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TREATMENT OF DEBT SECURITIES IN THE MACRO STRESS TESTING'S CURRENT CLIMATE-RELATED ADVERSE SCENARIO

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Article published in the Financial Stability Report 2021, pp. 64-67

BOX 3: TREATMENT OF DEBT SECURITIES IN THE MACRO STRESS TESTING'S CURRENT CLIMATE-RELATED ADVERSE SCENARIO

Within the MST framework, the approach applied on debt securities to quantify risk is differentiated according to the accounting treatment. Bonds held at amortised cost are subject to higher probabilities of default (PDs) consistent with a downgrade in the respective credit rating, while bonds at FV are subject to revaluation losses. While these approaches are applied to all bonds based on their respective characteristics (such as yield, coupon rate and maturity), for a climate-related adverse scenario, shocks should differentiate amongst the various levels of riskiness/exposure to climate risks.

In the 2022 SSM Climate Stress Test (CST), the exposures liable to market risk within the scope for the revaluation calculation include all corporate bonds and stocks in the **trading book** held at fair value through profit and loss (FVTPL). The scope of the market risk stress methodology covers all equity and NFC bond positions under full or partial FV measurement which are **held with a trading intent**, i.e. positions at FVTPL. Associated hedging positions also fall within the scope of the analysis.¹ Banks are asked to classify their bond and stock holdings under the NACE industries as determined by the ultimate parent company. For example, a bond issued by a finance subsidiary of a car manufacturer should not be classified as a bond issued by a financial institution but as an exposure to a manufacturer of motor vehicles.

Overview of Debt Securities Holdings in Malta

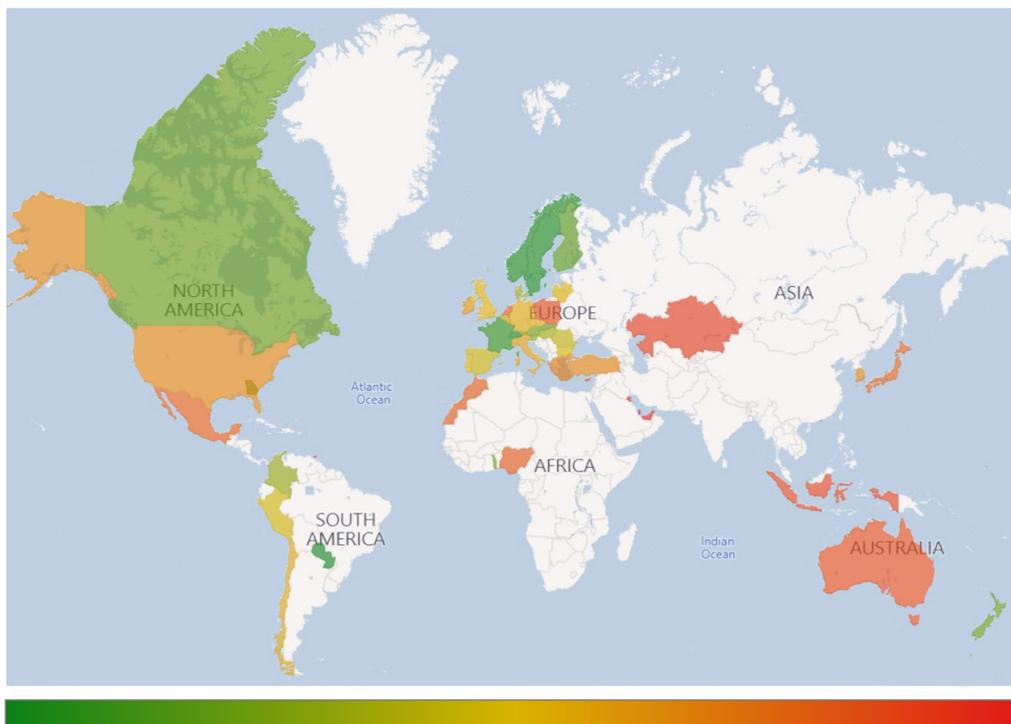
The bond portfolio of banks in scope of the MST is made up mostly of sovereign debt securities. Indeed, 61% of their debt securities are towards sovereign bonds. The second largest share is held by financial institutions which represent around a third of their portfolio (35%), with the remainder being NFC bonds. While many corporates have a financial holding company taking care of financing on behalf of the group, an assessment of the individual names of bonds held by banks reveals that most financial institutions are indeed credit institutions. Thus, for the vast majority of bonds held by the banks in scope, it is not possible to link their activities to sectors of economic activity (and associated CO₂ emissions) as done by the SSM for its 2022 CST.

Consequently, it was deemed appropriate to link the bonds to the exposure towards climate risks within the country of origin as the debt generated would be used to finance activities within the respective jurisdiction. Several sources and proxies were considered including the CO₂ emissions by country but ultimately, in line with the scenario narrative targeting the phase-out of fossil fuels, the country-specific exposure to climate risk is based on the World Bank's share of electricity production from oil, gas and coal sources to total energy production for each country.² For the few countries where data was unavailable, other data sources and publicly available information were considered to cross-fill the data.³

Figure 1 shows the world map with shaded countries representing the share of non-renewables in electricity production for the subset of countries to which banks' debt securities portfolio are exposed to. The shading ranges from dark green for the countries with the lowest share of fossil fuels energy production (e.g. Paraguay, Switzerland and Sweden with respective shares of non-renewables is below 1% of total), to dark red for the countries which are most reliant on fossil fuels (Kuwait, Qatar and Trinidad and Tobago with full reliance). The figure does not include information on the relative shares in nominal terms of exposure.

The country specific factors would then be used to determine the applicable magnitude of the shock commensurate to the level of fossil-fuel intensity.

