

BOX 6: EXPERIMENTAL AND ANALYTICAL CLIMATE CHANGE-RELATED INDICATORS FOR THE FINANCIAL SECTOR IN MALTA¹

Introduction

On 27 January 2023, the ECB published its first harmonised climate change-related indicators for the euro area, as part of an action plan to include climate change considerations in the ECB's policy strategies.² These indicators are the first of their kind in the euro area and aim to reflect climate risks that can affect not only the financial system, but also monetary policy and price stability. Three types of indicators are included in the ECB's publication, namely: (1) experimental indicators on sustainable finance, (2) analytical indicators on carbon emissions in the financial sector's loan and securities portfolios, and (3) analytical indicators on physical risks associated in the loans and securities portfolios of the financial sector.³ These indicators were presented at a country level on the ECB's website,⁴ alongside a detailed report documenting their methodology, data sources, caveats, and a technical annex. The caveats listed therein are noteworthy and caution is therefore suggested in the use of such indicators.

This box focuses on the indicators compiled for Malta, which were in turn, updated by the Central Bank of Malta with the latest available data. The aim is not to conduct an exhaustive analysis of the indicators, but rather to raise awareness of their existence and encourage researchers to use them in related fields as these indicators mature over time.

The time series of these indicators includes quarterly data spanning from 2021 Q1 until 2022 Q4 for sustainable finance indicators, annual data from 2018 to 2020 for carbon emissions indicators, and annual data for 2020 for physical risks indicators.

1. Experimental indicators on sustainable finance

Experimental indicators on sustainable finance comprise mainly indicators on issuances and holdings of green, social, or sustainable securities.⁵ These indicators are compiled exclusively using official European System of Central Bank (ESCB) data sources, namely granular information from the Centralised Securities Database (CSDB) and the Securities Holdings Statistics (SHS) dataset.

The sustainability classifications comprise four groups:

1. **Green** – debt securities where proceeds are used to finance green projects
2. **Social** – debt securities where proceeds are used to finance social projects
3. **Sustainability** – debt securities where proceeds are used to finance a combination of both green and social projects
4. **Sustainability-linked** – debt securities where issuers are committed to future improvements in sustainability outcome(s) with no restrictions on how the proceeds can be used.

While the reference jurisdiction of the issuances of sustainable debt securities is the issuer country, data on the holdings of such securities refer to the counterparty's jurisdiction. The latter includes the euro area, the rest of the European Union and the rest of the world.

Chart 1 shows the nominal value of the holdings of securities by resident deposit-taking corporations except central banks, non-money market investment funds, and insurance corporations, broken

¹ Written by Gabriele Lentini, Economist Statistician and Dr Krisztina Dekany, Senior Statistical Information Management Officer within the Statistics Department of the Central Bank of Malta. The author would like to thank Mr Jesmond Pule', Mr Alan Cassar, Deputy Governor Mr Oliver Bonello for their helpful comments and suggestions.

² See https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.pr210708_1~f104919225.en.html.

³ Experimental and analytical indicators are not considered as official statistics and are thus to be treated with caution.

⁴ See https://www.ecb.europa.eu/stats/ecb_statistics/sustainability-indicators/html/index.en.html.

⁵ Securities comprise debt securities, such as bonds, and other securities such as equity.

down by sustainability classifications.

It can be noticed that between 2021 to 2022 holdings of such securities were on the increase, with the highest nominal value of holdings being the green securities, whilst sustainability securities accounted for the lowest share.

Chart 2 shows the holdings of securities broken down by sector.

Chart 2 shows that, over these two years, Deposit-taking corporations except central banks reported the strongest increase in the holdings of such securities.

2. Analytical indicators on carbon footprint

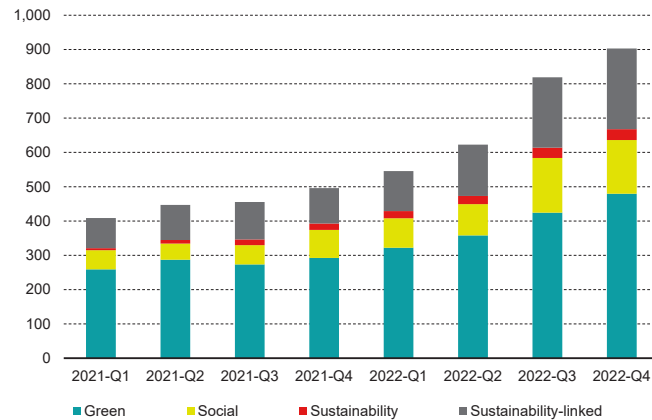
The ECB released four indicators on carbon intensity,⁶ namely:

1. **Financed emissions**, which is the total greenhouse gas (GHG) emissions weighted by the share of investment over these activities, in proportion to the total company value.
2. **Carbon Intensity**, represented by financed emissions in proportion to the company production value of a firm, weighted by the share of investment over these activities over the total company value.
3. **Weighted average carbon intensity**, which is the total GHG emissions standardised using a measure of company production value and weighted by the share of the investment in its total investment portfolios.
4. **Carbon Footprint**, measured as financed emissions in proportion to the total investment portfolios value.

