Online Appendix to BIS Bulletin No 27

The analysis is based on the BIS international banking statistics (IBS), which provide measures of national banking systems' globally consolidated US dollar assets and liabilities positions, broken down by counterparty sector, currency and other dimensions.[1]

A true measure of banks' short-term dollar funding needs requires information about the maturity and liquidity profile of banks' dollar positions, information that is not captured in the IBS. We thus follow McGuire and von Peter (2012) and use the counterparty sector as a proxy for this missing information. To operationalise this concept, we (a) merge the IBS with other data, in order to obtain a more granular counterparty sector decomposition than that available in the IBS; and (b) rely on several assumptions about the maturity and liquidity characteristics of the positons vis-à-vis these counterparty sectors. We discuss each of these elements in turn.

Non-US banks' USD assets and liabilities by counterparty sector

Banks' dollar positions as captured in the IBS are broken down into positions vis-à-vis other banks, official monetary authorities (cross-border deposits of foreign exchange reserves) and non-banks (with subsectors). This suffers from two problems. First, there is no sector information for banks' local positions booked by their affiliates in the United States (see McGuire and von Peter (2012)). Second, positions vis-à-vis non-banks include positions that are clearly short-term or liquid, and which should thus be broken out separately in the construction of our estimates of short-term dollar funding needs.

To deal with these issues, we first merge the IBS with US CALL reports data, which capture the balance sheets of non-US banks' branches and subsidiaries in the United States. This provides banks' holdings of reserves at the Federal Reserve (purple lines in Graphs 2 and 3) and of US Treasury and agency securities by their local US affiliates.[2] To estimate banks' worldwide consolidated holdings of such securities, we add banks' international claims on the US official sector from the BIS consolidated banking statistics (CBS). We also bring in borrowing from US-based money market funds (MMFs) from the Office of Financial Research (OFR).[3] The data series are removed from IBS-reported positions vis-à-vis non-banks, and are treated as stand-alone counterparty sectors (orange, purple and brown lines in Graphs 2 and 3). In a final step, we calculate the bank/non-bank split for the remaining dollar positions of non-US banks' US operations by applying the sectoral shares from the CALL data to the local positions in local currency from the CBS. The end result is that the green lines in Graphs 2 and 3 for "other non-banks" better capture illiquid and/or long-term positions, since they exclude positions known to be short-term.[4]

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[1] We combine the locational banking statistics by nationality with the consolidated banking statistics, following McGuire and von Peter (2012). The appendix in the working paper version provides further detail.

[2] US Treasury and agency securities are almost as good as reserves at the Fed for meeting dollar needs, and account for a sizeable share of high-quality liquid assets at banks operating in the United States.

[3] MMFs played a central role in the dry-up of bank funding during the GFC and also in the recent turmoil (Eren, Schrimpf and Sushko (2020)). These liabilities are typically short-term. The US MMF reform in 2016 shortened their average maturity further as it led to a shift from Prime funds to Government funds, which can only provide short-term repo funding against US Treasury securities (Aldasoro, Ehlers, Eren and McCauley (2017)).

[4] Positions with "other non-banks" will include position with CCPs (eg cleared repo) which can be short-term. Unfortunately, it is not possible using public data to correct for repo funding from CCPs in the way we carved out short-term funding from MMFs.

Assumptions used in estimating banks' short-term US dollar funding needs

In constructing the estimates of short-term dollar funding needs, we rely on the following assumptions:

Assumption 1: Positions (assets/liabilities) vis-à-vis other banks are short-term. Moreover, any gross liabilities to other banks can be met by unwinding gross claims on other banks. This assumption allows us to focus on <u>net</u> (rather than gross) interbank liabilities in constructing estimates of short-term dollar funding needs.

Assumption 2: The IBS captures cross-border positions vis-à-vis official monetary authorities. These mainly represent deposits of foreign exchange reserves, and exclude local liquidity support provided by central banks. The maturity profile of these cross-border positions is unknown, but they proved to be unstable during the Global Financial Crisis (2007-2009), and are thus assumed to be short-term in our estimates.

Assumption 3: Positions vis-à-vis "other non-banks" (ie after carving out borrowing from MMFs, holdings of US Treasury and agency securities and reserves at the Federal Reserve) are predominantly long-term and/or illiquid.

Assumption 4: Following prudential and supervisory guidance, banks avoid large open-currency positions. Thus, the difference between their observed on-balance sheet dollar assets and liabilities can be used as a proxy for their net borrowing (or lending, if negative) of US dollars via FX swaps and other FX derivatives.

Assumption 5: There are no geographic frictions that prevent banks from netting or moving funds across borders. This assumption warrants a consolidated perspective for the global banking group. It also implies that dollar liquidity can be reallocated through internal markets, and intragroup positions do not contribute to dollar needs (Fender and McGuire (2010) elaborate and relax this assumption).

Assumption 6: There are no frictions that prevent banks of the same nationality from netting or moving funds between them. This assumption allows the analysis to be conducted at the level of banking systems.

Armed with these assumptions, the lower- and upper-bound estimates of non-US banks' short-term dollar funding needs are as follows:

Upper bound estimate: The sum of borrowing from MMFs, from official monetary authorities, net interbank borrowing (ie negative blue lines in Graph 2) and net dollar borrowing via FX swaps (ie negative shaded areas in Graph 2). By construction, the upper bound estimate is always positive or zero.

Lower bound estimate: The sum of short-term dollar liabilities (including FX swaps), less all short-term/liquid dollar assets; ie the sum across all short-term *net* positions (area and lines in Graph 2 other than the green lines). Under Assumption 4, the sum of these elements equals net claims on "other non-banks" (green lines in Graph 2); the lower bound can be negative if banks have more liabilities to "other non-banks" than claims on these entities.

Relationship: The lower bound estimate equals the upper bound less holdings of US Treasury and agency securities, reserves at the Federal Reserve, dollars lent via FX swaps (ie positive shaded area in Graph 2) and net interbank lending (ie positive blue lines in Graph 2).

References

Aldasoro, I, T Ehlers, E Eren and R McCauley (2017): "Non-US banks dollar funding grows despite US money market fund reform", *BIS Quarterly Review*, March.

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