

Dollar Funding Stresses in China

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The need for US dollar funding during the financial stresses in mid-March 2020, as the COVID pandemic news shocked markets, was evident in a number of countries. Notably, however, China's dollar liquidity needs received little attention. Given China's significant economic and financial linkages to the United States and the rest of the world, financial instability there could have implications for the global economy. Hence, it is useful to develop a deeper understanding of the dollar liquidity needs of Chinese banks and non-financial corporations and to probe whether existing avenues of dollar funding for banks and other firms in China are sufficient in times of stress. This is our objective.

I. Warning Signs: Evidence of Dollar Funding Stress in March 2020

Dollar funding stresses abroad are instantly observable through the cross-currency basis (CCB) between the dollar and foreign currencies. For a given currency, this basis is the difference between the interest rate for borrowing dollars directly and the interest rate for borrowing dollars synthetically by combining a foreign currency borrowing with foreign exchange (FX) derivatives. If funding markets are efficient, arbitrage between these two alternative methods for borrowing dollars keeps the basis near zero. When access to dollar funding is stressed, however, the magnitude of a cross-currency basis, relative to the dollar, can become significantly negative because of the balance-sheet constraints of potential arbitrageur banks (Du, Tepper, and Verdelhan, 2018; Avdjiev, Eren, and McGuire, 2020; Correa, Du, and Liao, 2020).

For example, in mid-March 2020, the basis between the US dollar and the Korean won became quite negative. Korean banks that had difficulty obtaining dollar funding resorted to borrowing won and converting their won loans into dollar funding with FX derivatives. They were willing to pay synthetic dollar funding costs far above dollar borrowing rates available to global banks with more direct access to dollar funding. The magnitude of the USD/KRW basis was reduced when the Bank of Korea held its first US dollar auction at the end of March following the establishment by the Federal Reserve of a temporary dollar liquidity swap line with the Bank of Korea in mid-March. The Bank of Korea then conducted regular dollar auctions that allowed commercial banks in Korea to source dollar funding at considerably lower interest rates than otherwise available on wholesale markets, though the Bank of Korea's dollar funding rates were still above typical prevailing market rates in non-stressed conditions. This facility expired as of December 31, 2021.

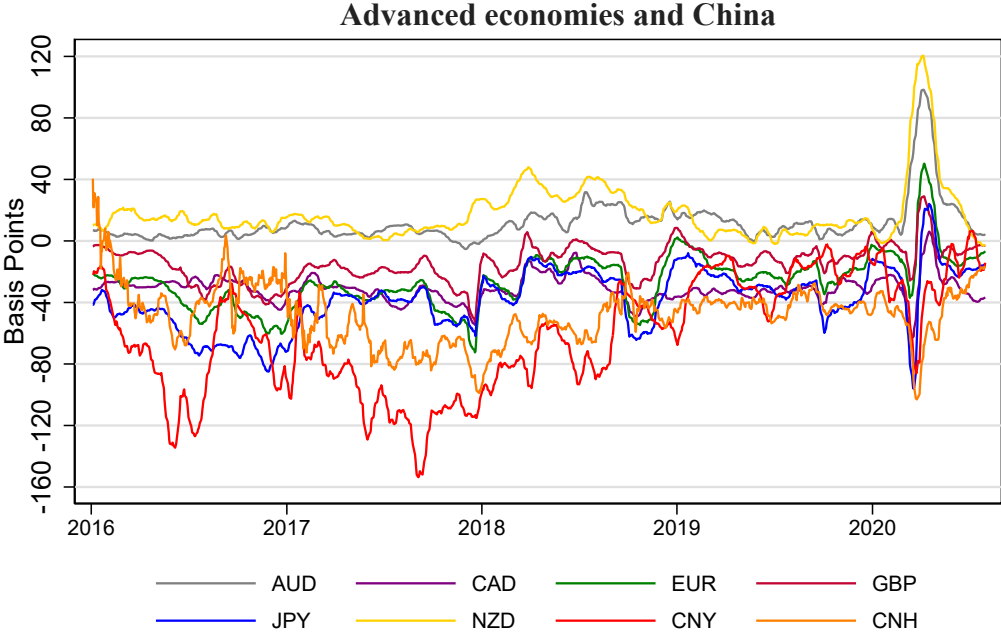
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The USD/CNY and USD/CNH bases also became quite negative in March 2020, as shown in Figure 1, tripling in magnitude to about 110 basis points. (CNY refers to renminbi deposits in onshore Chinese banks, while CNH refers to renminbi deposits in Hong Kong banks.) Compared with a set of advanced economies and emerging market countries whose banks also had large US dollar debt exposures, China was among the countries with the largest negative cross-currency bases in March 2020. The bases for USD/CNY and USD/CNH in March 2020 were more than four standard deviations below their 2019 means, lower than that of any other major foreign currency, as shown in Figure 2. This is clear evidence that Chinese banks had significant difficulty obtaining dollar funding at interest rates prevalent in “normal” times. Evidently, China was not an exception with respect to the widening of cross-currency bases, as many dollar-dependent markets, most notably Japan and the euro area, experienced the same form of stress.