The first two indicators are known as indicators on ‘financing the transition to a net-zero economy’, whilst the last two indicators are described as ‘indicators on transition’. The data for Malta consists

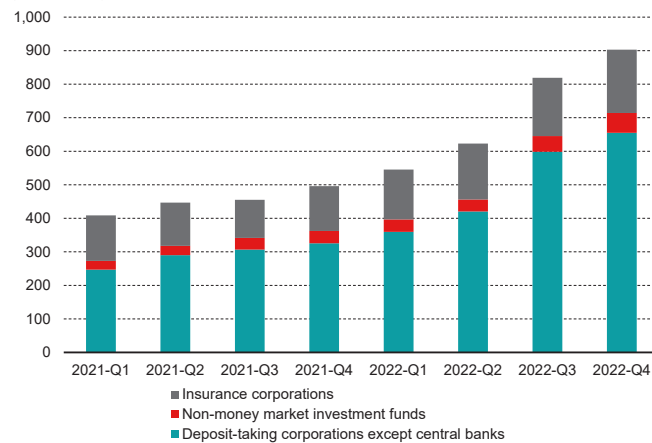
⁶ Further explanations of the four indicators can be found in [Towards climate-related statistical indicators – Technical Annex](#), European Central Bank, Frankfurt, p. 9.

Chart 1
HOLDINGS FOR MALTA BROKEN DOWN BY SUSTAINABILITY CLASSIFICATION
(EUR millions)



Source: SHSS.

Chart 2
HOLDINGS FOR MALTA BROKEN DOWN BY SECTOR
(EUR millions)



Source: SHSS.

of group level data for two sectors, namely the deposit-taking corporations except central banks and insurance corporations and pension funds. Group level data are obtained from the parent company's reported financial and emissions' data, sourced from private commercial data sources. Furthermore, the data considered for Malta consists solely of direct emissions, which are emissions from the sources owned by the reporting entity. The indicators for Malta are reproduced in Charts 3 and 4.

As can be seen in Chart 3, insurance corporations and pension funds held securities of high-emission companies compared to those held by deposit-taking corporations. This characteristic is not unique to Malta, as it could be observed across most euro area countries. Similarly, Chart 4 shows that carbon intensity, weighted average carbon intensity and carbon footprints are all higher for insurance corporations and pension funds when compared to deposit-taking corporations.

Similar traits are also observed for roughly half of the Euro Area countries. These observations could however be the result of a disparity in the coverage of the underlying data, that is the share of securities holdings about which emissions information exists. For the Maltese data, the coverage for the securities held by insurance corporation and pension funds is significantly larger than that of deposit-taking corporations. Furthermore, the coverage for deposit-taking corporations drops by almost a half in 2019 and 2020 when compared to 2018.

Charts 3 and 4 show a drop in the indicators for 2019. Although this reflects lower overall reported GHG Scope 1 emissions, it could be heavily influenced by the coverage issues mentioned earlier, and therefore such results should be treated with caution.

Chart 5 compares the 2020 carbon footprint across the euro area countries.

Chart 3
FINANCED EMISSIONS FOR MALTA BROKEN DOWN BY SECTOR
(thousands; tons)