Figure 1
GEOGRAPHIC DISTRIBUTION OF DEBT SECURITIES COLOURED BY SHARE OF ELECTRICITY PRODUCTION FROM OIL, GAS AND COAL SOURCES



Sources: Central Bank of Malta; World Bank (map generated in PowerBI).

For debt securities held at FV, revaluation losses would be incurred following a widening of credit spreads. According to a [study](#) by Morgan Stanley Capital International (MSCI) available on their Net-Zero Knowledge Hub, the worst-assumed spread for debt securities is equivalent to 416 basis points (bps) for investment-grade debt in Europe when considering a scenario limiting climate change to 1.5°C. Without the climate shock, the spread would be at 84 bps. Drawing from these magnitudes, given that the climate-related scenario narrative also features a target to limit climate change to 1.5°C, the applicable credit spread on FV non-sovereign bonds can vary proportionally based on the defined factors between 84 bps (no reliance on fossil fuels in energy production) and 416 bps (full reliance). Bond specific factors such as coupon rate, coupon frequency and term to maturity would be accounted for in the bond-pricing function.

For FV sovereign bonds, a set of market haircuts is estimated for 10-year bonds on the basis of the price difference consistent with the MSCI yields quoted above. Based on the instruments contained in banks' portfolios, prices of 10-year sovereign bonds would drop by 7.2% if yields increase by 84 bps, and by 30.5% if yields increase by 416 bps. These shocks are then apportioned according to tenure to determine haircuts for specific (lower) maturity buckets as shown in Table 1.

FV sovereign bonds would then be subject to a specific haircut within the range of haircuts applicable to the respective maturity, based on the country factor. For instance, a 2-year sovereign bond with a country factor of 50% would attract a valuation haircut of 2.85% as the midpoint between 1.1% and 4.6%.

Table 1
HAIRCUTS FOR SOVEREIGN FV BONDS

Term to maturity	Level of emission intensity (%)	
	Low	High
Up to 3 months	0.1	0.4
3 months to 1 year	0.5	1.9
1 year to 2 years	1.1	4.6
2 years to 3 years	1.8	7.6
3 years to 5 years	2.9	12.2
5 years to 10 years	5.4	22.9
10 years or more	7.2	30.5

Source: Central Bank of Malta.

Conversely, bonds held at amortised cost (AMC) are insulated from market movements as these bonds are retained until maturity to gain from the ultimate principal repayment and any coupon payments in the interim. Thus, these bonds are assessed against credit default risk with higher risk of insolvencies among activities in high CO₂ emission intensity. Such risk is reflected in higher probabilities of default which are assigned to AMC bonds on the basis of a downgrade between a single to 3-notch downgrade, depending on country specific factors. In other words, countries with 0% use of fossil fuels would attract a 1-notch downgrade while countries with a 100% reliance on fossil fuels would attract the full 3-notch downgrade, relative to the current rating.

Comparison of Results

Table 2 compares the results of the credit quality deterioration (CQD) sensitivity analysis based on the shocks presented in the previous Financial Stability Reports, and the results obtained under the adapted methodology for the climate-related adverse scenario contemplated for the MST.⁴ Both tests use December 2021 as reference date.

Under the traditional CQD, the Tier 1 capital ratio declines by 1.07 and 2.05 percentage points for core domestic and non-core domestic banks, respectively. Under the fossil fuels in energy production approach used in the MST, Tier 1 capital ratio drops by 1.66 and 3.15 percentage points for the two respective bank categories. The latter approach has a higher impact, mainly from the wider range of FV credit spreads (84 to 416 bps) compared to the 132 bps applied in the traditional CQD. Although banks could benefit from lower credit spreads for countries with very low reliance on fossil fuels in their energy production, a shock of 132 bps corresponds to a country factor of 14.5% under this methodology. Conversely, banks have an average country factor of 60%, resulting in overall higher shocks being applied in the revised methodology. The additional severity is commensurate with the climate-related adverse scenario to phase-out reliance on fossil fuels in the medium term and ultimately reach the target of limiting climate change by 1.5°C by 2050.

Table 2
COMPARISON OF RESULTS UNDER STANDARD CQD AND CONTRIBUTION TO MST'S CLIMATE-RELATED ADVERSE

Bank category	Tier 1 Capital Ratio (%)		
	Dec. 2021	CQD	MST
Core domestic banks	19.20	18.13	17.54
Non-core domestic banks	20.17	18.12	17.02

Source: Central Bank of Malta.

Despite the reduction in the Tier 1 capital ratio, banks would be able to withstand the shocks under both approaches, tested here in isolation. Moreover, the impact from the climate-adapted methodology for bonds is combined with the other risk factors assessed under the MST framework and represent part of the impacts of credit risk and market risk on the capital ratio reported in Chart 3.3 and 3.4, respectively. Considering the overall larger impact on capital from the 3-year period of heightened transition risk reported in these charts, banks in both categories are able to absorb the losses and retain capital levels above the minimum requirements, at both an aggregate and individual bank basis.

Notes

¹ Similar to the EBA methodology for the 2021 EU-wide stress test, banks can request the trading exemption provided that neither of the following conditions hold: the institution has at least one VaR model in place, approved by the competent authority under the CRR; the bank's total market risk capital requirement is greater than 5% of the total capital requirement.

² Data downloaded from: <https://data.worldbank.org/indicator/EG.ELC.FOSL.ZS>. Latest observation is for 2015.

³ For instance, Jersey was proxied by France since it sources most of its energy via three interconnectors with mainland France. Similarly, San Marino was proxied by Italy due to its proximity.

⁴ While international banks are included in the CQD, these fall out of scope of the MST framework and are not included in this comparison.