EU-wide pilot exercise on climate risk

European Banking Authority (EBA)

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1 | Introduction
Context and Background

The Pilot exercise was designed as a learning exercise to investigate how existing and newly developed climate risk assessment and classification tools perform, and to test banks' readiness to deal with related data and methodological challenges

In 2019 it was revised the CRR/CRD package which includes article 449a on disclosure of Environmental, Social and Governance (ESG) risks. Furthermore in 2020 the European Parliament (EP) and the Council published the taxonomy regulation. The main regulatory changes include the following:

- **Taxonomy:** provides uniform criteria for companies and investors to determine which economic activities can be considered environmentally sustainable. Additionally, it establishes a common language that these investors will use when it comes to investing in projects and economic activities that have a positive impact on the climate and the environment. The EU taxonomy is currently limited to defining green activities considered as environmentally sustainable and technical screening criteria have been so far developed for two environmental objectives, climate change mitigation and climate change adaptation.

- **CRD:** the revised CRR/CRD package gives the EBA the mandate to develop appropriate qualitative and quantitative criteria, including stress testing processes and scenario analyses, to be applied by financial institutions to assess the impact of ESG risks under scenarios with different severities.

- **DP on management and supervision of ESG risks[1]**: In addition, the EBA regulation has been aligned with these new tasks and it mandates the EBA to develop common methodologies for assessing the effect of risks stemming from adverse environmental developments on an institution's financial position.

- In this context the EBA has developed a pilot exercise for a sensitivity analysis on climate-related risks[2]:
  - As the EU taxonomy and climate risk stress test frameworks are still developing, this pilot was designed as a learning exercise to investigate how existing and newly developed climate risk assessment and classification tools perform, and to test banks' readiness to deal with related data and methodological challenges.
  - This exercise provides an indicative picture of the main challenges that supervisors and banks are facing in identifying the greenness of activities, classifying and measuring climate risks, and should support banks in their transition efforts.

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The 2020 EBA pilot exercise has been a learning exercise in which the EBA and participating banks (29 European banks) explored different tools to categorise exposures that could potentially be vulnerable to climate risks methodological limitations

Characteristics

- It is **not a stress test exercise**, but it should feed into future EBA work on climate stress testing, in particular by exploring how some of the widespread data classification methodologies perform in measuring the climate-related risks of EU banks' corporate exposures and the data limitations behind them.

- Data were collected directly from **29 participating volunteer banks** using templates aligned with the supervisory reporting definitions.
- The data analysed covers non-SME corporate exposures to non-financial obligors domiciled in EU countries under both the standardised approach (SA) and the internal ratings based (IRB) approach.

Data

KEY ASPECTS

Objective

- The main objective is to **explore data and methodological challenges to categorise exposures**, on the basis of selected climate risk factors, rather than to quantify the impact on banks' risk profiles.

  o The exercise aims at testing banks readiness to apply the criteria set by the EU taxonomy and provides an estimate of the current levels of taxonomy aligned exposures.

- The analysis was run by **applying shocks**, to risk parameters to measure the impact in terms of expected loss.

- This assessment aims to explore available methodologies and inform on how a climate risk stress test could eventually be shaped.
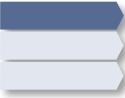
Development

3 Methodology
Overview of the exercise

The banks' data were mapped and evaluated
according to different classification approaches, including the EU taxonomy. The latter was applied
by banks directly and complemented with a top-down classification tool

1 **Portfolio classification**

- The EBA classified Bank's exposures using some of the methods currently available and which could be relevant from a climate perspective. In particular, both a **sector-based** and an **emission-based** approach were applied.

2 **Green taxonomy**

- In a further step, banks were also asked to provide an **estimate of the 'greenness' or alignment with the EU taxonomy** criteria of the exposures within the scope of this exercise (green data classification).
- A **top-down tool** for gauging the amount of exposures aligned with the EU taxonomy was also applied to complement the analysis.

