finance, and the increasing likelihood of defaults and drawdown of credit lines would have prompted these banks to demand more US dollar funding from markets,[9] especially if their foreign currency claims are not sufficiently funded by stable sources of foreign currency liabilities (Figure 11).[10] Distress in inter-firm trade credits—the principal alternative to bank-intermediated trade finance but which could also be indirectly financed by banks—may have also contributed to the surge in US dollar demand.[11]

Figure 10. Major ASEAN+3 Economies: US Dollar Funding Premium and Trade with China



Sources: Bloomberg Finance L.P.; and International Monetary Fund.
Note: The US dollar funding premium is implied from 3-month exchange rate swap markets. The 6-month average refers to the September 2019 to February 2020 period. Total trade refers to the sum of exports and imports.

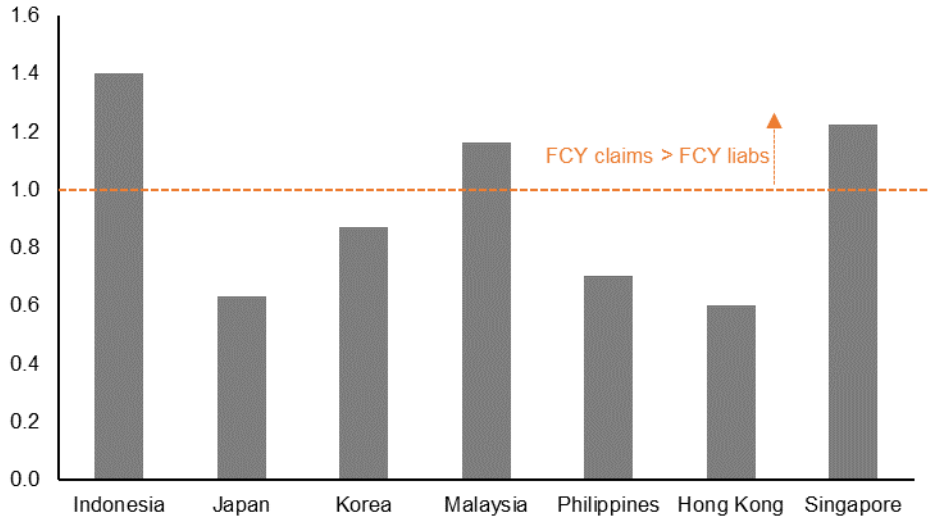
[8] According to the Korea Automobile Manufacturers Association, component shortages from China and the worsened effect of the virus in Korea led to a 26 percent decline in the auto industry's output in February 2020 relative to a year ago; the industry's exports likewise fell by 25 percent year-on-year.

[9] Public reports of credit line drawdowns are still sparse in Asia. A recent example is Nissan, which was reportedly seeking a credit line worth USD 4.6 billion from Japanese banks in early April to stave off funding problems as vehicle sales plunged as a result of the pandemic.

[10] More stable sources of banks' US dollar liabilities include deposits, bond issuances, and loans. The US dollar is generally the funding currency for trade finance given that global trade is typically invoiced in US dollars.

[11] Inter-firm trade credit between importers and exporters could be on an *open account basis*, where goods are shipped in advance of payment, or *cash-in-advance basis,* where payment is made before shipment. Inter-firm trade credit provides flexibility and could entail lower fees than trade finance, but leaves firms more exposed to payment risk if not mitigated by trade credit insurance.

Figure 11. ASEAN+3: Ratio of Banks' Local Foreign Currency Claims and Foreign Currency Liabilities



Sources: Bank for International Settlements; and AMRO staff calculations.
Note: Data for banks' local positions are not available for China and Thailand.

11. **The US dollar funding stress could resurface in the region as export earnings face a steeper contraction from the widespread impact of the COVID-19 pandemic.** The strain in corporate earnings is only likely to intensify with the epicenter of the COVID-19 infections having shifted from East to West, where much of Asia's exports are consumed. This situation, coupled with firms' continuing need to service external liabilities, could pressure banks' balance sheets, thus increasing the likelihood that a global scramble for US dollars could resurface.