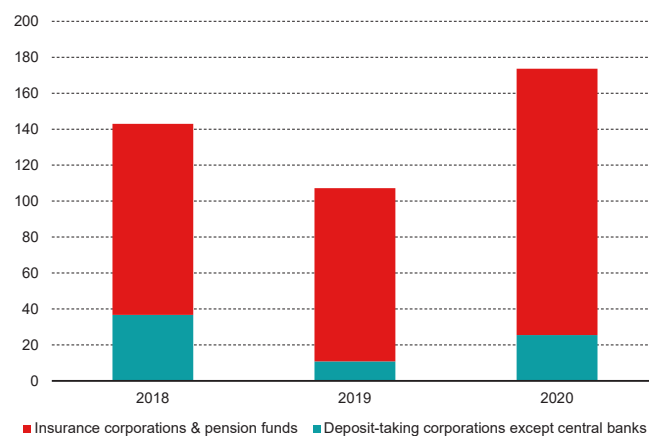
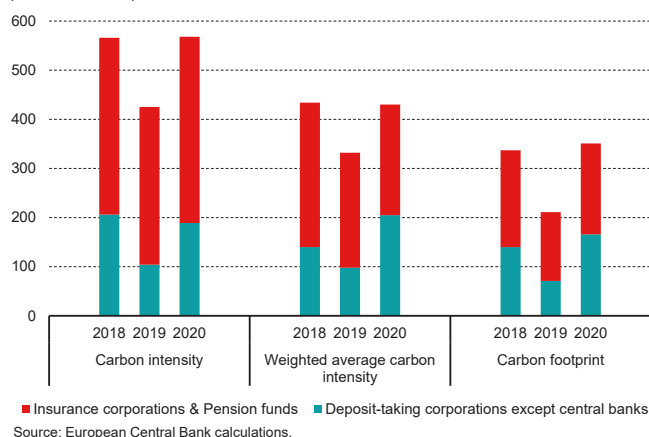


Chart 4
CARBON INTENSITY, WEIGHTED AVERAGE CARBON INTENSITY AND CARBON FOOTPRINT FOR MALTA BROKEN DOWN BY SECTOR
(tons/EUR millions)



As can be seen in Chart 5, Malta's score is in line with the median value across the countries with respect to the carbon footprint indicator. Similarly, Malta's figures hover around the median for both carbon intensity as well as the weighted average carbon intensity.

3. Analytical indicators on Physical Risks

The Physical risks indicators consider risks emanating from climate change-induced natural hazards, like floods, storms or wildfires, which in turn, could affect the market value of loans, bonds and equities.

The ECB considers seven natural hazards for which physical risk indicators were constructed, namely: (1) coastal flooding, (2) river flooding, (3) windstorms, (4) landslides, (5) subsidence, (6) water stress, and (7) wildfires. For the first five of these hazards, only current hazard profiles are available, however, for water stress and wildfires, projected data⁷ are available for 2030 and 2030-2050, respectively. For each of the physical hazards, climate and financial variables were combined to calculate three different sets of indicators, namely Normalised Exposure at Risk (NEAR), Potential Exposure at Risk (PEAR) and Risk Scores (RS).⁸

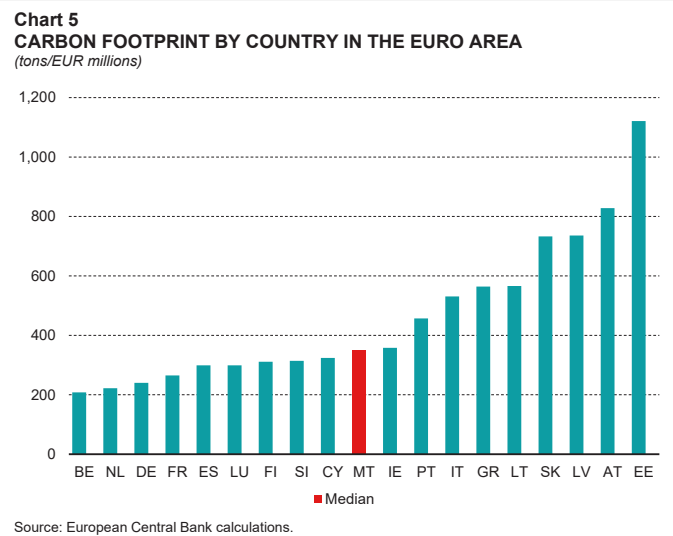
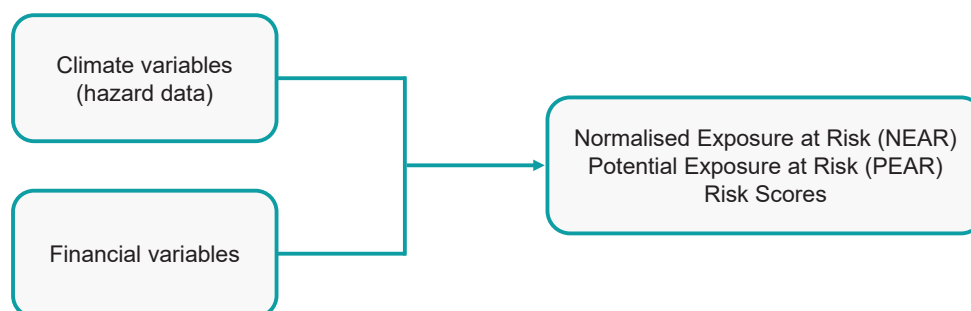


Figure 1
PHYSICAL RISK INDICATORS



Source: Central Bank of Malta.