3 **Scenario analysis**

- Finally, it was performed a **scenario analysis** to estimate the **possible impact of transition and physical risk on banks' balance sheets**.
- The analysis was run by **applying shocks, stemming from different Greening the Financial System (NGFS) climate risk scenarios**, to risk parameters to measure the impact in terms of expected loss.
- The **scenario analyisis does not aim at measuring possible capital implications** coming from climate risk scenarios, but rather at exploring available methodologies and inform on how a climate risk stress test framework for credit exposures could eventually be shaped.
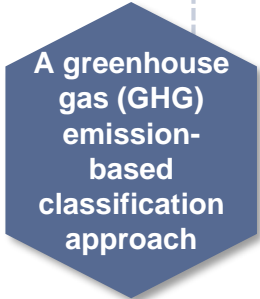
The classification approaches applied aim at quantifying and categorising the share of banks' exposures that could be relevant from a climate perspective

Sector-based classification approach

- The exposures have been classified into the so-called **Climate Policy Relevant Sectors** (CPRS) based on the sector of the counterparty.
- The CPRS, in its most aggregate level, consists of **eight categories**: i) Fossil fuel; ii) Utility; iii) Energy-intensive; iv) Buildings; v) Transportation; vi) Agriculture; vii) Finance; and viii) Others.
- Exposures to CPRS 1 to 6 are defined as those exposures that may be potentially affected by climate transition risks.

A greenhouse gas (GHG) emission-based classification approach

- To complement the CPRS analysis, an **alternative classification approach, based on the Greenhouse Gases (GHG) emission intensity of the obligor is applied**.
- Under this approach, which is run at obligor level, banks' total original exposures are allocated to **six buckets of GHG emission intensity**.

Advantages

- It allows a climate-relevant assessment to be made of a large part of financial assets that can be applied in a comparable way across portfolios and jurisdictions, is actionable on standard data and that covers both low- and high-carbon sectors.

Disadvantages

- One limitation may apply when companies operate in multiple business lines.
- The CPRS approach only allows data to be classified into climate relevant sectors without providing a grading scale across activities or sectors.

Advantages

- This approach can be applied at different levels of granularity (i.e. borrowers or sector) and it usually requires the usage of data from external providers.

Disadvantages

- This approach would not fully capture possible effects on fossil fuel producers, which are not among the top emitters and are expected to be severely impacted by transition risk as sectors phase out of fossil fuels and move towards lower-carbon energy sources.
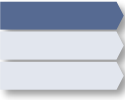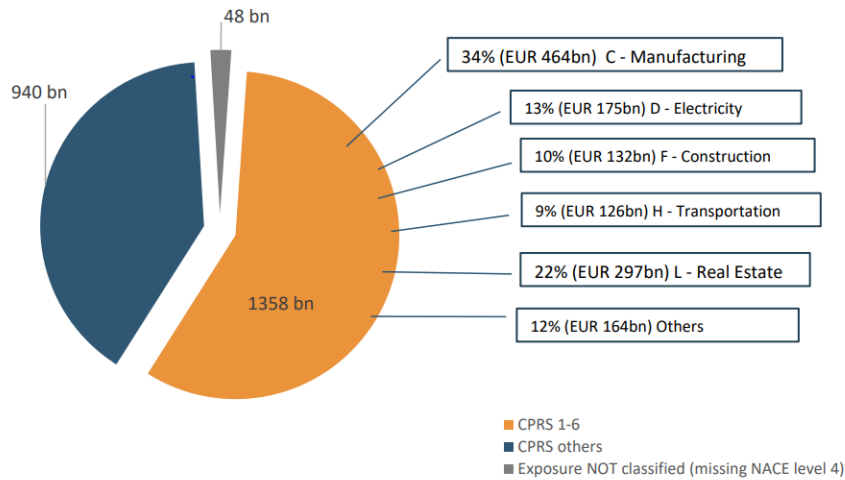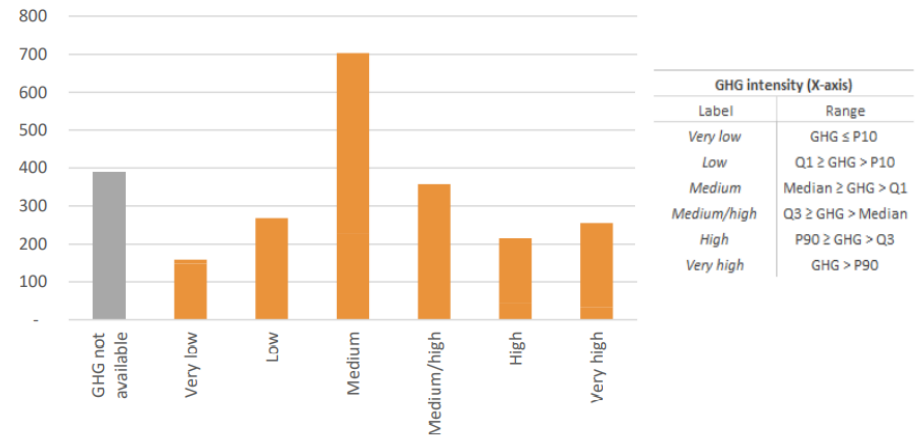
Overall, almost 98% of the EUR 2.34 trillion of exposures submitted by banks in this exercise were classified according to the CPRS approach