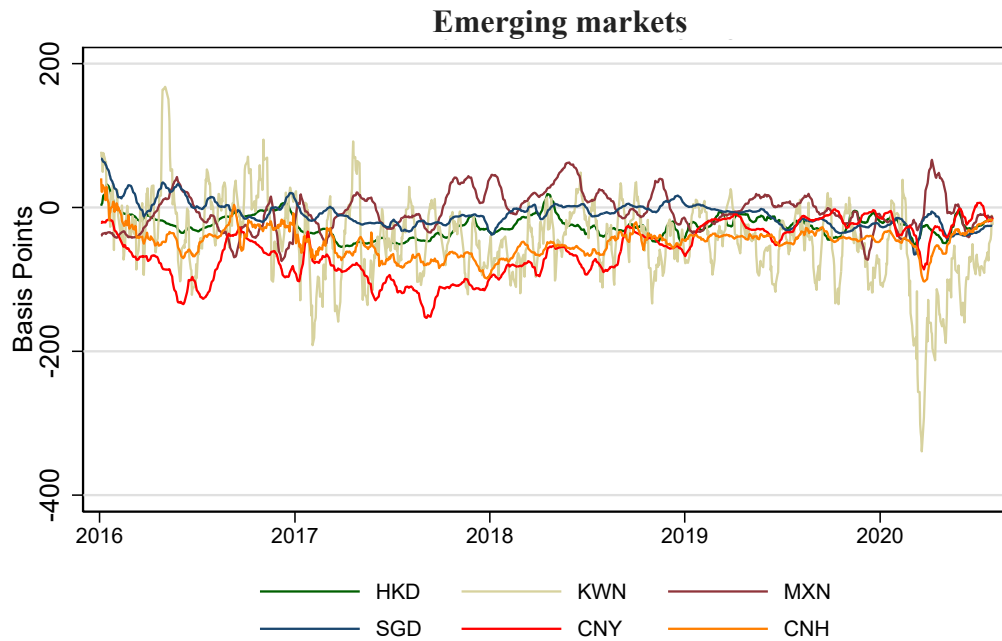
As financial market conditions improved alongside the rapid policy responses by central banks around the world, the difficulty of obtaining dollar funding subsided, and cross-currency bases between the US dollar and currencies of some countries with access to the dollar swap lines not only reverted to pre-March levels but even turned positive, suggesting that countries with adequate sources of dollars became dollar providers. This could have benefitted countries, such as China, that had no dollar swap lines, and is consistent with the fact that the USD/CNY and USD/CNH bases did eventually recover, albeit more slowly than some other cross-currency bases.

A cross-currency basis is only one of the available indicators of market stress in dollar funding markets. We next review how dollar borrowing has grown in China’s financial and non-financial sectors.

Figure 1. Cross-currency bases, including USD/CNY and USD/CNH

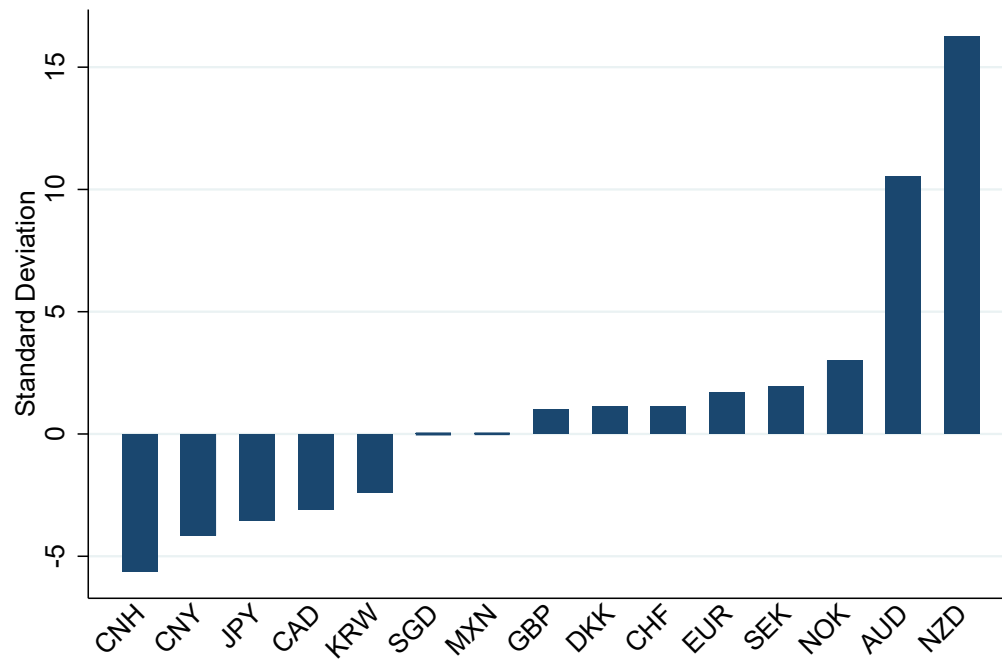


Source: Bloomberg. The figure plots the 10-day moving averages of the three-month Libor-based cross-currency basis.



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Figure 2. Cross-currency basis Z-scores: Covid versus 2019

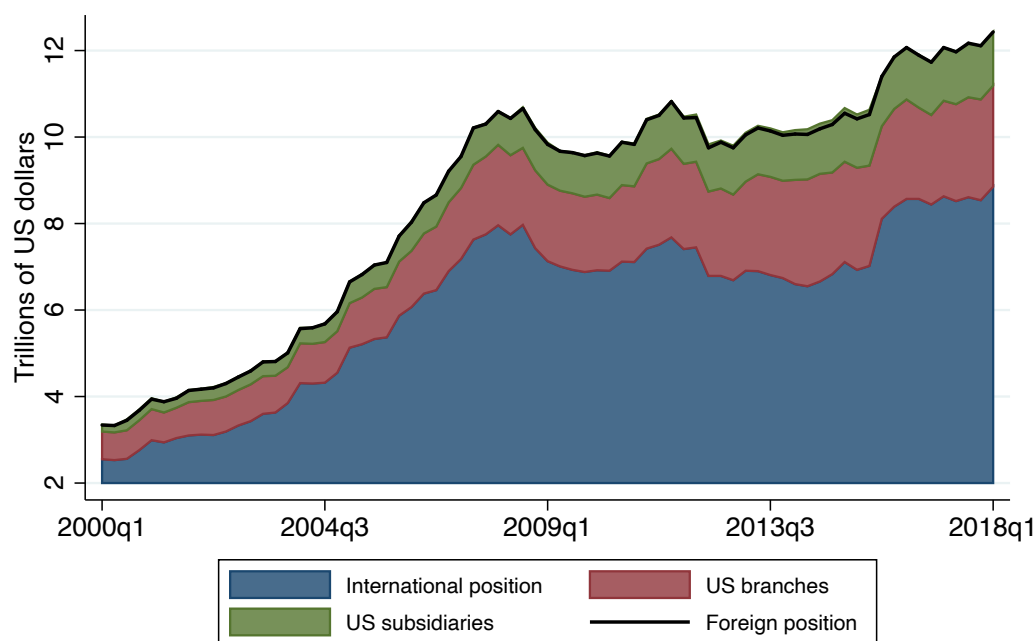


Source: Bloomberg. The figure plots the standard deviations of the three-month Libor-based cross-currency basis during March 17-31, 2020, from the 2019 average.