IV. Buffers and Policies

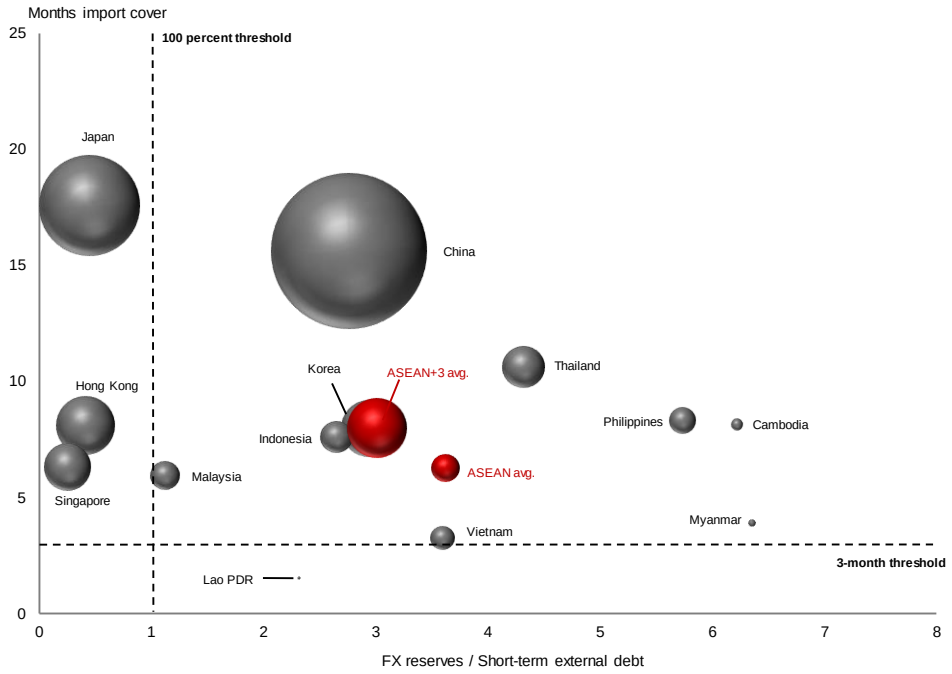
12. **The region's central bank reserves are generally adequate to cover immediate external funding needs.** They comfortably exceed the standard rules of thumb, in terms of imports (3 months) and short-term debt (100 percent coverage) (Figure 12), and are being supplemented by regulatory and operational measures to ease the US dollar funding stress in the system (Appendix II). Additionally, members may also have access to bilateral and multilateral swap agreements and budgetary support from the Asian Development Bank (Appendix III).

13. **The swap and repo lines extended by the Fed have enhanced the capacity of the region's central banks to inject dollar liquidity into their respective economies.** However, markets are closely monitoring how the Fed dollars would be deployed to domestic banks (Sachdeva, 2020).[12] Equally important is the need to ensure that the US dollars acquired by the domestic banks are adequately channeled to the non-financial corporates and other institutions that need to finance working capital, cover missed payments and external liabilities. Firms that took trade credits would also require quick and timely financial support, either through export credit agency guarantees or even local

[12] The Bank of Japan, for instance, regularly publishes a schedule of its lending operations for the US dollar sourced from the Fed, and the Bank of Korea and Monetary Authority of Singapore have also started to share details of the same towards end-March.

currency funding lifelines that could be exchanged for US dollars. The immediate priority is to ensure the survival of local businesses, in the absence of demand, so that they are eventually able to fuel economic recovery.

Figure 12. ASEAN+3: Adequacy of Foreign Exchange Reserves



Sources: International Monetary Fund; national authorities; and AMRO staff calculations.
Note: Based on latest available data. Import coverage includes imports of goods and services. Size of bubble denotes the relative amount of international reserves in US dollars. avg = average. FX = foreign exchange; Lao PDR = Lao People's Democratic Republic.

Appendix I. US Dollar Funding Stress Episodes since the Global Financial Crisis

How does one define US dollar funding stress? The most common symptom of a global US dollar funding stress is the fall in cross currency basis (the basis) for major currencies (euro, Japanese yen, UK pound sterling). The basis falling significantly lower into negative territory indicates that borrowing US dollars through exchange rate swaps is becoming more expensive. A visual observation of the basis over since January 2007 shows that there were limited periods when the fall in basis was either higher or comparable to the one seen in March 2020 (Appendix Figure 1). While it is easy to pinpoint the peak in funding stress (i.e. bottom of the basis), for defining the start and end of periods of elevated funding stress, we formulate an objective approach.

