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Global banks' dollar funding needs and central bank swap lines

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Global banks' dollar funding needs and central bank swap lines

Key takeaways

- *At $13 trillion, the gross dollar liabilities of banks headquartered outside the United States at end-2019 were nearly as high as before the Great Financial Crisis. Most of their dollar funding was booked outside the United States.*
- *We measure non-US banks' short-term dollar funding needs by comparing short-term dollar liabilities (including off-balance sheet FX swaps) with holdings of liquid dollar assets.*
- *The scale of the central bank swap lines are of similar magnitude to banks' short-term dollar funding needs. Swap line usage peaked in May at $449 billion and has subsided since. However, dollar funding needs of corporates may yet reveal a broader need for dollars outside the banking system.*

During the Great Financial Crisis (GFC), the Federal Reserve set up swap lines with other central banks to defuse an acute US dollar shortage among global banks. With the spread of the Covid-19 pandemic and market dislocations in March 2020, dollar swap lines between the Federal Reserve and 14 central banks were reinstated, and were complemented by a dollar repo facility for other monetary authorities (the FIMA Repo Facility).[1]

This Bulletin assesses the short-term dollar funding needs of non-US banks to gauge the adequacy of central bank swap lines. We do so in three steps, building on McGuire and von Peter (2012). First, we examine banks' gross dollar liabilities, most of which are booked in offices outside the United States. Gross liabilities, however, generally overstate banks' short-term dollar funding needs, since not all liabilities are set to mature soon. Thus, as a second step, we zero in on banks' short-term liabilities using information about the counterparty sector, specifically their net borrowing from other banks, from US money market funds (MMFs) and from the FX swap market. Third, since banks also hold offsetting positions in liquid dollar assets, we estimate a *net* measure of short-term dollar funding needs. The final section compares these estimates with the scale and usage of central bank swap lines.

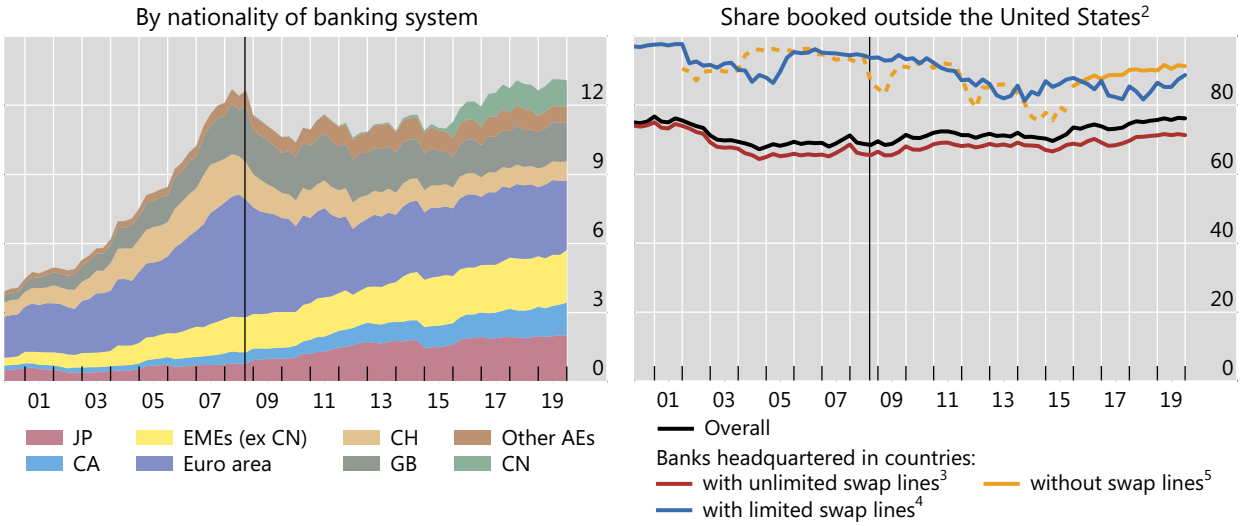
The uptake of dollars peaked in late May 2020 at $449 billion, and has fallen since. Usage may pick up again if financial conditions deteriorate as banks meet the needs of their clients during this exceptional period.