II. The Extent of China's Dollar-Denominated Debt

Heavy global reliance on dollar-denominated debt has been a phenomenon for some time. Non-US banks commonly issue short-term dollar liabilities, and did so even before the run-up to the Global Financial Crisis. Many non-financial firms in foreign countries also finance some of their activities in dollars. The dollar liabilities of non-US banks have now surpassed their 2007 level, as shown in Figure 3, reproduced from IMF (2019). Aldasoro, Ehlers, McGuire, and von Peter (2020) and the IMF (2019) point to the increased extent of dollar borrowing by foreign entities, including non-US banks, non-bank financial institutions, and operating companies. The outstanding quantity of dollar-denominated international debt securities and cross-border loans is 26 percent of global GDP and is 50 percent of outstanding debt securities in all currencies (CGFS, 2020). Factors that support global reliance on dollar funding include complementarity between dollar trade invoicing and the dollar as a safe haven (Gopinath and Stein, 2021), a preference among global investors for dollar-denominated fixed-income assets (Maggiore, Neiman, and Schreger, 2020), and an independent central bank, the Federal Reserve.

Figure 3. Trends in US dollar activities of non-US banks



Source: BIS Locational Banking Statistics and IMF Global Financial Stability Report (2019). Foreign position consists of international position as defined by the BIS plus the positions in US branches and subsidiaries.

China's dollar-denominated debt is primarily issued by its banks, corporations, and local government financing vehicles (LGFVs). The latter two categories are often lumped together (CGFS, 2020).² Before providing a rough sense of the magnitudes of dollar borrowing by Chinese

² Local government financing vehicles (LGFVs) are semi-independent arms of subnational governments used to raise money for local governments to develop infrastructure projects. Since subnational governments are not permitted to

entities, we emphasize the incompleteness of the available data. For example, the currency denomination of debt issued by Chinese entities is often not reported or is reported inconsistently. Maturity information is typically difficult to find.

II.A The Dollar Exposures of China's Banks

The Chinese banking system is the largest in the world, with total assets³ in Q1 2021 of about 330 trillion RMB, or about 325 percent of GDP, which is also high by global standards. Although much of the domestic activities of Chinese banks are denominated in renminbi, the largest banks are highly active abroad and rely most heavily on the US dollar for their foreign borrowing and lending. Banks dominate the Chinese financial system, holding over two-thirds of its assets. They are highly interconnected with other parts of China's financial system and real economy.⁴

According to publicly available BIS banking data, as of Q3 2021, internationally-active reporting banks in China (which include a small proportion of non-Chinese banks with affiliates in China) have cross-border liabilities amounting to \$1,563 billion, of which \$586 billion (or 37 percent) is dollar denominated.⁵ However, these same banks have \$1,057 billion in cross-border dollar-denominated assets, implying a large dollar funding gap. The BIS data cover total cross-border assets and liabilities in a given currency without a sub-breakdown for maturity. According to public BIS data,⁶ the on-balance sheet dollar funding gap of \$471 billion represents about 20 percent of China's total external debt.

Typically, a dollar funding gap is associated with a reliance on short-term dollar liabilities to fund long-term dollar assets, representing a potential source of financial instability (Aldasoro, Ehlers, McGuire, and von Peter, 2020; International Monetary Fund, 2019; Iida, Takeshi, and Sudo, 2018; McGuire and von Peter, 2009). China's bank supervisors monitor mismatches between assets and liabilities in major foreign currencies.⁷ Chinese banks likely cover some their large dollar funding gap with derivatives such as currency forwards and swaps. The total of direct dollar liabilities and synthetic dollar liabilities achieved in derivatives markets represents a significant rollover risk that becomes apparent during stress periods through an elevated cross-currency basis, as occurred in March 2020.

Comparing with funding gaps in other countries, publicly available BIS data suggest that the dollar funding gap for China's banks is relatively large, in line with those of Japanese and Canadian BIS-

borrow without central government approval, LGFVs have been a common "off-budget" solution--borrowing money that could be paid off by selling land near the infrastructure project, which was expected to appreciate by the time the debt was due.

³ Source: [China Banking and Insurance Regulatory Commission](#).

⁴ Source: IMF's People's Republic of China: Financial System Stability Assessment, 2017.

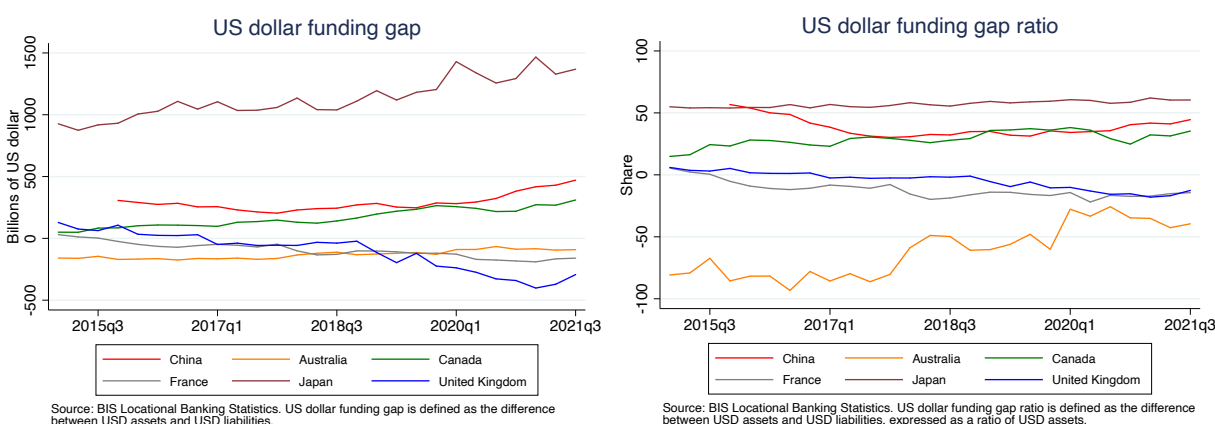
⁵ See BIS Locational Banking Statistics, Table A5. <https://stats.bis.org/statx/srs/table/a5?c=CN&f=pdf>.

