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Report

Mapping climate risk: Main findings from the EU-wide pilot exercise

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Abbreviations

| | |
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| ACPR | Autorité de Contrôle Prudentiel et de Résolution |
| BOE | Bank of England |
| CET1 | Common Equity Tier 1 |
| CPRS | Climate Policy Relevant Sectors |
| CRD | Capital Requirements Directive |
| CRR | Capital Requirements Regulation |
| DNB | De Nederlandsche Bank |
| EBA | European Banking Authority |
| ECB | European Central Bank |
| EIOPA | European Insurance and Occupational Pensions Authority |
| ESAs | European Supervisory Authorities |
| ESG | Environmental, Social and Governance |
| ESMA | European Securities and Markets Authority |
| ESRB | European Systemic Risk Board |
| EU | European Union |
| GAR | Green Asset Ratio |
| GHG | Greenhouse Gases |
| IFD | Investment firm directive |
| IRB | Internal Ratings Based (approach) |
| ITS | Implementing Technical Standard |
| NACE | European Classification of Economic Activities¹ |
| NGFS | Network for Greening the Financial System |
| RWA | Risk Weighted Assets |
| RAR | Risk Assessment Report |
| SA | Standardised Approach |
| SME | Small and Medium Enterprise |
| SREP | Supervisory Review and Evaluation Process |
| TAC | Taxonomy Alignment Coefficient |
| TEG | Technical Expert Group |

¹ Nomenclature statistique des Activités économiques dans la Communauté Européenne

Executive summary

A financial system that is sound and resilient to climate change related risks is key in facilitating a smooth transition to a low-carbon economy and mitigating the potentially disruptive impacts of environmental risks. Even though these risks may represent a long-term threat for financial stability, they are already starting to crystallise and could significantly increase in the short and medium term if no action is taken.

In general, quantifying the potential impact of climate risks on the banking sector and testing banks readiness to identify, classify, evaluate and manage these risks is a priority for policy makers. The process of integrating climate risks into standard financial stability monitoring and supervision has already kicked off, building on recent EU initiatives on sustainable finance. One of the main ongoing tasks is to establish a unified EU classification system (EU taxonomy²) to identify and classify environmentally sustainable economic activities ('green' activities). In addition, updated regulation mandates the three European Supervisory Authorities (ESAs) to develop common methodologies and define data requirements for climate risk assessment³.

In particular, the revised CRR/CRD package gives the EBA the mandate⁴ 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. In addition, the EBA regulation⁵ 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. As announced in the EBA action plan on sustainable finance⁶, in 2020 the EBA launched a pilot exercise on climate risk that comes together with and complements similar initiatives⁷ run by supervisors, central banks and European institutions on insurance, investment funds and the banking sectors.

Why run a pilot exercise?

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. Therefore, this exercise provides an indicative picture of the main

² Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088. The EU commission published in April 2021 its Sustainable finance package which includes EU Taxonomy Climate Delegated Act (https://ec.europa.eu/info/publications/210421-sustainable-finance-communication_en).

³ This is reflected in the ESA's founding regulation.

⁴ Point 8 of article 98 of the CRD.

⁵ Article 23 of Regulation (1093/2010) <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02010R1093-20200101&qid=1620380533630&from=en>.

⁶ https://www.eba.europa.eu/sites/default/documents/files/document_library/EBA%20Action%20plan%20on%20sustainable%20finance.pdf.

⁷ For instance: ACPR, BoE, DnB, ECB, EIOPA, ESMA and ESRB.

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.

How was the pilot exercise run?

The exercise was run on a sample of 29 volunteer banks, which provided raw data on non-SME corporate exposures to EU countries, and focused on the identification and quantification of exposures from a climate perspective, in particular, on climate transition risk⁸. The scope of the exercise is narrowed to EU corporate exposures and considers only non-SME counterparties for which climate-related information (provided directly by clients or retrieved from external data providers) are more available than for SMEs. 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. These approaches come with certain limitations but represent a first attempt to measure the greenness of the EU banking sector with available information and methodologies. Finally, a scenario analysis based on a joint EBA/ECB tool was also employed for exploring modelling options regarding the transmission mechanism between the shocks coming from climate risk scenarios, as defined by the Network for Greening the Financial System (NGFS)⁹ and banks' balance sheets.

What are the main results¹⁰ and how should they be interpreted?

According to the outcome of the mapping exercise, more than half of banks' exposures (58% of total non-SME corporate exposures to EU obligors) are allocated to sectors that might be sensitive to transition risk, and are concentrated in some specific sectors. A parallel analysis, based on greenhouse gas emissions (GHG), reveals that 35% of the total non-SME corporate exposures submitted in the exercise are to EU obligors with GHG emissions above the median of the distribution. In relation to the green classification, banks are currently in different development phases to assess the greenness of exposures. The exercise involves estimations using two techniques and the report shows the differences in outcomes. Given the outlined constraints, a first gauge of the green asset ratio is provided showing an EU aggregated green asset ratio of 7.9%.