[1] See CGFS (2020), Cetorelli, Goldberg and Ravazzolo (2020), and Eren, Schrimpf and Sushko (2020).

Dollar liabilities of non-US banks inside and outside the United States

At $13 trillion, gross dollar liabilities of non-US banks at end-2019 appear as large as they were just before the GFC.[2] The nationality mix has shifted from European banks, which shrank their global dollar books, to Canadian, Japanese and Chinese and other emerging market economy (EME) banks (Graph 1, left-hand panel). At end-2019, Japanese and UK banks' dollar liabilities topped $2 trillion, while Canadian, French, Swiss, Chinese and German banks' each exceeded $1 trillion. Banks from several EMEs – notably China, but also Russia, Turkey and Chinese Taipei – became substantial dollar borrowers in recent years.

US dollar liabilities on the balance sheets of non-US banks (USD trn)[1] Graph 1



The vertical lines mark the Lehman Brothers bankruptcy (15 September 2008).

[1] Non-US banks' US dollar-denominated liabilities raised in any of the 47 BIS reporting countries (including the United States). Excludes intragroup positions but includes liabilities to other (unaffiliated) banks. From end-2015, includes positions reported by China and Russia. [2] Share booked outside the US in total liabilities. [3] Banks headquartered in AT, BE, CA, CH, DE, ES, FI, FR, GB, GR, IE, IT, JP, LU, NL, PT. [4] Banks headquartered in AU, BR, DK, KR, MX, NO, SE. [5] Banks headquartered in other jurisdictions as reported in the BIS international banking statistics. The break in Q4 2015 is due to the inclusion of China and Russia in the BIS reporting population.

Sources: BIS consolidated banking statistics; BIS locational banking statistics (by nationality); authors' calculations.

Non-US banks use their offices (branches and subsidiaries) around the globe to source dollars. Only a small share (22% at end-2019) of their dollar liabilities are booked at their affiliates in the United States, where dollar funding markets are deep and banks have access to facilities at the Federal Reserve (Graph 1, right-hand panel).[3] The other 78%, a full $10 trillion in dollar liabilities, is recorded on the balance sheets of offices outside the United States. When these dollar liabilities come due, banks must either roll them over or repay them. Central banks with dollar swap lines from the Federal Reserve were able to channel dollars to domestic banks. Among banking systems from jurisdictions without a dollar swap line, Chinese banks' $1 trillion in *observed* dollar liabilities stand out.[4]

[2] They are smaller than in 2007 in relative terms, when scaled by global GDP (see CGFS (2020)).