⁶ Again, see BIS Locational Banking Statistics, Table A5.

⁷ The Liquidity Risk Rules, Article 40 requires CBIRC to regularly analyze and monitor the liquidity risk of banks and the banking system from the perspective of liquidity risk profile in significant currencies. Additionally, Article 44 requires the CBIRC to decide whether or not to monitor the liquidity risk in each significant currency individually, according to the size of foreign exchange business, mismatches in currencies, and market influence of banks. (IMF Financial Sector Assessment Program, Basel Core Principles Assessment, p. 211.)

reporting banks, and is increasing. Banks in countries with negative gaps, such as those of Australia, France, and the United Kingdom, as well as US banks themselves, would in principle be able to provide dollar funding to China’s banks. Figure 4 shows the dollar funding gaps by country, relying on publicly available BIS data. However, data for most countries include local positions (domestic lending and borrowing in US dollars), whereas China does not report these domestic exposures to the BIS. Moreover, the publicly available BIS data do not include bilateral relationships among reporting entities on a national basis (including the extent to which Chinese banks lend to each other in dollars within China), which could affect the overall reported quantities for China. Based on confidential underlying data, the analysis of Aldasoro, Ehlers, McGuire, and von Peter (2020) shows that combined funding gap of the four largest Chinese banks moved from positive to negative from 2016 to 2018, which suggests they had more dollar liabilities than dollar assets - a situation that could be present even now. This piece of evidence, taken together with the publicly available BIS data, implies that these four banks could help to fund the (larger) funding gaps of the other Chinese banks. It is possible, however, that the public BIS data provide an inaccurate portrayal of net Chinese bank exposures or both.⁸

Figure 4. US dollar funding gaps.



BIS debt securities statistics cover debt issued by Chinese banks, in terms of both outstanding amounts and net flows. International debt outstanding issued by Chinese banks amounted to \$80.8 billion out of the \$229.6 billion total international debt outstanding as of Q2 2021, some 35 percent. Of the international debt outstanding, \$63.5 billion (79 percent) is dollar-denominated. Of the total bank debt, the original maturity over one year (of the amount outstanding) was 93 percent. Without more maturity information, we are unable to deduce the exact extent of liquidity or rollover risk, but the dollar proportions indicate that these risks could be large. The average maturity of bank debt tends to be relatively short in comparison with other non-bank corporate debt

Chinese banks also have dollar liquidity and credit exposures through their lending to borrowers in countries involved in the Belt and Road Initiative (BRI). Horn, Reinhart, and Trebesch (2021) estimate that around 75 percent of BRI loans are denominated in US dollars and are provided by China’s development banks and four largest commercial banks, which are predominantly state

⁸ See footnote 5 from Aldasoro, Ehlers, McGuire, and von Peter (2020).

owned. Updated AidData suggest that between 2000 and 2017, \$1.6 trillion of dollar-denominated loans and grants (in 2017 constant dollars) were provided to BRI countries--90.6 percent of the total. These Chinese lenders typically require the borrower to deposit the loan proceeds in the lender's bank. Because of this, the balance sheets of these Chinese banks may not accurately reflect the associated net credit and liquidity exposures. However, since the four large commercial Chinese banks have more than enough liabilities to cover their assets, they appear to avoid the problem of needing to roll over their liabilities. These liabilities could potentially be in the form of stable dollar deposits since they are connected to the long-term infrastructure projects of their borrowers rather than runnable short-term debt. Unfortunately, neither the maturity nor creditor composition of the liabilities is evident in the reports. On the other hand, the balance sheet of one of the largest foreign-currency lenders, the China Development Bank, a government-owned entity, *does* appear to have significant dollar (net) exposures, amounting to \$100 billion in 2020, according to its annual report. The takeaway is that the liquidity risk may be somewhat less for the four commercial BRI-reporting banks, though it is impossible to precisely gauge the liquidity risk from public data. (There is also likely to be some credit risk associated with the currency risk facing BRI borrowers.)

II.B The Dollar Exposures of China's Non-Financial Firms

At the end of 2019, Chinese non-financial firms had \$590 billion in outstanding US dollar denominated bonds, accounting for about 36 percent of all dollar bonds issued by emerging market economies (CGFS, 2020). Forty percent, or \$236 billion, is attributed to bonds issued by Chinese property developers and LGFVs, entities that have no natural dollar-based revenues (CGFS, 2020). This suggests a mismatch that would often need to be hedged in FX derivatives markets or rolled over. The \$590 billion in outstanding offshore bond issues of Chinese corporations (including LGFVs) accounted for approximately 29 percent of China's total external debt of \$2.1 trillion at the time.⁹

In 2020, it was estimated that between 2019 through 2024 a total of \$488 billions of US dollar bonds issued by Chinese firms were to be extinguished or rolled over with new funding (CGFS, 2020). Among the most stressed of the associated borrowers are property developers, who have been hit by regulatory leverage constraints.¹⁰ As of November 2021, they were facing around \$41.5 billion in US dollar liabilities maturing in 2022 alone (Bloomberg).¹¹ Defaults on dollar-denominated debt in the fall of 2021 by Evergrande, the largest property developer in China, suggest that rollovers may be difficult if lenders observe further weaknesses in this sector.

In sum, non-financial Chinese corporates have a large proportion of the outstanding dollar bonds issued internationally from emerging-market countries. The dollar amounts of these bonds are

⁹ Source: World Bank, Joint External Debt Hub.

