ONLINE ANNEX 1.2. BANK INTERNATIONAL DOLLAR FUNDING METHODOLOGY[1]

This annex discusses the methodology used to measure liquidity and funding conditions of non-US banks' *international* US dollar balance sheets, defined to include their dollar positions outside the United States plus those in US branches, but excluding US subsidiaries. US banks are excluded because they only play a small part in the provision of US dollar credit internationally.

The section presents two main dollar liquidity indicators: a liquidity ratio and a stable funding ratio. These metrics, both defined more precisely below, broadly mimic the Basel framework's liquidity coverage ratio (LCR) and net stable funding ratio (NSFR).

The two liquidity metrics are presented at a country aggregate level, based on estimated international dollar balance sheets of banks headquartered in each country. These balance sheets are constructed using a consistent structure and level of aggregation for non–US banks' (1) operations located outside the United States and (2) branch operations in the United States (Online Annex Table 1.2.1). A third element of these banks' operations, US subsidiaries, is excluded. Subsidiary operations play little role in international intermediation, and the funds in these subsidiaries are not easily transferred intragroup across national boundaries or jurisdictions.

Online Annex Table 1.2.1. Non–US Banks' US Dollar Balance Sheet Structure

A: Assets	**L: Liabilities**
A1. High-quality liquid assets	L1. Interbank liabilities
A2. Interbank assets	L2. Intragroup liabilities
A3. Intragroup assets	L3. Bonds
A4. Loans	L4. Other short-term liabilities
A5. Other claims	L5. Deposits
L6. Foreign exchange swap positions: If A > L, then there is a foreign exchange mismatch on the bank's balance sheet. We assume banks use foreign exchange swaps (equal to A minus L) to fund this foreign exchange mismatch.	

Operations outside the United States are captured through Bank for International Settlements (BIS) locational banking statistics, using data by nationality of reporting banks (published in BIS International Banking, Table A7). These statistics capture banks' claims and liabilities vis-à-vis nonresidents in any currency (cross-border positions) plus claims and liabilities vis-à-vis residents of the reporting country in foreign currencies (local positions). The framework draws on unpublished data, provided by the BIS, that include claims and liabilities by currency split into the counterparty sector. The version of the data set published by the BIS presents information either by currency or by counterparty sector, but not both.

[1] This is an annex to Chapter 1 of the April 2018 *Global Financial Stability Report*.

Branch operations in the United States are captured through a bottom-up approach that aggregates by nationality the balance sheet information in the Federal Financial Institutions Examination Council (FFIEC) 002 (foreign banks' US branch) regulatory filings.

This approach can lead to some double counting in the international dollar balance sheet; for example, if the US branch of a foreign bank lends directly to a borrower in another country. However, the distortion is probably minor. Most cross-border transactions proceed intragroup from the US branch to another foreign office, which then lends to a borrower, and these transactions are captured in Table A7.

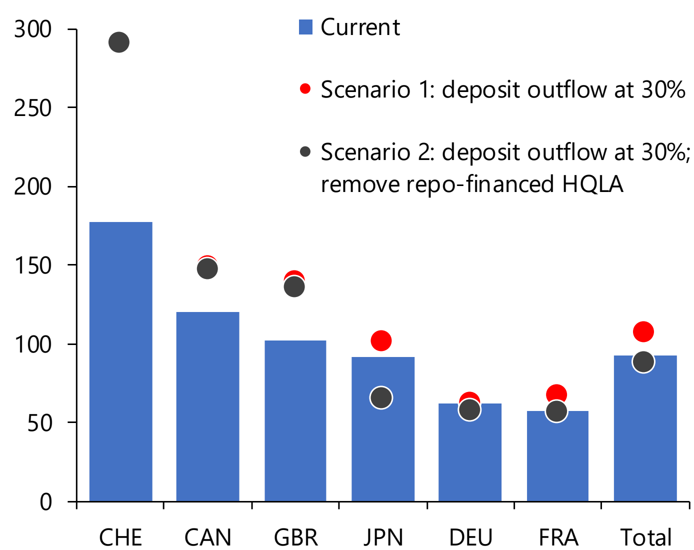
While the FFIEC 002 filings provide all the information needed to construct the entire dollar balance sheet for branch operations in the United States (denoted Module 2 in Online Annex Table 1.2.3), it is more difficult to construct balance sheets for operations located outside the United States (Module 1 in Online Annex Table 1.2.3). BIS statistics provide less information on bank balance sheet composition, in particular high-quality liquid assets (HQLA), bonds, and other short-term liabilities. For HQLA, this framework uses data on *claims on the US official sector* (from BIS consolidated banking statistics Table B4; the official sector includes the general government and central banks) minus HQLA holdings from subsidiaries in the United States, using aggregated figures from the call reports of 28 non–US banks' US subsidiaries whose parent banks are from the countries included in this analysis (see Online Annex Table 1.2.4 for details). For bonds and other short-term liabilities, data on short-term and long-term securities are taken from Table C3 of the BIS debt securities statistics (see Online Annex Table 1.2.3 for further details).