⁷ Regarding the projected data, both wildfire and water stress indicators were calculated on the 'worst-case scenario' of global warming, also called RCP 8.5. This high-emissions scenario is frequently referred to as "business as usual", suggesting that this is a likely outcome if society does not make concerted efforts to cut GHG emissions, representing the 90th percentile of non-policy baseline scenarios available at the time, <https://www.carbonbrief.org/explainer-the-high-emissions-rcp8-5-global-warming-scenario/>.

⁸ For more details of the computation functions and the data sources, check the following documents: Statistics Committee of the European System of Central Banks (2023): [Towards climate-related statistical indicators](#), European Central Bank, Frankfurt, pp. 14-16. Statistics Committee of the European System of Central Banks (2023): [Towards climate-related statistical indicators – Technical Annex](#), European Central Bank, Frankfurt, pp. 15-24.

Three sets of indicators have been computed using harmonised methodologies across euro area countries.⁹

The indicators are calculated from the point of view of the creditor or the holder. Thus, for instance, it is possible for a financial institution in Malta to face a river flooding risk if it has invested in a company located in a fluvial flood risk area in a third country. The location information of firms is based on the ESCB's Register of Institutions and Affiliates Data (RIAD) and contains information at the level of the legal entity. Given that the NEAR is still under development and more data is needed for its robust application to Malta, this box article focuses on the PEAR indicators.

Potential Exposure at Risk indicators

The PEAR indicator captures the maximum share of the portfolios that is potentially exposed to physical hazards, based on the total financial exposure entity by entity that have a risk score above zero.

PEAR indicators were calculated for all the seven different hazards:

1. Coastal flooding is the inundation of normally dry land areas along the coast with seawater. Coastal flooding is typically a result of a combination of sea tidal surges, high winds, and barometric pressure.
2. Landslide is defined as the gravitational movement of a mass of rock, earth, or debris down a slope. It can be triggered by heavy or prolonged rainfall, earthquakes, volcanic eruptions, rapid snow melt, slope undercutting by rivers or sea waves, permafrost thawing, land use changes (for example deforestation), rapid reservoir drawdown, irrigation, blasting vibrations or water leakage from utilities.
3. River flooding occurs when water levels rise over the top of riverbanks. River flooding typically happens for four reasons: excessive rain making landfall, persistent thunderstorms over the same area for extended periods, combined rainfall and snowmelt, and ice jam.
4. Subsidence refers to (i) a sinking down of a part of the earth's crust, generally due to underground excavations, or (ii) the sudden sinking or gradual downward settling of the Earth's surface with little or no horizontal motion.
5. Wildfire is an unplanned fire which burns in a natural area such as a forest, grassland, or prairie. Wildfires are often caused by human activity or a natural phenomenon such as lightning or droughts and can happen at any time and anywhere.
6. Windstorms are defined as an extreme weather condition with very strong wind, heavy rain, and often thunder and lightning.
7. Water stress is the ratio between total water withdrawals and available renewable surface water. It measures the level of competition for available water and estimates the degree to which fresh-water availability is an ongoing concern.

Chart 6 shows the PEAR indicator in percentage terms (right y-axis) with dots, while the bars represent the portfolios in euro millions (left y-axis) at potential risk from each of the seven hazards.

For example, in the case of coastal flooding, the bars show the portfolios value which is hypothetically exposed to coastal flooding; in the case of Malta, in 2020, about €228 million worth of loans, bonds and securities were estimated to be potentially exposed to this type of hazard at non-zero risk. Staying with the same example of hazard, the respective PEAR indicator, marked with a red dot, shows that the maximum share of the portfolios (of loans, bonds, and securities) that is potentially exposed to coastal flooding is roughly 4.6%.

⁹ Statistics Committee of the European System of Central Banks (2023): [Towards climate-related statistical indicators](#), European Central Bank, Frankfurt, p. 13.

Having a closer look at the cross-country comparisons of the separate types of hazards, Table 1 shows the PEAR indicators (%) for all the euro area countries including Malta and the euro area average.