Finally, the scenario analysis shows that the impact of climate-related risks across banks has different magnitudes and is concentrated in some particular sectors. Tools for scenario analysis are quickly developing and further progress should be made on modelling the transmission channels of climate risk shocks to banks balance sheets.

Given the nature of the exercise and the related data and methodological limitations, the results presented in this report should be interpreted with caution and should be considered starting point estimates for future work on climate risk. In this regard, readers should bear in mind that the focus of the report is to analyse different data classification methods for mapping banks'

⁸ Physical risk is only considered in the scenario analysis.

⁹ https://www.ngfs.net/sites/default/files/medias/documents/820184_ngfs_scenarios_final_version_v6.pdf

¹⁰ Some preliminary findings were published in the December 2020 EBA Risk Assessment Report (RAR) (https://www.eba.europa.eu/sites/default/documents/files/document_library/Risk%20Analysis%20and%20Data/Risk%20Assessment%20Reports/2020/December%202020/961060/Risk%20Assessment_Report_December_2020.pdf). Bear in mind that the final figures in this report might differ from those in the RAR as further data quality checks were applied.

corporate non-SME exposures and to identify advantages and limitations in terms of data and methodologies. In light of this, the findings should contribute to the ongoing and developing process of building up consistent and comparable climate risk assessment tools and help banks to quantify the amount of exposures that might require managerial attention from a transition perspective.

What next?

The EBA will continue to actively work on climate risk assessment, which has become a priority for the near future. In this regard, the main findings of the pilot exercise and the experience gained in this process will represent the basis of a wider discussion on how to design a climate risk stress test for the EU banking sector. Further interaction with the industry will be also key to exploring possible solutions and identifying key challenges for developing methodologies and data requirements that would be suitable for this purpose. The EBA will continue working, in line with its mandates, on the design of a climate risk stress test framework.

1 Overview and data

1.1 Introduction

1. Methodologies for assessing climate risks are developing and initiatives from central banks, supervisors and other institutions to identify those risks are spreading. Despite the similarities, the assessment of climate risks presents unique challenges compared to the traditional risk evaluation and requires a reconsideration of the risk assessment tools and data requirements currently available¹¹. This becomes even more challenging when it comes to stress testing and scenario analysis for which all elements should be linked consistently in the same framework.
2. One of the main obstacles for designing a climate risk stress test framework is the lack of a well consolidated set of climate risk indicators and comparable, granular and consistent data for their calculation. As a result, methodologies to quantify climate risk heavily rely on expert judgment, approximations and assumptions.
3. Furthermore, there are significant modelling challenges in calibrating climate risk scenarios for transition and physical risks given the interactions between policy implementation, technology shocks and their effects on different economic sectors. On top of that, the usage of long time horizons to evaluate transition paths challenges the way risks are usually assessed: transition scenarios often project impacts over 30-year horizons while banks and supervisors typically use one- to five-year periods to conduct business planning and stress testing exercises. This also results in a higher uncertainty affecting the projections of financial and macroeconomic variables. Finally, the evolution of climate risks cannot be inferred by using historical information and, therefore, a forward-looking approach would be more appropriate to calibrate the distribution of climate risk drivers in the future.
4. In addition, quantitative and qualitative tools to measure the financial impact of climate risks should be based on commonly agreed definitions and indicators to achieve consistency. The introduction of the EU taxonomy, which provides a universal and harmonised definition of economic activities considered as environmentally sustainable ('green'), is the first step towards reaching this goal. However, a similar standard definition of environmentally 'harmful' activities would be very helpful when assessing risks related to the transition to a more sustainable economy.

¹¹ See also the EBA consultation paper on 'On management and supervision of ESG risks for credit institutions and investment firms'.

https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Discussions/2021/Discussion%20Paper%20on%20management%20and%20supervision%20of%20ESG%20risks%20for%20credit%20institutions%20and%20investment%20firms/935496/2020-11-02%20%20ESG%20Discussion%20Paper.pdf.

5. Supervisors, central banks and other institutions have started setting the fundamentals for incorporating climate risk in their risk assessment tools, putting in place initiatives to explore how climate risk could be framed in scenario analysis or stress testing.
6. In its action plan on sustainable finance, the EBA has set out a plan¹² regarding its deliverables and activities related to environmental, social, and governance (ESG) risks in the near future. Regarding scenario analysis and stress testing, the EBA decided to follow a step-by-step approach and start focusing on the assessment of climate change related risks. In particular, priority was given to the mapping of banks' exposures, in relation to their climate relevance, and then in parallel explore modelling techniques to estimate possible impacts of the climate risk scenario.