The average cross currency basis for the major currencies (euro, Japanese yen, UK pound sterling, "the average basis") between the period of January 2007 and March 2020 has a mean of –22.6 basis points, and the corresponding standard deviation is 13.5 basis points. The periods during which the average basis fell below one standard deviation from mean (i.e., –22.6 – 13.5 = –36.1 basis points) have been the times when US dollar funding was a concern for markets (Appendix I). These periods have also been accompanied by a rise in the spread between the US London Interbank Offer Rate (LIBOR) and the US Overnight Index Swap (OIS), as well as the spread between the Commercial Paper (CP) yield, and comparable US Treasury (UST) yields, confirming the stress in US dollar funding (Appendix Figure 2). The periods identified by this approach are consistent with the periods of funding stress identified in the literature (Du, Tepper, and Verdelhan, 2016; and Allen and others, 2017)

There appears to be a dichotomy in the phases of rising US dollar funding stress and easing funding stress, which could be characterized as follows:

- Period of rising funding stress: The period starts when the average basis falls below the 13-year mean (–22.6 basis points) and continues to fall below the one standard deviation mark (–36.1 basis points) and ends at the lowest point before it recovers to above the 12-year mean.

- Period of easing funding stress: The period starts at the lowest point of average basis and ends when it rises to above the 13-year mean.

Based on these parameters, there would have been at least four episodes over the past 12 years when US dollar funding stress rose to levels seen in March 2020. While each episode was driven by different factors, there were a few common trends in the way markets behaved:

- Periods accompanied by larger (GFC, COVID-19) or longer (European Sovereign Debt Crisis) rises in volatility (Appendix Figure 3) have seen more severe declines in equities and greater US dollar strength than when the funding squeeze was lower/intermittent (Greece debt crisis) or when accompanied by a limited rise in volatility (2015–2017).

- Broadly, equity markets and exchange rates (against the US dollar) came under pressure during phases when the US dollar funding stress is rising, but then regained lost ground when the funding pressures started to ease (Appendix Figures 4 and 5).

Appendix Table 1. Economic Crises and the Phases of US Dollar Funding Stress

Episode	Low in average basis (bp)*	USD funding stress (rising)			USD funding stress (falling)		
		Start	End	Average volatility**	Start	End	Average volatility**
Global financial crisis (GFC)	-101	Jun-08	Nov-08	37	Dec-08	Oct-09	35
Greece debt crisis	-40	Apr-10	May-10	25	Jun-10	Feb-11	22
European debt crisis	-62	Aug-11	Nov-11	34	Dec-11	Sep-12	19
Multiple factors***	-53	Mar-15	Dec-16	16	Jan-17	Apr-18	13
Covid-19	-40	9-Mar-20	19-Mar-20	66	20-Mar-20	31-Mar-20	65

Sources: Bloomberg; and AMRO staff calculations.
Note: * Average basis of EUR, GBP, JPY vs USD (1yr). ** Volatility as measured by Chicago Board Options Exchange Volatility Index. ***The USD funding stress gradually built up after the oil price crash in late 2015, followed by the People's Bank of China's announcement of the USDCNY rate moving higher and finally a Fed lift-off in December 2015.

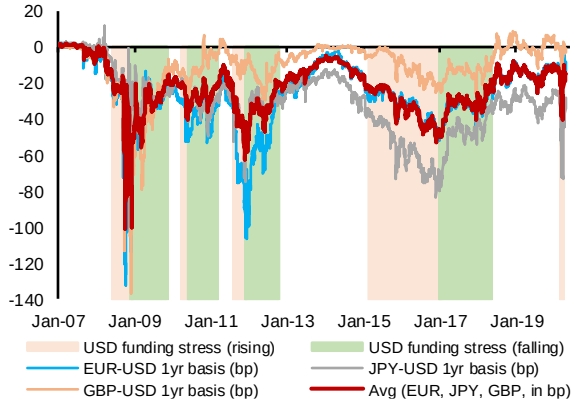
During each of the four episodes, the responses by country and asset class resulted in several interesting observations:

- The Indonesian rupiah, Korean won, Malaysian ringgit, and Philippine peso were the most affected currencies during periods of rising US dollar funding stress (Appendix Figure 6). They were also unable to recover their losses once the funding stress started to abate. The Japanese yen typically gained throughout the entire US dollar funding stress period (inclusive of both rising and falling periods).