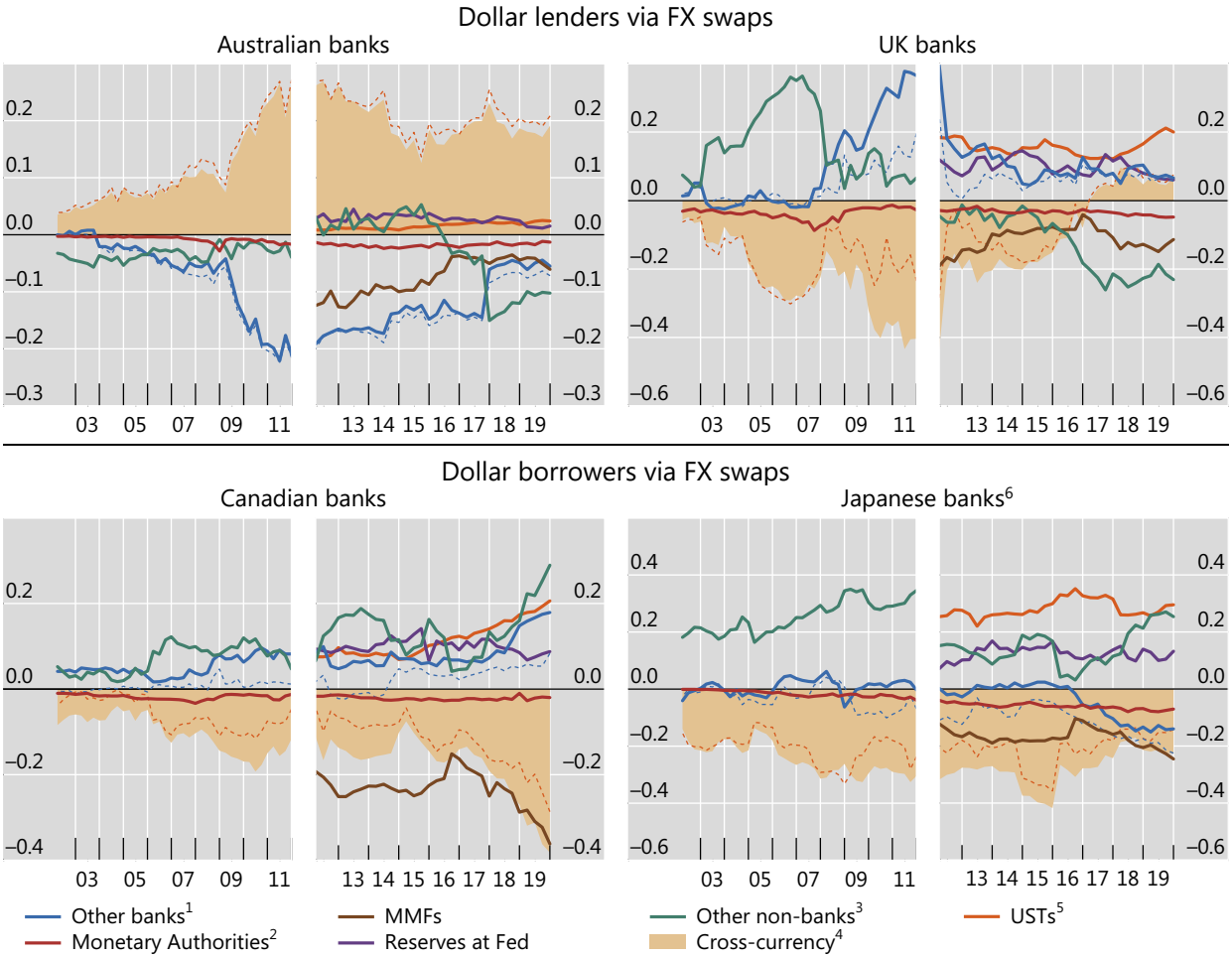
[3] Down from the 30% peak in 2004. European banks drove the downward trend. Non-European banks booked a rising but, at 30%, still low share of their dollar liabilities through their US affiliates (Aldasoro and Ehlers (2018)). The US banking affiliates of foreign banks can borrow from the Federal Reserve against eligible collateral.

[4] In the BIS international banking statistics (IBS), Chinese banks' worldwide US dollar positions are only partially captured; the liabilities shown in Graph 1 are those we *observe*. China reports these banks' cross-border positions, but not their dollar positions vis-à-vis residents of China. Most major reporting countries do not report Chinese banks' dollar positions.

Short-term liabilities and liquid assets

We now turn to short-term dollar funding needs. Borrowing from other banks and from MMFs is mostly short-term, unlike funding from households and firms (eg retail and corporate deposits). Reserves at the Federal Reserve and holdings of US Treasury and agency securities (USTs) are highly liquid assets that can be used to cover short-term liabilities, unlike claims on other non-banks (eg loans and mortgages). Banks' net positions in FX derivatives (unobserved), which are also short-term, can be inferred from the difference between total dollar assets and liabilities under the assumption that banks avoid significant open currency positions by using FX swaps and other derivatives – in line with risk management practices and prudential regulations. Breaking down banks' balance sheets in this way yields estimates of their short-term dollar funding needs (see next section).

