THE LIQUIDITY FRAMEWORK

BOX 2: THE LIQUIDITY FRAMEWORK

The Stress Testing and Risk Models Office (STRM) within the Central Bank of Malta has updated its suite of univariate stress tests with an improved framework for assessing liquidity risk. The test exploits granular data on the securities holdings of banks and adopts a broad definition of liquidity to assess individual domestic banks' counterbalancing capacity in the case of a bank-run type scenario. Counterbalancing capacity is defined as the quantity of funds at the disposal of the bank that can be used to meet liquidity requirements which, for the purpose of this test, is simulated under two different scenarios. A specific survival period of five consecutive days and up to four weeks is assumed. The outcome of the test identifies whether the system and individual banks, following liquidity outflows and the release of counterbalancing capacity, remain liquid or otherwise within the assumed survival period.

Overview of the model

The model draws from various IMF working papers, including IMF Financial Sector Assessment Programmes (FSAP), and works by OeNB experts, particularly Schmieder et al. (2012).[1] The former *Financial Stability Report* liquidity framework, whose results were published in the *Financial Stability Report* 2013 and the preceding published *Financial Stability Reports*, was based on Čihák's 2007 paper.[2] The old framework stressed the liquidity position of banks by assuming persistent deposit withdrawals ranging from 10% to 20% of total deposits daily, for five consecutive days. Banks were assumed to utilise the assets at their disposal which qualified as liquid under the relevant Banking Rules issued by the Malta Financial Services Authority (MFSA). The test did not apply any haircuts to these liquid positions and did not allow banks to tap into other sources of funding, such as ECB refinancing operations and repurchase agreements (REPO). The counterbalancing capacity was rather restricted as only assets in their most liquid form were utilised in the test.

In the current new framework, a broader counterbalancing capacity is assumed as well as a longer survival period. Banks are tested against an extreme but plausible liquidity outflow as a number of depositors withdraw their demand and time deposits. The quantity of funds at the banks' disposal to meet liquidity requirements is tested under two different scenarios with the main difference being the use of ECB eligible securities – under one scenario, only ECB-pledged securities may be used to obtain ECB funding (Scenario 1); whilst in the second scenario, ECB funding may be obtained against all securities that are eligible as at the reference date (Scenario 2). For further detail on the assumptions adopted under the two different scenarios refer to counterbalancing capacity: Scenario 1 and Scenario 2 below. Under both scenarios, instruments issued by banks which mature during the survival period are included as part of the counterbalancing capacity. These are assumed to be rolled over at a higher yield to compensate the bond holder for the increased liquidity risk faced by the bank. The par value and final coupon payment of securities with a remaining term to maturity of less than four weeks are also added. Banks may also utilise their excess deposit with the Central Bank under the reserve deposit requirement, as well as their total reserve. Cash and cash equivalents available on banks' balance sheets also form part of their counterbalancing capacity. Intra-group funding and interbank are however assumed not to be available. This assumption is justified by the funding liquidity challenges for many banks observed in practice during periods of liquidity shortage whereby interbank markets usually dry up.

The extent of deposit withdrawals differs according to the type of customer, type of account and survival period. For example, retail and corporate customer demand deposit withdrawals are set at 1% and 2% daily, respectively. Household deposits represent a rather stable source of funds for banks. Indeed, the Deposit Compensation Scheme limits the extent of deposit withdrawals by households in

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[1] Schmieder et al., (2012), "Next Generation System-Wide Liquidity Stress Testing", IMF Working Paper WP/12/3.
[2] Čihák, (2007), "Introduction to Applied Stress Testing", IMF Working Paper WP/07/59.

a liquidity run scenario given that deposits of up to €100,000 are guaranteed in Malta. Government deposits are assumed to be withdrawn in their entirety during the survival period.

Shorter-dated, three-month term deposits are assumed to mature in a uniform fashion, maturing at a linear daily rate of 1/67 per working day. Longer-dated securities are not accounted for, as an assumed uniform daily maturity rate would result in an insignificant withdrawal.