The liquidity ratio is defined as estimated HQLA divided by estimated funding outflows over a relatively short (generally one-month) stress period. Outflow assumptions for the broad liability classes are shown in Online Annex Table 1.2.2. Because of data limitations, the liquidity ratio differs from the Basel Liquidity Coverage Ratio in a few ways. In the numerator, estimated HQLA excludes Level 2 assets (high-rated corporate bonds and some mortgage-backed securities) and holdings of foreign government securities, but includes encumbered HQLA such as those funded by repos. On balance, the net impact on HQLA from these offsetting factors should be limited. The denominator uses simplified assumptions for the maturity profiles of interbank positions and deposits, and applies more conservative outflow assumptions compared with the Basel liquidity framework. The net impact on the liquidity ratio depends on how much these assumptions deviate from reality, but sensitivity analyses suggest that for most banking systems the liquidity ratio does not change meaningfully with less conservative assumptions, especially for those with weaker liquidity profiles (Online Annex Figure 1.2.1). Finally, the outflow assumptions do not consider off-balance-sheet activities, such as committed credit and other contractual obligations, and therefore the approach probably underestimates potential cash outflows.

Online Annex Table 1.2.2. Short-Term Outflow Assumptions

Liability Items	Outflow Assumptions (percent)	Compared with Basel Liquidity Coverage Ratio (LCR)
Interbank assets	80	**In line with Basel:** We assume 80 percent of interbank assets and liabilities mature within 30 days. In line with Basel LCR, the outflow assumption is 100 percent.
Interbank liabilities	−80	
Other short-term liabilities	−100	**More conservative than Basel:** Other short-term liabilities include both secured and unsecured funding. We assume 100 percent of these positions mature within 30 days and apply 100 percent outflow assumptions. For unsecured funding, such as commercial paper, the assumptions are in line with Basel LCR. For secured funding, such as repos, our assumptions are more conservative, likely overestimating the cash outflows and underestimating the liquidity ratio. However, the inclusion of HQLA funded by repos in the numerator helps offset the bias.
Deposits	−40	**More conservative than Basel:** We assume 40 percent cash outflows for all US dollar deposits. This is more conservative than Basel LCR (40 percent applied on wholesale deposits from nonfinancial firms, 25 percent on operational deposits, and 5–10 percent on retail deposits from small business customers), but we think the upward adjustment is appropriate because foreign currency funding is probably inherently more flighty than local currency funding of domestic banks.

Online Annex Figure 1.2.1. Liquidity Ratio Sensitivity Analysis
(Percent)



Sources: Bank for International Settlements; Federal Financial Institutions Examination Council; S&P Global Market Intelligence; bank financial statements; IMF staff estimates and analysis.
Note: Figure uses International Organization for Standardization (ISO) country codes. HQLA = high-quality liquid assets.

The stable funding ratio is defined as stable funding divided by loans, in which stable funding is the sum of total deposits, long-term securities, and long-term swaps. For Japan, according to Bank of Japan data, 70 percent of swap funding is greater than one year in duration and included in stable funding. For other countries, for which this information is not available, 50 percent of swap funding is assumed to be long term. The stable funding ratio is intended to be broadly analogous to the Basel framework's NSFR, but probably generates higher estimates on more favorable funding assumptions. Because of limited information on the maturity profile of deposits, the approach used here includes all deposits as stable funding and applies no available stable funding (ASF) haircut to wholesale deposits.

Online Annex Table 1.2.3. Constructing Non–US Banks' International US Dollar Balance Sheet

Module 1: Operations outside United States

Balance Sheet Items	Data Series from Source	Data Source
A1. HQLA	Claims on ultimate risk basis, official sector *minus* HQLA positions from US subsidiaries *minus* HQLA positions from US branches	BIS consolidated banking statistics, Table B4 for United States Table 1.2.3 A1. HQLA Module 2 A1. HQLA
A2. Interbank assets	Claims on banks *minus* Intragroup claims	BIS locational banking statistics*
A3. Intragroup assets	Intragroup claims	
A4. Loans	Claims on nonbanks *minus* Holdings of government securities HQLA *minus* Claims on central banks *minus* Reserves at US branches	BIS locational banking statistics Table 1.2.2 A1. HQLA BIS locational banking statistics FFIEC 002
A5. Other claims	Total claims (banks plus nonbanks) *minus* A1 to A4 from Module 1	
L1. Interbank liabilities	Liabilities to banks *minus* Intragroup liabilities	BIS locational banking statistics
L2. Intragroup liabilities	Intragroup liabilities	
L3. Bonds	International debt securities, issued by banks, long term	BIS debt securities statistics, Table C3, denominated in US dollars
L4. Other short-term liabilities	International debt securities, issued by banks, short term	
L5. Deposits	Liabilities to nonbanks *minus* Bonds *minus* International debt securities, issued by banks, short term	BIS locational banking statistics Module 1 L3. Bonds Module 1 L4. Other short-term liabilities
L6. FX swaps	Total claims Claims on banks Claims on nonbanks *minus* Total liabilities Liabilities to banks Liabilities to nonbanks	BIS locational banking statistics

* BIS locational banking statistics, Table A7, sum of cross-border and local positions, denominated in US dollars.