- When the US dollar funding stress eased, equity markets in China, Japan and Singapore were not able to rebound to levels seen before the onset of the stress, but the Thai and Indonesian markets recovered well (Appendix Figure 7). Korea, Malaysia and the Philippines equities experienced the smallest declines during the rising funding stress phase.

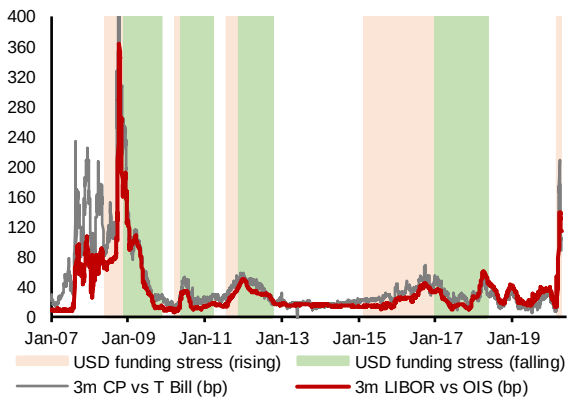
- Indonesia stands out as it is the only regional bond market where yields rose during rising US dollar funding stress periods but fell more when they eased. Malaysian and Philippine bonds also underperformed, while Thai and Chinese bonds typically outperformed regional peers when the funding stress was rising (Appendix Figure 8).

Appendix Figure 1. Major Currencies: Cross Currency Basis
(Basis points)



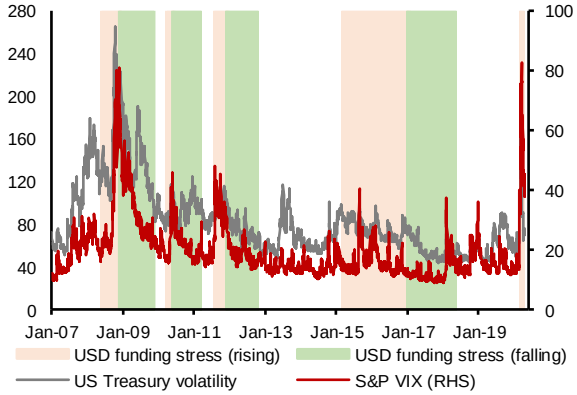
Sources: Bloomberg Finance L.P.; and AMRO staff calculations.
Note: bp = basis points

Appendix Figure 2. US Credit Conditions
(Basis points)



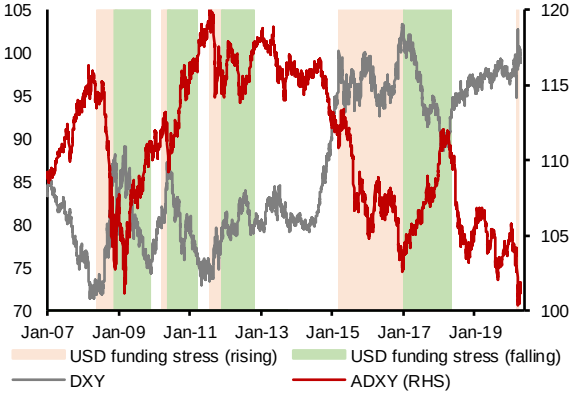
Sources: Haver Analytics; and AMRO staff calculations.
Note: bp = basis points

Appendix Figure 3. United States: Market Volatility



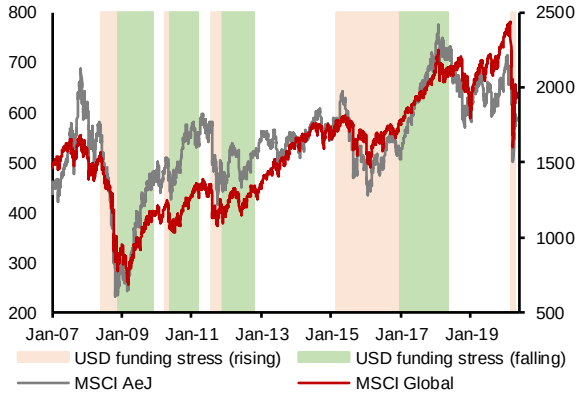
Sources: Haver Analytics; and AMRO staff calculations.