Counterbalancing capacity: Scenario 1

The counterbalancing capacity is shocked to reproduce a scenario where liquidity on the exchange is thin. In the first scenario, banks can sell all non-HTM unencumbered securities and get ECB funding against pledged securities. In addition, the following is assumed:

- ECB haircuts are applied on pledged HTM and non-HTM securities (see Table 2).
- Non-pledged HTM securities can neither be added to the collateral pool nor liquidated on the market.[3]
- Non-pledged fair value securities are liquidated on the exchange at fire sale rates (further detail on fire sale rates below).

Counterbalancing capacity: Scenario 2

In Scenario 2, banks get ECB funding against all ECB eligible securities, not only against those that are pledged, and sell the remaining non-eligible, fair value securities, which is the main difference compared to Scenario 1. The following is assumed:

- The ECB haircut is applied on eligible HTM and non-HTM securities.
- Non-eligible HTM securities cannot be liquidated.[4]
- Non-eligible, fair value securities are liquidated on the exchange at fire sale rates.

Counterbalancing capacity haircuts

Table 1 below includes information on the haircuts applied on securities that are pledged with the ECB. ECB valuation haircuts differ in terms of security category and remaining term to maturity.[5]

Table 1
ECB VALUATION HAIRCUTS FOR INVESTMENT GRADE SECURITIES
Per cent

Remaining term to maturity (years)	Category 1 Government	Category 2 Supranational	Category 3 Other	Category 4 Financial	Category 5 ABS
0-1	0.5	1.0	1.0	6.5	10.0
2-3	1.0	1.5	2.0	8.5	10.0
4-5	1.5	2.5	3.0	11.0	10.0
6-7	2.0	3.5	4.5	12.5	10.0
8-10	3.0	4.5	6.0	14.0	10.0
11-30	5.0	8.0	9.0	17.0	10.0

Source: ECB.

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[3] Note that this exclusion makes the test more extreme since under stressed situations banks could also liquidate HTM securities irrespective of the accounting rules.
[4] See Footnote 3.
[5] https://www.ecb.europa.eu/ecb/legal/pdf/en_dec_2015_35f.pdf

Table 2
MARKET LIQUIDITY HAIRCUTS (ADVERSE SHOCK)
Per cent

	Category 1 Government	Category 2 Supranational	Category 3 Other	Category 4 Financial	Category 5 ABS
AAA	1	3	6	20	50
AA+ to AA-	1	3	6	20	50
A+ to A-	3	5	8	25	80
BBB+ to C	5	7	15	50	100
D	100	100	100	100	100
WD	100	100	100	100	100

Source: IMF.

With regards to fire sale rates, two scenarios are assumed. In the less adverse scenario, a 10% shock is applied to the bid-ask spread of bonds held in a bank's securities portfolio.[6] In setting more adverse haircuts, the exercise draws from the 2012 IMF working paper by Schmieder et al., and the most recent 2014 Austrian FSAP report, as per Table 2.[7] The haircuts applied differ on the basis of credit rating grade and exposure category.[8]

System-wide implications can be drawn from the analysis of the aggregate bank's position. The outcome of the model is binary in that it identifies whether a bank, following liquidity outflows and its release of counterbalancing capacity, remains liquid or otherwise within the assumed survival period. The extent of excess liquidity, if any, under the stressful conditions is also presented.[9]

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[6]   During September 2008, at the peak of the crisis, the size of the bid-ask spread was in the 5-10% range across different asset qualities. Barnhill and Schumacher (2011) "Modelling Correlated Systemic Bank Liquidity Risks", IMF Working Paper WP/11/263.

[7]   http://www.imf.org/external/pubs/ft/scr/2014/cr1416.pdf

[8]   Categories are aligned with those used by the ECB in its December 2014 *Guideline on the Implementation of the Eurosystem Monetary Policy Framework*.

[9]   Results of the liquidity stress test are included in Chapter 3.