Online Annex Table 1.2.3. (continued)

Module 2: Branch Operations within United States

Data source: FFIEC 002, Federal Reserve. Codes in brackets indicate FFIEC 002 form field identifier.

Balance Sheet Item	Data Series from Source
A1. HQLA	Balance due from Federal Reserve Banks [RCFD0090] *plus* Government securities: US government securities [RCFD0260] + US government agency obligations [RCFD0371] + MBS issued or guaranteed by US government agencies [RCFDC416] + Securities of foreign governments and official institutions [RCFDA003] *plus* Trading assets: US Treasury and agency securities [RCFDK479] + MBS issued or guaranteed by US government agencies [RCFDK298]
A2. Interbank assets	Balance due from depository institutions in the United States: US branches and agencies of other foreign banks (including IBFs) [RCFD0083] + Other depository institutions in the United States (including IBFs) [RCFD0085] *plus* Balances due from banks in foreign countries and foreign central banks: Foreign branches of US banks [RCFD0073] + Banks in home country and home-country central bank [RCFD2431] + All other banks in foreign countries and foreign central banks [RCFD3149] *plus* Federal funds sold: With commercial banks in the United States [RCFDC412] + With nonbank brokers and dealers in securities [RCFDF857] + With others [RCFDC413] *plus* Securities purchased under agreements to resell: With commercial banks in the United States [RCFDC412] + With nonbank brokers and dealers in securities [RCFDF856] + With others [RCFDC415]
A3. Intragroup	Net due from related depository institutions [RCFD2154]
A4. Loans	Total loans and leases, net of unearned income [RCFD2122]
A5. Other claims	Other bonds, notes, debentures, and corporate stock: MBS, other [RCFDC417] + Other asset-backed securities [RCFDC036] + All other [RCFDC037] *plus* Trading assets: MBS, other [RCFD3536] + Other asset-backed securities [RCFDK299] + Other securities [RCFDL193] + Other trading assets [RCFDK302]
L1. Interbank liabilities	Transaction deposits from commercial banks in the United States: US branches and agencies of other foreign banks [RCON1643] + Other commercial banks in the United States [RCON1645] *plus* Transaction deposits from banks in foreign countries: Foreign branches of US banks [RCON1646] + Other banks in foreign countries [RCON1647]

Online Annex Table 1.2.2. (concluded)

	plus Nontransaction deposits from commercial banks in the United States: US branches and agencies of other foreign banks [RCON2347] + Other commercial banks in the United States [RCON2348] *plus* Nontransaction deposits from banks in foreign countries: Foreign branches of US banks [RCON2367] + Other banks in foreign countries [RCON2373] *plus* Money market unsecured funding (federal funds purchased): With banks in the United States [RCFDC420] + With others [RCFDC421] *plus* Secured funding (securities sold under agreements to repurchase): With commercial banks in the United States [RCFDC422] + With others [RCFDC423]
L2. Intragroup	Net due to related depository institutions [RCFD2944]
L3. Bonds	Assume branches do not issue bonds, therefore 0 for all
L4. Other short-term liabilities	Trading liabilities [RCFD3548] *plus* Other liabilities to nonrelated parties [RCFD2916]
L5. Deposits	Transaction deposits from nonfinancial depositors: US addresses (domicile) [RCONC040] + Non-US addresses (domicile) [RCONC043] *plus* Nontransaction deposits from nonfinancial depositors: US addresses (domicile) [RCONC041] + Non-US addresses (domicile) [RCONC044] *plus* Nontransaction deposits from foreign governments and official institutions [RCON2377] *plus* All other nontransaction deposits [RCON2259]

Note: BIS = Bank for International Settlements; FFIEC = Federal Financial Institutions Examination Council; FX = foreign exchange; HQLA = high-quality liquid assets; IBF = international banking facility; MBS = mortgage-backed securities.

Online Annex Table 1.2.4. HQLA Holdings of Non–US Banks' US Subsidiaries

Data source: Call Reports.

Balance Sheet Items	Data Series from Source
A1. HQLA	Reserves with the Federal Reserve *plus* US Treasuries held *plus* Other US official sector and agency securities *plus* Foreign government securities