Appendix Figure 4. US Dollar and Asian Currency Indices



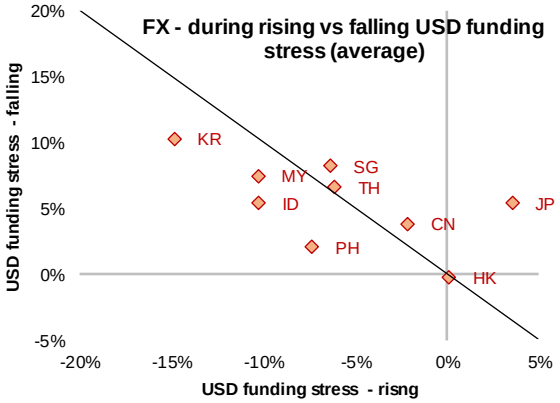
Sources: Bloomberg Finance L.P.; and AMRO staff calculations.

Appendix Figure 5. Global and Regional Equity Market Indices



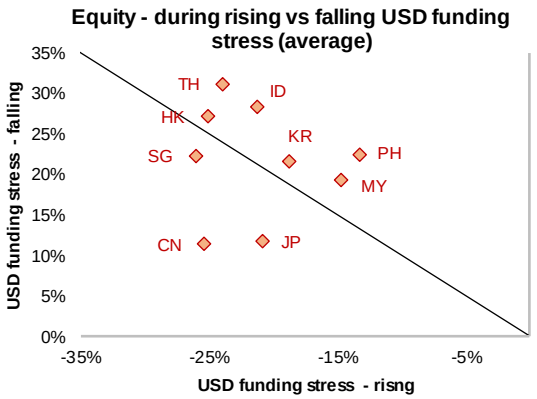
Sources: Haver Analytics; and AMRO staff calculations.

Appendix Figure 6. ASEAN+3: Average Change in Regional Exchange Rates around US Dollar Funding Stress



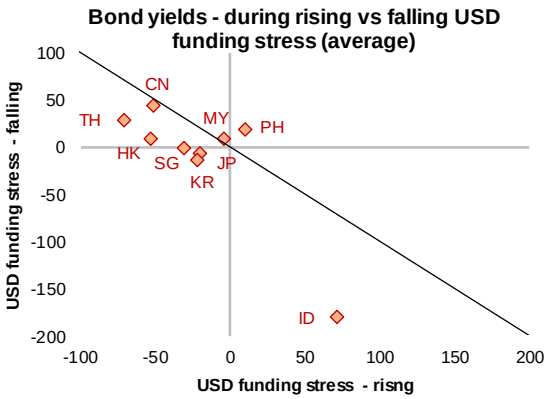
Sources: Haver Analytics; and AMRO staff calculations.

Appendix Figure 7. ASEAN+3: Average Change in Regional Equities around US Dollar Funding Stress



Sources: Haver Analytics; and AMRO staff calculations.

Appendix Figure 8. ASEAN+3: Average Change in Regional 10-Year Bond Yields around US dollar Funding Stress



Sources: Haver Analytics; and AMRO staff calculations.

Appendix II. ASEAN+3: Measures to Ease US Dollar Funding Stress

Appendix Table 2. ASEAN+3: Measures Implemented by Central Banks to Ease US Dollar Funding Stress since March 1, 2020

(As of April 15, 2020)