Focusing on the PEAR indicators for Malta, only the wildfire and water stress indicators are higher than the euro area average. A number of caveats are noteworthy. Firstly, the climate variables underlying these two types of hazards were projected into the future

(2030-2050 and up to 2030, respectively), based on a worst-case scenario for global warming. Also, the high readings for Malta reflect the structural characteristic of the indicators themselves, which was referred to earlier, mainly that these are based on the holder/issuer side. Thus, if for example a financial institution domiciled in Malta invested in a security of a firm located in another country at

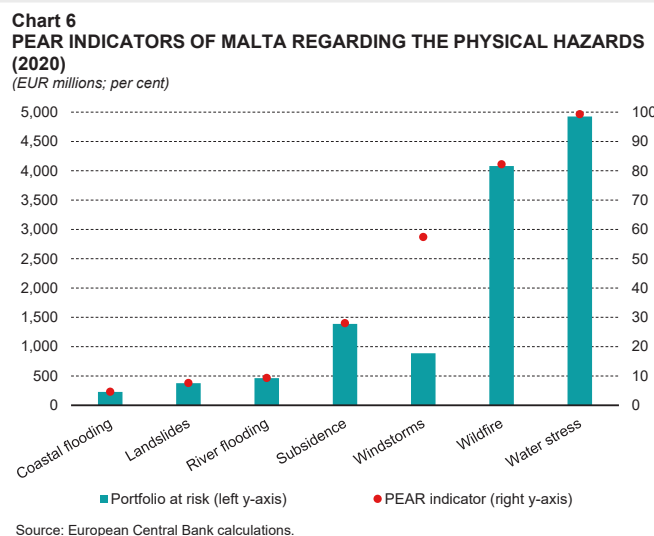


Table 1
PEAR INDICATOR OF THE SEVEN HAZARDS BY COUNTRY IN THE EURO AREA
(per cent)

	Coastal flooding	Landslides	River flooding	Subsidence	Wildfire	Windstorms	Water stress
Austria (AT)	6.6	29.4	32.6	96.3	84.8	28.0	100.0
Belgium (BE)	11.7	11.9	19.0	80.4	84.4	28.3	99.7
Cyprus (CY)	1.7	5.1	1.3	15.8	75.1	86.3	96.3
Estonia (EE)	1.1	1.1	9.2	37.4	87.0	84.1	98.3
Finland (FI)	5.1	4.3	25.5	94.5	77.8	81.5	96.9
France (FR)	11.2	25.4	26.7	74.5	79.2	47.7	99.4
Germany (DE)	11.9	18.7	29.8	75.4	86.4	57.5	99.8
Greece (EL)	0.7	38.5	1.7	91.7	71.2	29.7	94.5
Ireland (IE)	20.1	27.3	33.9	81.1	81.2	63.2	99.7
Italy (IT)	8.4	39.5	20.9	86.5	80.7	67.1	98.9
Latvia (LV)	1.0	0.8	26.5	30.0	62.0	98.5	99.3
Lithuania (LT)	0.9	2.2	11.4	96.8	97.8	99.6	99.6
Luxembourg (LU)	19.6	27.9	35.2	86.3	89.4	62.2	99.9
Malta (MT)	4.6	7.6	9.3	28.0	82.2	57.4	99.3
Netherlands (NL)	29.8	10.4	28.1	77.2	80.3	68.0	99.5
Portugal (PT)	3.9	19.1	4.1	73.6	72.6	46.5	96.8
Slovakia (SK)	1.4	12.3	24.8	99.1	88.3	94.7	100.0
Slovenia (SI)	4.0	51.2	35.4	83.8	99.2	14.0	99.5
Spain (ES)	5.5	21.3	12.5	78.3	73.9	59.6	97.8
Euro area (EA)	7.9	18.6	20.4	73.0	81.8	61.8	98.7

Source: European Central Bank calculations.

risk of forest fires, although the indicator would capture that risk on the resident financial institution, it does not mean that the underlying risk would lie within the Maltese physical territory. This is also more relevant in the context of the Maltese financial sector, which exhibits a significant portion of its activity being oriented towards the international sphere and hence exhibiting limited or no links with assets located in Malta. Furthermore, considering that large areas of Europe, including Malta, are projected to suffer higher water stress in future, the relatively high PEAR reading of 99.3% reflects not only the international exposures held by resident institutions, but also those located within the Maltese territory.

Way forward

The next publication and refinements of these experimental indicators by the ECB is planned towards the end of 2023 and may include breakdowns for the physical risk indicators by (a) sectors of the economy such as deposit-taking corporations except central banks, non-MMF investment funds and Insurance corporations and by (b) instruments such as loans, bonds, equities for both carbon footprint and physical risk indicators.

The Central Bank of Malta will focus more on individual natural hazard types which could potentially have the most significant affects in Malta, such as coastal flooding and windstorms. However, one should keep in mind that through transactions with foreign counterparties, resident banks may also have significant risks from other hazard types occurring in other jurisdictions.

Furthermore, the Central Bank of Malta will continue to liaise with the ECB and other national central banks to improve the data coverage to improve its reliability and enable further research and analysis.