Selected non-US banks' net dollar positions: sources and uses (USD trn) Graph 2



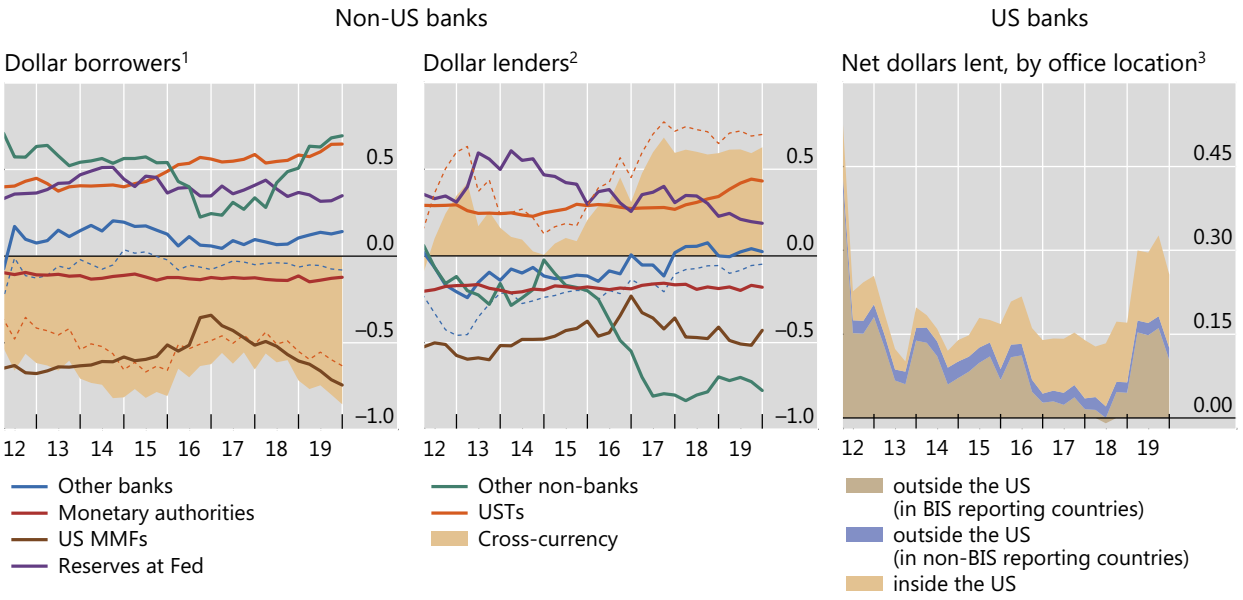
[1] Net positions with other (unaffiliated) banks. Intragroup positions, which should net to zero for any one banking system, are reported with error and thus yield two equally valid estimates of net interbank positions (solid and dashed blue lines) and cross-currency positions (shaded area and dashed orange line). [2] Net cross-border liabilities to monetary authorities (mainly deposits of foreign exchange reserves). [3] In the left-hand panel for each banking system, net positions vis-à-vis all non-banks. In the right-hand panel, net positions excluding USTs and reserves at the Fed and liabilities to MMFs. [4] Cross-currency positions calculated as the difference between total US dollar assets and liabilities (see footnote 1 for dashed orange line). [5] Estimated as holdings by affiliates in the United States (CALL reports) plus consolidated international claims on the US official sector. This is likely an underestimate since international claims on US agencies are generally classified as claims on non-banks. [6] Excludes estimates of trustee positions Japanese banks hold on behalf of customers.

Sources: CALL reports (FFIEC002, FFIEC031, FFIEC041 and FR2886b); OFR US Money Market Fund Monitor; BIS consolidated banking statistics; BIS locational banking statistics; BIS calculations.

Dollar lenders in the FX swap market are those banking systems that can provide dollar liquidity as their on-balance sheet dollar funding (ie liabilities) exceed their dollar assets. The top row of Graph 2 shows two example banking systems. The graphs are split into the time around the GFC using only the BIS international banking statistics (left-hand panels), and the post-GFC period including outside data (right-hand panels). Australian banks (top left-hand panel) have long been net borrowers of dollars from other banks (blue line), from money market funds (brown line), from central banks (ie deposits of foreign exchange reserves; red line) and, in recent years, increasingly from non-banks (green line). They channelled this dollar liquidity into FX swaps (shaded area). For their part, UK banks (top right-hand panel) switched to lending dollars via FX swaps in 2017.

Japanese and Canadian banks are examples of *dollar borrowers* in the FX swap market (Graph 2, bottom row). They borrowed dollars from MMFs and roughly equal amounts via FX swaps, to support their net lending to non-banks (green lines) as well as holdings of reserves and USTs. Other dollar borrowers in the FX swap market include banks headquartered in Switzerland, India and Mexico.

Net positions of dollar borrowing and lending banks via FX swaps (USD trn) Graph 3



See Graph 2 for the definitions of the items plotted in the left-hand and centre panels.