Country	Date	Measure
Hong Kong, China	Apr 3	• HKMA announces that it is in discussion with the US Federal Reserve to obtain US dollars under the FIMA Repo Facility for lending to local banks.
Indonesia	Mar 2	• BI announces to lower exchange rate reserve requirements for commercial banks from 8 to 4 percent, effective Mar 16, which will increase exchange rate liquidity in the banking industry by around USD 3.2 billion.
	Mar 2 and 19	• BI optimizes/strengthens intervention strategy in the spot exchange rate and domestic non-deliverable forward (DNDF) markets as well as in the secondary government bond market, in order to minimize the risk of increasing IDR volatility.
	Apr 7	• BI secures a repo line with the US Federal Reserve, strengthening its second line of defense in enhancing domestic dollar liquidity.
Japan	Mar 16	• BOJ announces that six central banks (BOC, BOE, BOJ, ECB, US Federal Reserve, and SNB) participating in the standing US dollar liquidity swap arrangements – launched in Oct 2013 – have agreed to lower the US dollar liquidity swap pricing by 0.25 percent (i.e. to OIS plus 25 bps) to enhance the provision of liquidity as coordinated central banks action. • The six central banks also agree to offer USD with a new 84-day maturity operations weekly, in addition to the existing 7-day maturity operations to increase the swap lines' effectiveness in providing term liquidity. • Both changes takes effect from the week of March 16.
	Mar 20	• BOJ announces that the six central banks have also agreed to increase the frequency of 7-day maturity operations from weekly to daily to further enhance the US dollar liquidity provision. The weekly 84-day maturity operations will be continued. • The daily operations start from March 23 and continue at least through the end of April.
Korea	Mar 19	• MOEF raises the cap on exchange rate forward positions held by local banks to 50 percent of their equity capital from 40 percent, and for foreign bank branches to 250 percent from 200 percent.
	Mar 26	• MOEF temporarily lifts levy on financial institutions' non-deposit exchange rate liabilities from April to June 2020 , and expands instalment payment plans for payments that are due in 2020 • Lowers exchange rate liquidity coverage ratio (LCR) to 70 percent from 80 percent until May 2020
	Mar 31	• BOK starts competitive US dollar loan facility auctions using proceeds of swap transactions with the US Federal Reserve.
Singapore	Mar 26	• MAS announces plan to conduct auctions under the MAS US Dollar Facility, which is funded by the US dollar liquidity swap agreement with the US Federal Reserve.

Sources: National authorities; AMRO staff compilations.

Appendix III. Key Financing Sources for the ASEAN+3

Appendix Table 3. ASEAN+3: Comparison of Financing Sources

(Billions of US dollars)

Member	FX Reserves	BSA		CMIM		IMF				ADB	
		ASEAN+3	Others	IMF Delinked Portion (30 percent)	Total (100 percent)	Standby Arrangement (435 percent)	Precautionary and Liquidity Line (500 percent)	RFI / RCF		Asia Pacific Disaster Response Fund (grant) (per event)	Countercyclical Support Facility (Ordinary Capital Resources-Eligible)
								Annual access (100 percent)	Accumulative access (150 percent)		
China	3,180.3	242.5	251.0	10.3	34.2	181.1	208.2	41.7	62.5	0.003	0.5
Hong Kong	445.7	56.7		6.3	6.3					0.003	
Japan	1,366.2	50.5	89.8	11.5	38.4	183.2	210.5	42.2	63.2	0.003	
Korea	400.2	63.9	82.1 + unlimited local currency with BoC	11.5	38.4	51.0	58.6	11.7	17.6	0.003	
+3	**5,392.4**										
Indonesia	121.0	68.5	6.4	6.8	22.8	27.6	31.8	6.4	9.5	0.003	0.5
Malaysia	101.7	31.5		6.8	22.8	21.6	24.8	5.0	7.4	0.003	0.5
Philippines	87.6	12.0		6.8	22.8	12.1	14.0	2.8	4.2	0.003	0.5
Singapore	279.1	62.5	60.0	6.8	22.8	23.1	26.6	5.3	8.0	0.003	
Thailand	226.5	20.4		6.8	22.8	19.1	21.9	4.4	6.6	0.003	0.5
Vietnam	82.0			3.0	10.0	6.9	7.9	1.6	2.4	0.003	0.5
Cambodia	17.5			0.4	1.2	1.0	1.2	0.2	0.4	0.003	
Myanmar	5.8			0.2	0.6	3.1	3.5	0.7	1.1	0.003	
Brunei	3.3			0.1	0.3	1.8	2.1	0.4	0.6	0.003	
Lao PDR	1.1			0.1	0.3	0.6	0.7	0.1	0.2	0.003	
ASEAN	**920.8**										
Total	**6,313.2**	**322.4** 1/	**489.3**			**532.3**	**611.8**	**122.6**	**183.5**		