¹⁰ On February 28, 2021, for example, the [Financial Times \(FT\) reported](#) the default of a \$530 million dollar bond issued by China Fortune Land Development. Specifically, the FT reported that "The Chinese government outlined a plan in August [2020] aimed at reducing leverage according to three metrics — the so-called three red lines. Analysts have suggested the guidelines are directly affecting primarily the 12 biggest developers."

¹¹ Estimated from Bloomberg News, "China's Developers Face \$1.3 Billion in December Bond Payments, November 28, 2021.

large. Moreover, a large proportion of these bonds have relatively short maturities (requiring rollover by 2024) and are obligations of entities that have no natural source of dollar income.

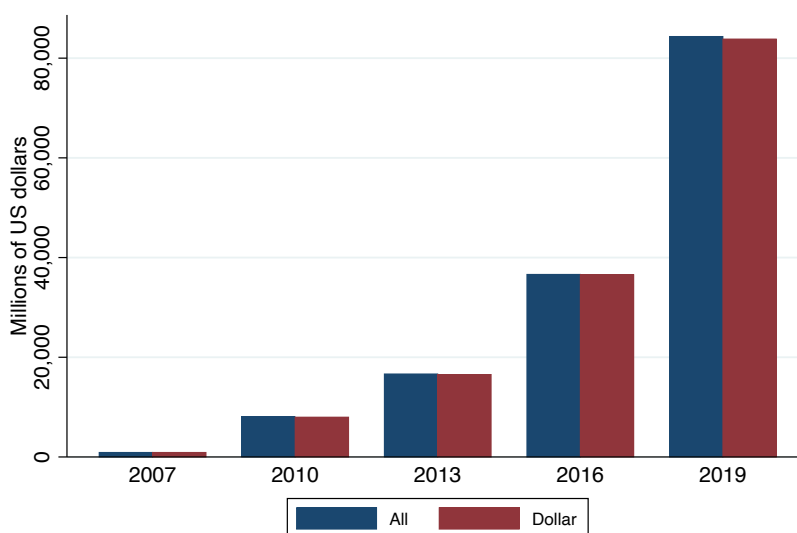
While the information that we have provided about dollar-based exposures of Chinese entities is far from complete, we believe that the available data imply that China has significant dollar exposures that could strain the ability of Chinese banks and corporations to source sufficient dollar funding during a period of stress.

II.C China’s US Dollar Exposures Are Growing

Although we are unable to obtain an all-in picture of dollar funding exposures in China, given the incomplete available information, the trend toward greater US dollar borrowing and lending by Chinese entities is unmistakable. Moreover, this increase in dollar exposures has been faster in China than in the rest of the world. China is special, in this way, partly because of the faster growth in demand for credit by Chinese firms, relative to the rest of the world, and partly because of the expansion of the Belt and Road Initiative, under which lending in dollars is preferred by both China’s lenders and by BRI borrowers.

Further evidence of China’s growing use of dollar funding is the expanding reliance of Chinese entities on foreign exchange swaps. The increased use of derivatives, and especially foreign exchange swaps (which underlie the cross-currency basis), is evident from the data on derivatives turnover in [BIS Triennial Surveys](#). Figure 5 shows increasing net notional volumes of trade of FX swaps by entities in China.¹²

Figure 5. FX swap turnover by entities in China
(net-gross basis, average daily volume)



Source: BIS Triennial Central Bank Survey of Foreign Exchange and Over-the-counter (OTC) Derivatives Markets.

¹² China is only 2.6 percent of all FX swap turnover as of 2019. The proportion of dollar-based FX swaps in the global FX swaps market is 90 percent: for China it is 99 percent.

III. Spillovers from China

Dollar funding stress in China could spill over to the rest of the world through several channels.

A lack of funding in US dollars for Chinese non-financial corporates and financial intermediaries could result in difficulties in the ability of these firms to roll over dollar-denominated debt, potentially causing them to default to their lenders, which include US banks and banks to which US banks have exposure. In turn, defaults or distress of Chinese non-financial corporates or financial-sector firms could lead to concerns that other similarly positioned institutions, both in China and in other countries with dollar exposures, would also default.

A recent example is contagion risk from the debt troubles of China Evergrande, a large Chinese real estate developer. Such financial disruptions can (and have) caused dollar-denominated corporate credit spreads to widen, affecting other asset classes, including those of US-based high yield debt. For instance, the rising default risk of Evergrande induced significant widenings of bond spreads in connected countries in Asia and in the US high-yield bond market.¹³ Aside from detrimental effects on the cost of debt financing, dollar funding stress in China could induce fire sales of dollar-denominated assets such as US Treasuries and a contraction in the quantity of credit in some countries in which Chinese banks are active lenders. These financial stresses could trigger or exacerbate a regional or global recession, among other knock-on impacts to the economies of many connected countries. Surges in sales of US Treasuries can also cause dysfunctionality in the secondary market for Treasuries, as occurred in March-April 2020 after the World Health Organization declared COVID to be global pandemic.

China's direct financial linkages with the rest of the world have increased in recent years, even though they are more limited than what would be implied by the size of its economy, in large part due to its gradual approach to a loosening of capital controls. Among the advanced economies, Japan and the European Union have the greatest financial exposure to China. Direct linkages between China and the United States have been growing, as US mutual fund exposures to China have increased through both equity and debt.¹⁴ With such increased investor exposure to Chinese financial markets, investors in global bond and equity mutual funds could experience a relatively rapid decline in their wealth after a fall in Chinese debt and equity prices. Another link, in the opposite direction, is the significant amount of US Treasuries held in China's foreign exchange reserves.

Despite the nascent direct linkages, the transmission of financial shocks to date has been experienced through changes in market sentiment and the repricing of risks. For instance, in August 2015 and January 2016, rapid declines in the Chinese stock market of 26.7 percent and 18.8 percent were felt in the United States, with declines in the S&P 500 over the same period of

¹³ The weaknesses discovered in Evergrande, a Chinese real estate developer, on September 14, 2021 and its default on its dollar-denominated debt caused debt yield spreads to increase by 9.5 percent in South East Asian debt markets and by 3.9 percent on US high-yield debt. For instance, correlation between the EM Asian corporate bond index and the US high-yield index increased from -0.13 from January 1, 2021 to September 14, 2021 to 0.57 during the period of distress in September. Source: ICE-BofA Indices.