CPRS classification at EU level and for selected NACE level 1 sections[1]

48 bn

940 bn

1358 bn

- 34% (EUR 464bn) C - Manufacturing
- 13% (EUR 175bn) D - Electricity
- 10% (EUR 132bn) F - Construction
- 9% (EUR 126bn) H - Transportation
- 22% (EUR 297bn) L - Real Estate
- 12% (EUR 164bn) Others

■ CPRS 1-6
■ CPRS others
■ Exposure NOT classified (missing NACE level 4)

Original exposures to GHG emission intensity buckets[1]

GHG intensity (X-axis)	
Label	Range
Very low	GHG ≤ P10
Low	Q1 ≥ GHG > P10
Medium	Median ≥ GHG > Q1
Medium/high	Q3 ≥ GHG > Median
High	P90 ≥ GHG > Q3
Very high	GHG > P90

- **The results of the CPRS approach show that EUR 1.36 trillion of corporate exposures** (58% of the total) **are allocated to CPRS 1-6**, while EUR 940 billion (40% of the total) are allocated to CPRS others (7 and 8) for which transition risk is expected to be lower. The residual amount (2% of the total) is not classified as it refers to obligors that do not have a NACE level 4 available.

- The graph shows the NACE level 1 sections which CPRS 1-6 exposures are more concentrated.

- According to the results of the GHG intensity classification, of the EUR 1.96 trillion of exposure classified (80% of the total submitted), **almost EUR 828 billion** (35% of the total submitted) of the **exposures** correspond to obligors with GHG emissions intensity classified as medium/high, high or very high. These emissions are more sensitive to the possible introduction of transition policies aimed at reducing GHG emissions.

(1) EUR bn
NOTE: The graphs are taken from the EU-wide pilot exercise report

**A green taxonomy, such as the EU taxonomy, is designed for
banks to have the capacity and the availability to channel capital flows
towards environmental and sustainable activities**

- **The EU taxonomy is a classification system** establishing a list of criteria for the classification of environmentally sustainable economic activities. It aims to help companies, investors and policymakers to navigate the transition to a low-carbon, resilient and resource-efficient economy in which economic activities can be considered as environmentally sustainable. Nowadays the EU taxonomy is limited to defining green activities considered as environmentally sustainable.

- **Technical screening criteria have been so far developed for two environmental objectives**, climate change mitigation and climate change adaptation. Applying the taxonomy at European Classification of Economic Activities (NACE) section level means identifying the share of exposures, to a specific NACE section (e.g. NACE classes), that is related to taxonomy compliant activities ('green') or not.

The framework for the EU taxonomy (Regulation (EU) 2020/852, Article 3) contains overarching criteria that an economic activity has to meet in order to qualify as environmentally sustainable:

Make a **substantial contribution** to one of six environmental objectives.

Meet **minimum social** and governance safeguards.

Do **no significant harm** (DNSH) to the other five environmental objectives.

Comply with robust and **science-based** technical screening criteria.

Twenty six banks, out of the 29 participating in the pilot exercise, provided an estimate of the greenness of their exposures according to the EU taxonomy, either for the full set or a subset of the submitted exposures