[1] Banks headquartered in: CA, CH, DE, IE, IN, IT, JP, KR, MX, NL and PA. [2] Banks headquartered in AT, AU, BE, BR, CL, DK, ES, FI, FR, GB, GR, HK, LU, NO, PT, SE, TR and TW. [3] Estimates generated by adding the US dollar asset and liability gap reported for US banks' offices outside the US (but in BIS reporting countries) to (i) US banks' cross-border non-US dollar positions booked by offices inside the US and (ii) US banks' net local claims in local currencies vis-à-vis countries that do not report to the BIS locational banking statistics. For (i), US banks' home offices' local non-US dollar positions are not included, and are assumed to be small. For (ii), the implicit assumption is that US banks' net local currency positions are funded by providing US dollars for local currencies via FX swaps.

Sources: CALL reports (FFIEC002, FFIEC031, FFIEC041 and FR2886b); OFR US Money Market Fund Monitor; BIS consolidated banking statistics; BIS locational banking statistics; BIS calculations.

Dollar borrowers (Graph 3, left-hand panel) obtained between $630 billion and $855 billion via FX swaps, and channelled these funds into liquid assets and to non-banks (green line). For their part, the dollar lenders (centre panel) supplied between $628 billion and $701 billion. On net, non-US banks as a whole therefore needed around $227 billion from other sources. An estimate of dollars provided via FX swaps by US banks (right-hand panel) suggests that, in principle, they could have filled this gap.[5] However,

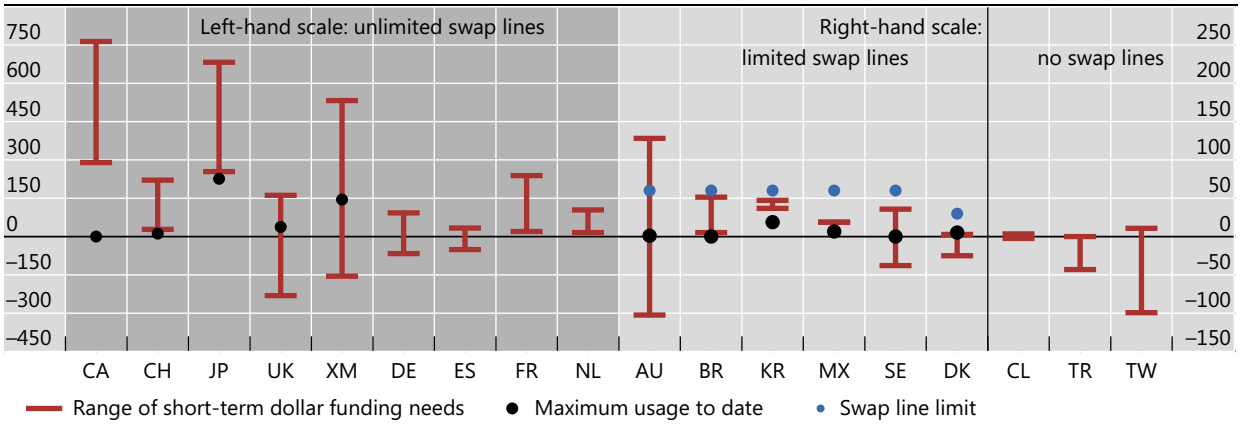
[5] This analysis excludes Chinese banks, which have large dollar positions not fully captured in the IBS (footnote 4). The positions that *are* captured show a gap of between $200 and $300 billion at end-2019, which would put Chinese banks among the largest dollar borrowers via FX swaps. However, Chinese data on foreign currency positions of domestic depository institutions show

disruptions in other dollar markets (eg MMFs) or a deterioration in financial conditions more generally have at times upset the balance of supply and demand of dollars in the FX swap market. This goes beyond the dollar lending and borrowing of the banking sector, as non-banks may scramble for short-term funding when financial conditions tighten.[6]

Short-term dollar funding needs and US dollar swap lines

To gauge the dollar funding needs of banks, we consider upper and lower bounds (Graph 4). At a minimum, banks' short-term dollar needs comprise their maturing dollar obligations, less all short-term/liquid dollar assets that can be used to meet such outflows. Banks' short-term borrowing – FX swaps[7] and borrowing from other banks and MMFs – must be repaid or rolled over to finance banks' net claims on "other non-banks" (green lines in Graph 3), which are long-term and/or illiquid.[8] This is our *lower bound*, which can be negative when banks have more liquid assets than short-term dollar liabilities.[9]

Short-term funding needs and central bank swap lines, by banking system (USD bn) Graph 4



Sources: Federal Reserve; BIS consolidated banking statistics; BIS locational banking statistics (by nationality); authors' calculations.