¹⁴ Of the top-ten Exchange Traded Fund flow recipients in 2021, iSHARES Core MSCI Emerging Market EFT, has large equity exposures to greater China--26 percent to Hong Kong, 15 percent to Taiwan, and 5 percent to mainland China--adding up to 46 percent.

7.7 percent and 8.8 percent, respectively. Recent estimates by the [OECD researchers Pain and Rusticelli \(2022\)](#) suggest that a slowdown in China induced by stresses in the property development sector would affect global equity markets, partly over uncertainty surrounding financial conditions, and cause a repricing of risks. The OECD global economic model suggests that the largest financial impact would fall on Japan, followed by the United States and then the European Union. Perhaps surprisingly, their model suggests that the financial impact for the United States would be higher than the trade and supply shock components. Generalized contagion through global financial markets could also impact countries that maintain hubs for financial markets of all types. For instance, London, New York, Singapore and Hong Kong Special Administrative Region (SAR) account for 75 percent of all OTC foreign exchange transactions in 2019.¹⁵

Shocks to the Chinese real economy (the world's second largest) could also find their way to a number of advanced and emerging market countries. Japan and South East Asia would likely suffer the most given their strong trade and supply chain links with China. The United States, however, would not be immune, given that China is its largest trading partner--larger than either Mexico or Canada. US imports from China amounted to \$435.5 billion in 2020—about 18.6 percent of total US imports—and these imports are invoiced and financed predominantly in US dollars.¹⁶ Difficulties in obtaining dollar liquidity for Chinese importers could result in supply-chain delays and disruptions, including a need for importers to find other suppliers, disrupting consumer goods and other intermediate inputs sourced from China.

IV. Potential Solutions to a Lack of US Dollar Funding for China

While there are many motivations for issuing dollar-denominated debt, as noted in Section II, excessive build-ups of dollar funding to Chinese corporations and financial institutions are concerning whenever stressful conditions ensue. Recognizing its institutions' large and growing exposures to US dollars, Chinese authorities have taken mitigating measures, but their effectiveness remains unclear, especially in the near term. There are several existing avenues through which China could obtain US dollar funding on short notice; however, the reliability of these avenues is uncertain.

Actions by Chinese authorities

Chinese banks are generally required to maintain mostly balanced positions of foreign currency denominated assets and liabilities (including off-balance sheet derivatives positions). However, even if overall exposures are close to zero, maturity mismatches, whereby short-term dollar liabilities need to be rolled over, are problematic. The new Basel III requirements (specifically, the Net Stable Funding Ratio) attempt to limit excessively risky maturity mismatches in each currency. Although China has officially implemented this standard to counter excessive mismatch risk, maturity mismatches are an integral part of a typical bank's business model.

¹⁵ The BIS Triennial Central Bank Survey of Foreign Exchange and Over-the-counter (OTC) Derivatives Markets in 2019. Table D11.6.

¹⁶ IMF's Direction of Trade Statistics.

Aside from regulations aimed at domestic banks, Chinese authorities are increasingly restricting debt issuance by non-financial corporations in the property sector and by LGFVs.¹⁷ Lowering overall debt issuance of non-financial corporations and LGFVs could reduce dollar exposures, but only if dollar-denominated debt is reduced proportionately. Regulations now state that new loans are not to be used to rollover existing debt, so liquidity issues may arise before overall debt levels fall to less risky levels.¹⁸ A proposed nationwide property tax on homeownership may help wean local governments from land transfer fees and help reduce the impetus for LGFVs to issue debt on behalf of local governments.¹⁹ However, few countries have accomplished the goal of insulating their non-financial corporations from the risks of foreign-currency denominated debt, in part due to incentives to move funding activities abroad to circumvent such rules. Nonetheless, China's ability to control large portions of its economy may provide it with the tools to do so.

China's foreign exchange reserves

An often-used measure of a country's ability to withstand liquidity stress is the quantity of its official foreign exchange reserves. The amount of dollar-denominated reserves held by China's State Administration of Foreign Exchange (SAFE), an entity within the People's Bank of China (PBOC), is a closely guarded secret. As of the end of August 2022, SAFE reported total foreign exchange reserves of \$3.055 trillion (down from \$3.8 trillion in 2013), which is a four-year low. Still, SAFE has the world's largest foreign exchange reserves, nearly \$1.8 trillion dollars more than Japan's reserves, the world's second largest. IMF data show that, in aggregate, 59.2 percent of all central banks' FX reserves are dollar denominated. If this percentage is applied to China, then a rough estimate of \$1.8 trillion of US dollar denominated assets would have been available as of August 2022 as a potential source of liquidity, assuming that in a stressful event SAFE would have been willing to sell or obtain dollar financing from these assets (perhaps through the Fed's FIMA Repo Facility, discussed below) and assuming that these dollar assets are not already encumbered.

As another way to estimate China's holdings of US dollar bonds, the US Treasury Department's Treasury International Capital (TIC) System publishes [data](#) covering the holdings of various US dollar-denominated securities by country, including total holdings of long-term securities (US Treasuries, Agencies,²⁰ debt, and equities). As of June 2022, Chinese private and official sector investors (which include SAFE) together held \$1.5 trillion of these long-term US securities, of which \$0.97 trillion are long-term US Treasuries and \$244 billion are US Agency securities.