GAR for both bank estimates and Taxonomy Alignment Coefficient (TAC) estimates[1]
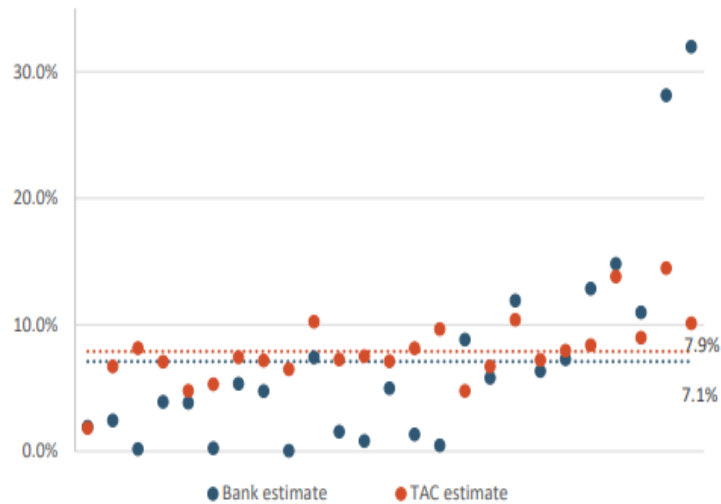
Coverage overview (green classification sample)[1]
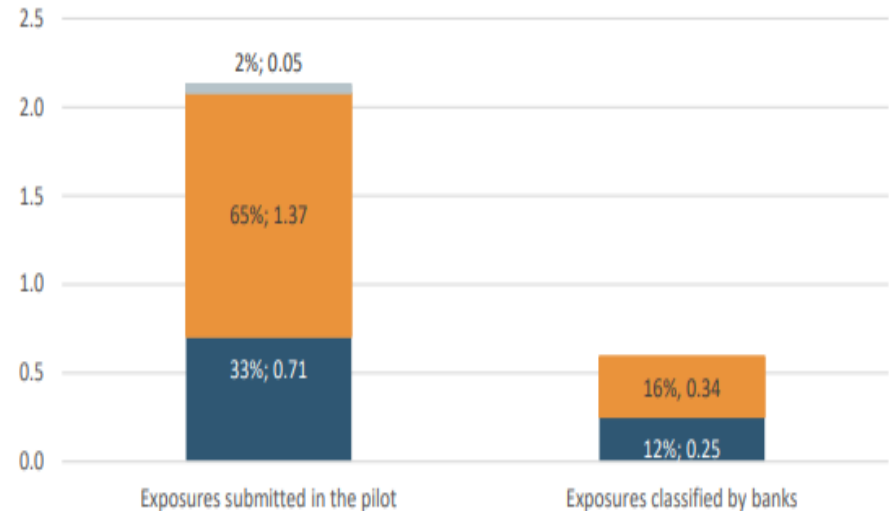
- **The average GAR is 7.1%** for the bank estimate **and 7.9% for the TAC estimate**. It should be reiterated that only the TAC estimates should be treated as consistent and comparable figures.

- **Most of the exposure (65%) is to obligors whose main activity is in a NACE sector which is considered not to be part of the EU taxonomy** (EUR 1.4 trillion). Exposure to obligors whose main activity is in the NACE classes covered by the EU taxonomy amounts to around EUR 0.7 trillion. Moreover, 2% of the exposures are not classified by NACE classification.

(1) EUR tn
NOTE: The graphs are taken from the EU-wide pilot exercise report

The scenario analysis assess the exposures sensitivity to shocks coming from the transition to a low carbon economy in the medium/long term

- The analysis run in this section relies on the shocks on risk parameters generated by the ECB top-down climate risk tool and focuses on the impact that both **transition and physical risk might have on banks' exposures** collected in the pilot exercise, under a static balance sheet assumption.

- In general, **banks' credit risk profiles can be affected by climate shocks** through the increase of the riskiness of their counterparties. Policy developments aimed at paving the way for a transition to a low carbon economy could impact the cost-revenues structure of carbon-intense firms and reduce their solvency. On the other hand, the disruption of physical capital coming from natural disasters can also influence the debt structure of firms.

- The ECB top-down tool **takes into account all these elements** and model both transition and physical risk into firms' risk parameters under different climate scenarios, as designed by the NGFS, and over a 30 year time horizon.

- The analysis employs **two adverse scenarios**, out of the four designed by the NGFS:

Disorderly scenario

- The **disorderly transition scenario is associated with relatively high costs from a delayed and/or ineffective implementation of climate policies**.
- This scenario also assumes that climate policies are relatively effective in limiting global warming in the long run and are thus accompanied by limited physical risk.