Sources: ADB; IMF; various central banks; and authors' estimates.
1/ refer to Appendix Table 4 for breakdown
Notes:
(i) Exchange rate: 1 SDR= 1.36609 USD as of 13 April 2020.
(ii) Data on FX reserves are as of March 2020, except for Hong Kong, China and the Philippines (February 2020), Brunei and Vietnam (latest January 2020), Lao PDR and Myanmar (latest December 2019), and Cambodia (latest November 2019).
(iii) There is no cap on access to the IMF Flexible Credit Line (FCL) facility and a case-by-case modality is adopted. IMF RFI is available for all IMF member countries while RCF is only for PRGT-eligible countries without ex-post conditionality.
(iv) Besides IMF and CMIM resources, there is an ASEAN swap arrangement that amounts to USD 2 billion among ASEAN countries.
(v) The amounts that ASEAN+3 members could request from the CMIM Precautionary Line (PL) facility are the same as those from the CMIM Stability Facility (SF). Members cannot apply for both the CMIM-PL and the CMIM-SF at the same time.
(vi) ADB has approved USD 3 million to Indonesia and the Philippines respectively in March 2020. Among the new package (USD20 billion) in response to COVID-19 announced on 3 April 2020, up to USD13 billion will be provided through a newly established Pandemic Response Option under Countercyclical Support Facility (CSF). Indonesia, the Philippines and Vietnam used the CSF during 2009-2010.

Appendix Table 4. ASEAN+3: Bilateral Swap Arrangements
(Billions of US dollars)

Member		Lender									
		CN	HK	ID	JP	KR	MY	PH	SG	TH	Total
Borrower	China	-	56.7	28.4	28.4	51.1	25.5	-	42.5	9.9	**242.5**
	Hong Kong	56.7	-	-	-	-	-	-	-	-	**56.7**
	Indonesia	28.4	-	-	22.8	8.8	1.9	-	6.7	-	**68.5**
	Japan	28.4	-	-	-	-	-	0.5	1.0 (JMOF) 10.2 (BoJ)	3.0 (JMOF) 7.4 (BoJ)	**50.5**
	Korea	51.1	-	8.8	-	-	4.1	-	-	-	**63.9**
	Malaysia	25.5	-	1.9		4.1	-	-	-	-	**31.5**
	Philippines	-	-	-	12.0	-	-	-	-	-	**12.0**
	Singapore	42.5	-	6.7	3.0 (JMOF) 10.2 (BoJ)	-	-	-	-	-	**62.5**
	Thailand	9.9	-	-	3.0 (JMOF) 7.4 (BoJ)	-	-	-	-	-	**20.4**
	Total	**242.5**	**56.7**	**45.8**	**86.8**	**63.9**	**31.5**	**0.5**	**60.5**	**20.4**	**322.4**

Sources: ASEAN+3 central banks.
Notes:
(i) Exchange rate: 1USD=7.0515RMB, 1USD=107.77JPY, 1USD=1,217.81KRW, 1USD=1.4155SGD, 1USD=4.3238MYR as of 13 April 2020.
(ii) Figures in red show BSAs signed between JMoF and 4 ASEAN countries, of which the BSA between Japan and Indonesia is one-way (from Japan to Indonesia) and others are two-way. The other BSAs are signed in local currencies. On top of the above, JMOF-BNM currency swap was agreed in principle in May 2017.
(iii) The grand total of USD 322.4 billion is not equal to the sum of the member sub-totals so as not to double-count.
(iv) In addition to the BSAs within the region, regional members also signed BSAs with countries outside the region. The People's Bank of China (PBoC) has BSAs with over 20 countries (USD 251 billion). The BoJ signed a BSA with the Reserve Bank of Australia (USD 14.8 billion) and the JMoF signed a BSA with the Reserve Bank of India (USD75 billion). The BoJ has standing liquidity facilities with the Fed, European Central Bank, Bank of England, Bank of Canada and Swiss National Bank. The BoK has BSAs with the Fed (USD60 billion), Reserve Bank of Australia (USD 7.9 billion), Central Bank of UAE (USD5 billion), Swiss National Bank (USD9.2 billion) and Bank of Canada (no limit on amount and maturity). BI signed a BSA with Reserve Bank of Australia in local currency (USD 6.4 billion) in order to promote bilateral trade and other purposes. MAS signed a BSA with the Fed (USD60 billion) in March 2020.
(v) CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand.

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