In principle, if China's banks or corporates were to experience dollar funding stresses, SAFE could sell or finance some of its dollar-denominated assets, so that the PBOC could lend the dollar

¹⁷ The "three red lines" for property companies refer to the regulations of the financing and debt levels of property developers, including (1) liability-to-asset ratio (excluding advance receipts) of less than 70 percent, (2) net debt-to-equity ratio of less than 100 percent, and (3) cash-to-short-term debt ratio of more than 100 percent. Authorities have limited local governments' ability to raise off-balance-sheet financing to backstop local government-owned entities (IMF 2021). In July 2021, the authorities ordered banks and insurers to refrain from providing fresh liquidity to LGFV platforms that enjoy implicit guarantees from local governments.

¹⁸ See Ministry of Finance statement "Notice on Issuing the Operational Guidelines for Adjusting the Use of Local Government Special Bonds" at http://yss.mof.gov.cn/zhuantilanmu/dfzgl/zcfg/202111/t20211110_3764807.htm

¹⁹ Huang, T, "China's looming property crisis threatens economic stability," Petersen Institute, January 12, 2022.

²⁰ These include bonds issued by Freddie Mac, Fannie Mae, and Ginnie Mae.

proceeds to China's banks, which could in turn lend dollars to firms in China. In the month of March 2020, the quantity of Treasuries owned by foreign official-sector owners that were custodied by the Federal Reserve Bank of New York fell by slightly over \$100 billion, suggesting that some central banks liquidated their Treasuries, perhaps in part to alleviate dollar stresses in their banking systems. [TIC data](#) show that China's total holdings of US Treasuries declined by only \$20 billion between February and April, 2020, indirectly suggesting that SAFE was not much of a source of dollar funding relief, at least via these holdings. Dollar assets are presumably held by China's official sector and banks outside the United States, so it is possible that China provided dollar liquidity obtained from these other locations.

Although funding relief was not apparent in the turmoil of 2020, more recent developments suggest otherwise. Between January and July of 2022, while the renminbi fell against the US dollar by around 6 percent, which has made it increasingly expensive for Chinese property developers to meet their dollar obligations, China's holdings of US Treasuries dropped by \$98 billion (9.2 percent).²¹ This might suggest the indirect use of FX reserves. Chinese authorities have also used other tactics to allow banks to provide dollar funding to property developers, including a lowering of the foreign exchange reserve ratio from 9 percent in May 2022 to 6 percent in September 2022 and managing a slow but steady alteration of the official fixing of the midpoint of the USD/CNY FX range. These actions suggest that some gradual, mostly indirect, interventions have been implemented to slow the depreciation of the renminbi and soften the blow to property developers without directly parting with FX reserves.

FX reserves serve other purposes, including the management of exchange rates and the need to pay for imports. In the past, SAFE has been willing to part with foreign exchange reserves for various purposes. In recent years, SAFE has reduced the degree to which it uses its reserves to support the price of the renminbi. The number of months of import coverage is a common benchmark of FX reserve sufficiency. As of the end of 2021, SAFE reserves covered 13.3 months of China's imports, which would be considered adequate by international standards. On the other hand, relative to broad money (M2), SAFE's FX reserves are below a generic safety threshold of the IMF. This measure considers how reserves could be used to cover a domestic banking deposit outflow from China. Taking into account China's use of capital flow measures, including limitations on capital outflows, the IMF judges its reserves to be adequate.

It's far from obvious that China would wish to suddenly liquidate a large amount of its dollar-denominated official reserves to cover a stressful dollar funding gap in China's banking and corporate sector. A significant rapid sale of dollar assets would cause price-impact losses, reducing both the proceeds of the sale as well as the mark-to-market valuation of the remaining reserves. Indeed, the lack of functionality of the US Treasury market during the March 2020 "dash for cash" suggests a very real risk that liquidation of US Treasury holdings could be detrimental to large holders' balance sheets.²² Moreover, the associated reduction in dollar-denominated FX reserves would leave China more exposed to future stresses.

The FIMA Repo Facility

²¹ As of September 20, the renminbi was down 10.6 percent against the US dollar.

²² See G30 Working Group on Treasury Market Liquidity (2021).

Rather than liquidating US Treasuries outright when domestic borrowers, including banks, face stressed conditions for the acquisition of dollars, a central bank could potentially obtain dollar financing in exchange for its Treasuries through the Fed's new repurchase agreement facility for foreign and international monetary authorities, the [FIMA Repo Facility](#). Using this facility, a central bank with a custodial account at the Federal Reserve Bank of New York can obtain repo financing for securities held in its custodial account. The interest rate for this facility is 25 basis points, as of April, 2022, with a per-counterparty limit of \$60 billion. The identities of account holders are confidential. Access to this facility is at the discretion of the Fed, which has the right to approve or deny requests when they are made.²³ Assuming that the PBOC has such an account, it could post its Treasuries and Agencies as collateral and obtain US dollar funding, which could be on-lent to banks in China.

To date, the *FIMA Repo Facility*, which was established as a temporary facility on March 31, 2020 before becoming a standing facility on July 27, 2021, has not been drawn on significantly. In the spring of 2020, the largest use of FIMA occurred during the week of May 13, with an uptake of \$1.4 billion, followed by two other uses (in the weeks ending July 1, 2020 and September 30, 2020, of about \$1 billion each). This facility did not play a significant dollar funding role during the crucial March-May 2020 period of dollar funding stress, perhaps because the stresses in market conditions were already dissipating by the time that FIMA was set up. Nevertheless, the FIMA Repo Facility potentially can be an effective avenue for providing dollar funding to the PBOC, and thus to China's banks, during a dollar liquidity crunch.

Other countries' swap lines

Another potential avenue for dollar funding is through Chinese banks with affiliates in other countries that have more abundant dollar funding, including through Fed central bank swap lines. Central banks with unlimited Fed swap lines include the ECB and those of Canada, Japan, Switzerland, and the United Kingdom, although Canada has not used the facility.²⁴ The central banks of these countries would need to accept the credit risk of the Chinese bank affiliates in their jurisdictions if they were to supply dollar funding to them. The short-term debt ratings of the four largest Chinese banks are all P-1, F1+, and A-1 from Moody's, Fitch, and S&P, respectively. We believe that it's natural to view these four giant, mostly state-owned, banks as "too big to fail," and also too affiliated with the government of China to be allowed to fail, except in the most extreme scenarios. Most central banks of countries that can provide local dollar funding explicitly state that they would only lend swap-related dollars to banks that are licensed in their countries or that have formal accounts with the respective central banks. Several Chinese commercial and wholesale banks have this central-bank access, through which dollar funding could be provided.