Hot house world scenario

- In the 'hot house world' scenario **no new policies are implemented**, therefore in this scenario the costs associated to the transition are very limited but those coming from natural catastrophes (physical risk) are extremely high.
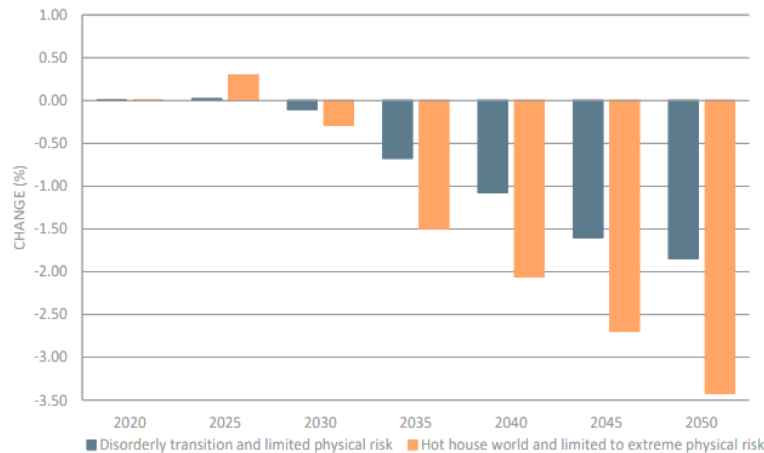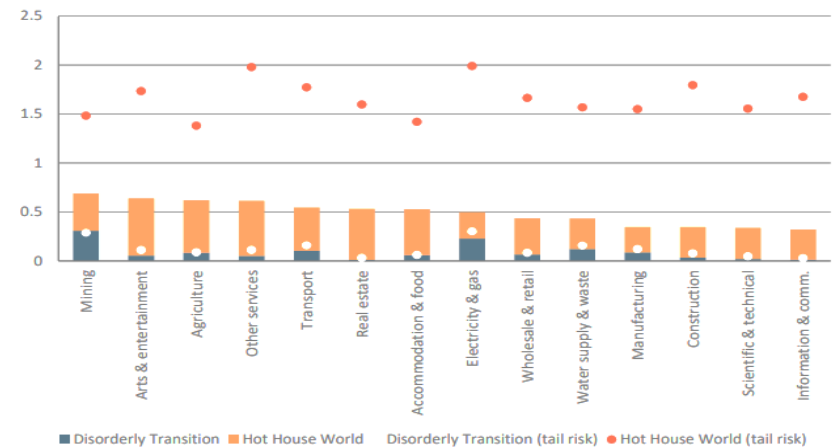
**This analysis employs the parameters sourced from the new ECB
climate risk stress test framework, which tracks the impact of both transition and physical risk**

GDP evolution under different climate scenarios

**Sectoral changes (pp) in EUR firm-level PDs with respect to the
orderly transition scenario (2020 to 2050)**

- This scenario **set-up enables a projection to be made of the evolution of key aggregates such as real GDP**, carbon emissions and energy prices, and to assess the macroeconomic impact deriving from the cost of policy action (transition risk) and inaction (physical risk).

- **There are two sets of results**. First, **how much firm-level PDs would change on average by sector** and in each scenario (bars). Second, **how much PDs would increase when focusing on the firms that are most vulnerable to physical risk**, again averaged by sector (dots). As we can see the firm vulnerability to physical risk may be subject to increases in their probability of default.

NOTE: The graphs are taken from the EU-wide pilot exercise report

The EU weighted average and the distribution across banks of the additional expected loss are reported. The expected loss is computed as the product of regulatory PD, LGD and the exposure value

Banks' distribution in each scenario: percentiles and EU average of additional expected losses

	Disorderly scenario	Hot House
10th Percentile	58	65
25th Percentile	92	107
50th Percentile	146	167
75th Percentile	199	213
90th Percentile	321	343
EU average	160	175

Impact by selected NACE level 1 sections in each scenario

	Disorderly scenario	Hot House
C - Manufacturing	11	12
D – Electricity, Gas,Steam	36	40
F - Construction	5	6
H – Transportation and Storage	6	7
L-Real Estate	50	53
Others	51	56
EU average	160	175

- At EU level, the additional **expected loss** in the two adverse scenarios, disorderly and hot house world, is **160 and 175 bps respectively**. The distribution across banks ranges from **58 bps to 321 bps** in the disorderly scenario and from 65 bps to 343 bps in the hot house scenario.

- The impact of the climate scenarios is **concentrated in Electricity and Real estate**.

This report summarises the main findings of the exercise highlighting potential climate change related risks for the EU banking sectors and providing some estimates that represent the starting point for future EBA work on climate risk

Mapping Climate Risk:

- Regarding the categorisation of banks' exposures from an environmental perspective, the report shows that the bulk of exposure that are potentially relevant from a climate perspective lies in Manufacturing, Electricity, gas, steam and air conditioning supply, Construction, Transporting and storage and Real estate activities, amounting to 50% of total exposures submitted in the exercise.

- The report also sheds light on the main challenges faced by banks in employing the EU taxonomy and thus the methodology used to identify the greenness of their clients.

- The report provides, in line with the recent EBA advice to the European Commission, a first application and estimate of the 'green asset ratio' for banks. A comparable green asset ratio is constructed and the average ratio across banks is estimated to be 7.9%. However, further research would be needed to include bank estimates.

- Finally, at EU level, the additional expected loss in the two adverse scenarios, disorderly and hot house world, is 160 and 175 bps respectively and the scenario analysis shows that the impact of climate-related risks across banks has different magnitudes and is concentrated in some particular sectors.

- The main findings of the pilot exercise and the experience gained in this process will form the basis of how to design a climate risk stress test exercise for the EU banking sector[1]

(1) It should be noted that the findings shown in this report are subject to limitations and caveats, for example limitations in terms of data coverage for GHG emission intensity.