Our *upper-bound* measure, on the other hand, recognises that banks cannot or may not wish to sell their liquid assets. This is the case if banks' target portfolio includes *all* positive net claims on the sectors shown in Graph 2, such as their short-term interbank lending or holdings of liquid assets (reserves and USTs), which may help satisfy regulatory requirements, satisfy precautionary motives or be key to the bank's business model. In this scenario, banks would need to roll over all short-term net liabilities to avoid liquidating their short-term assets. The corresponding measure (the sum of the negative lines/shaded areas in Graph 2, excluding the green lines) is our *upper-bound* measure of short-term dollar needs. It exceeds the lower bound and cannot be negative.

a roughly equal gap ($233 billion) in the opposite direction. Bird (2019) shows that the four Chinese G-SIBs combined moved from a positive to a negative net dollar position between 2016 and 2018, suggesting they are dollar *lenders* via FX swaps.

[6] This is true even for EMEs that have increasingly issued local currency instead of dollar bonds. A rising share of this debt is held by foreign investors. Such capital can be more flighty in times of stress, giving rise to a potentially greater sensitivity of holdings to shifts in measured risks. This is dubbed the "original sin redux" by Carstens and Shin (2019).

[7] Swaps are predominantly short-term; holding dollar assets on a currency-hedged basis thus entails short-term funding needs. BIS OTC derivatives statistics suggest that the most frequent maturity of FX swaps is less than a week.

[8] The counterparty sector helps identify which liabilities are short-term (eg the runoff factors in Basel III liquidity regulation). The maturity profile of liabilities to monetary authorities (red lines in Graphs 2 and 3), which mainly capture deposits of foreign exchange reserves in commercial banks, is not known. During the GFC, however, these liabilities proved to be unstable for many banking systems, and thus we assume they are "short-term".

[9] The online appendix details the assumptions behind the construction of these estimates.

The upper bound measure suggests that all but one of the banking systems in Graph 4 had short-term net dollar needs at end-2019, with Canadian banks coming out on top. They relied on MMFs and FX swap markets to fund long-term assets (Graph 2). By contrast, the lower bound estimates indicate that only nine banking systems would still face short-term dollar needs after taking account of short-term assets. Japanese banks, for instance, could reduce their dollar funding needs by using their holdings of reserves and USTs to meet maturing liabilities. Either measure is a fraction of banks' gross dollar liabilities (Graph 1), since some liabilities are long-term and banks hold liquid assets too.

The size of the central bank swap lines is comparable in magnitude to the estimated short-term dollar funding needs for most banking systems in Graph 4. The banks with the largest estimated needs, based on end-2019 data, have access to potentially unlimited dollar facilities (dark-shaded half). At $226 billion and $145 billion, the Bank of Japan and the ECB have seen the largest maximum allotments to banks in their respective jurisdictions. By contrast, facilities in Canada remain unused (black dots). For most of the nine countries with limited swap lines, the estimated needs and maximum auction uptake remained below the limits (blue dots).[10] The FIMA Repo Facility that can also be accessed by central banks without swap lines saw a modest uptake of $1.4 billion.

The combined uptake of dollar swap lines peaked at $449 billion in late May, compared with the $583 billion reached during the GFC. But the amounts outstanding subsided to $183 billion by early July as market-based FX swap pricing normalised (Pozsar (2020)). Yet, circumstances require that banks in turn provide dollar liquidity to corporates and households in need (Setser (2020)). Continued hardship in the global economy may yet reveal a broader need for dollars in the months to come. Non-US corporates may find it more difficult to refinance their dollar debt – in particular in EMEs if foreign investors continue to retreat (Hofmann, Shim and Shin (2020)).

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[10] The dollar facilities of Brazil, New Zealand and Sweden have seen no uptake so far, while for the other jurisdictions outstanding amounts have declined in recent weeks.

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