Chiang Mai Initiative Multilateralization

After the Asian Crisis of 1998, the ASEAN+3 countries' Chiang Mai Initiative provided for a common swap pool, the Chiang Mai Initiative Multilateralization (CMIM). Conceptually, this pool

²³ See <https://www.federalreserve.gov/newsevents/pressreleases/fima-repo-facility-faqs.htm> and https://www.federalreserve.gov/monetarypolicy/files/FOMC_StandingFIMAREpoResolution.pdf

²⁴ See Goldberg and Ravazzolo (2021) for an evaluation of the effectiveness of these swap lines during the stress period of 2020.

is meant to be drawn when any member country has insufficient foreign exchange reserves to support its currency or to meet capital outflows.²⁵ Japan and China are the largest contributors of FX reserves to CMIM, with much lower amounts committed by the other ASEAN+3 countries. A likely implication is that Japan and China would be the suppliers of liquidity for the other countries. The facility has been sized with this in mind, at only \$240 billion. However, with Japan and China each having much greater US dollar funding needs than the other members combined (see Figure 4), at this point it would be difficult for this facility to fulfill its formal mandate to provide reserves for any member country. Indeed, some of the other member countries in the region who could have used the CMIM in March 2020 preferred to tap the IMF's liquidity facility rather than use the CMIM facility, which has yet to be accessed.

Avenues through Hong Kong SAR

As the financial center closest to mainland China, Hong Kong SAR has served as a conduit for financial flows into and out of mainland China. Although the Hong Kong Monetary Authority (HKMA) does not have a dedicated swap line with the Fed, it has facilitated dollar flows between international financial markets and China through its dollar swap facility, and could potentially keep some amount of dollars flowing into China. On July 30, 2021, the HKMA decided to convert its existing temporary US Dollar Liquidity Facility into a standing arrangement, following the announcement that the Fed converted its temporary FIMA Repo Facility into a standing arrangement on July 28, 2021. The HKMA offers a collateralized dollar liquidity facility of \$10 billion to its licensed banks, which include several mainland Chinese banks, on the same terms as the FIMA Repo Facility.²⁶ The HKMA maintains the discretion to scale back or deny bids of the licensed banks.

The ability to post Chinese bonds as collateral internationally

Owners of bonds issued by entities in China could in principle obtain secured dollar financing by posting those bonds internationally as collateral. Currently, however, international central securities depositories do not have arrangements that would allow this. In April 2021, BNY Mellon announced that its triparty platform now accepts Chinese bonds as collateral, when pledged through Hong Kong's Bond Connect.²⁷ In a separate report,²⁸ the CEO of BNY Mellon Government Securities stated that "The Chinese bond market is now the second largest in the

²⁵ The CMIM has been further reinforced since 2014: i) the size has been doubled to USD240 billion; ii) the IMF de-linked portion has been raised to 30 percent of each member's quota; iii) the maturity and supporting period has been extended; and iv) a crisis prevention facility by the name of CMIM Precautionary Line (CMIM-PL) has been introduced.

²⁶ Details about the extension and functioning of HKMA's collateralized dollar liquidity facility can be found at <https://www.hkma.gov.hk/eng/news-and-media/press-releases/2021/07/20210730-3/>.

²⁷ BNY Mellon (2021) wrote: "In the first trade, which printed last week, a broker-dealer client was able to collateralize Chinese government securities through BNY Mellon's triparty solution. Under the transaction, BNY Mellon accessed the client's bonds, which were under custody at HSBC, and reflected the assets in BNY Mellon triparty, enabling the client to use the collateral for financing and other purposes."

²⁸ See "[Chinese govies step closer to collateral acceptability](#)," *Findesk*, July 7, 2021.

world, with overseas investors balances of Chinese assets ever growing. Providing a solution supporting assets to be used as collateral within the secondary market is critical in enabling liquidity, enhancing financial stability and reducing funding risk.”

Although bonds denominated in CNY would typically be assigned a substantial haircut, an increasing ability to pledge China bonds globally would nevertheless open the door to a substantial new potential source of dollar funding for banks, asset managers, or securities dealers in China that hold unencumbered high-quality CNY-denominated bonds, such as Chinese government securities.

V. Conclusion

We have documented that China’s potential needs for US dollar funding during periods of stress are large. China’s use of relatively short-term dollar funding has been increasing and seems likely to continue to grow. In March 2020, pandemic-induced turmoil in global dollar funding markets, as reflected in violations of covered interest parity, afflicted a number of countries relying on large dollar rollovers. The dislocations in dollar funding for Chinese financial institutions seem to have been large, judging from the data that we have presented from the cross-currency bases for USD/CNY and USD/CNH.

During future periods of stress in dollar funding markets, China might have difficulty in quickly sourcing a sufficient quantity of dollar financing to control liquidity stresses on its financial institutions and corporate sector, which could lead to global spillovers.

After noting some of the solutions that the Chinese authorities are attempting to implement to mitigate dollar exposures, we documented some avenues for dollar funding to Chinese entities during stress periods. Among these, the FIMA Repo facility (to the extent available to the PBOC) may turn out to be effective, in terms of size and immediacy, assuming that China’s FX reserves include a large quantity of US government securities that are custodied at the Federal Reserve Bank of New York. FIMA and central bank swap lines are partial substitutes for each other – neither is likely to cover all needs, and both offer significant potential dollar funding to central banks facing a dollar funding stress event.

In any case, there is a risk of disruption to dollar funding markets arising from a potentially large and sudden need for China’s banks and corporates to roll over dollar-denominated debts. Absent a means of rapidly and efficiently dealing with these large dollar funding stresses, the adverse impacts on China’s financial stability and economic growth could be substantial, and could spill over to the rest of the world.

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