1.2 The pilot exercise

7. The EBA pilot exercise on climate risk is the first EU-wide exercise for the banking sector and it is based on a sample of volunteer banks. Its 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. Therefore, 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.
8. Furthermore, the exercise aims at testing banks' readiness to apply the criteria set by the EU taxonomy¹³ and provides an estimate of the current levels of taxonomy aligned exposures. According to the EU taxonomy regulation, banks should disclose the alignment of their exposures with taxonomy criteria starting from 2022. In addition, the green asset ratio, as part of the Pillar 3 disclosures, will also have to be disclosed from 2022.
9. Data were collected directly from 29 participating banks using templates aligned, to the extent possible, with the supervisory reporting definitions. The raw data, which cover large EU corporate exposures, were subject to several rounds of quality checks to ensure comparability and consistency of results.
10. The exposures were then classified by the EBA using some of the methods currently available to measure the amount of banks' exposures which could be relevant from a climate perspective. In particular, both a sector-based and an emission-based approach were applied. 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

¹² See footnote 6.

¹³ A more detailed description of the EU taxonomy is given in chapter 3.

classification). This best effort attempt was the first test¹⁴ run on such a large sample of EU banks of the application of the EU taxonomy. In parallel, a top-down¹⁵ tool for gauging the amount of exposures aligned with the EU taxonomy was also applied to complement the analysis. Finally, the green data classification was supplemented by a questionnaire, which has provided information about the main challenges faced by banks when running such classification.

11. A scenario analysis to estimate the possible impact of transition and physical risk on banks' balance sheets was also performed. The analysis was run by applying shocks, stemming from different NGFS climate risk scenarios, to risk parameters¹⁶ to measure the impact in terms of expected loss. It needs to be highlighted that this assessment 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. In light of this, the results of the scenario analysis should be interpreted bearing in mind the limitations behind the model, the scenarios and the data used.

1.3 Scope, sample and data coverage

12. 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. These data were provided at obligor level as of December 2019¹⁷ and it covered over 477,000 unique obligors located in 29 countries¹⁸. The scope of the exercise is focused on non-SMEs as climate-related information (e.g. sector, or GHG emission intensity) on this type of counterparties is expected to be more accessible and available than for SMEs.
13. Participating banks were asked to provide the original exposure value, risk parameters, risk weighted assets and information on NACE 2 level 4 classes¹⁹ for each obligor in the scope²⁰ (see also Annex 5.2 on Data definitions and treatment).

¹⁴ Among private initiatives, the EBF/UNEP report also provides a picture of the main challenges for banks to apply the EU taxonomy: <https://www.ebf.eu/wp-content/uploads/2021/01/Testing-the-application-of-the-EU-Taxonomy-to-core-banking-products-EBF-UNEPFI-report-January-2021.pdf>.

¹⁵ See section 3.3.

¹⁶ The shocks are generated with the ECB climate risk top-down tool as explained in section 2.4.

¹⁷ All figures in the report refer to data as of end 2019.

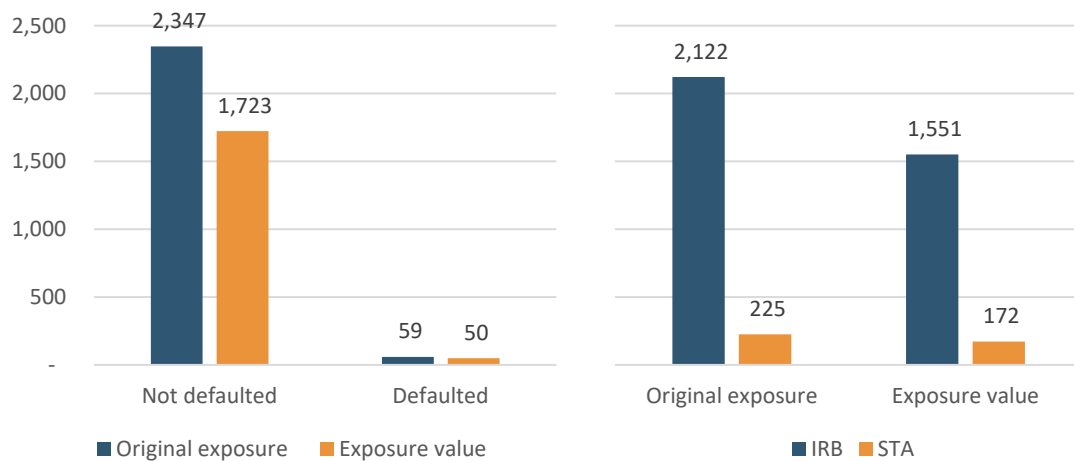
¹⁸ This includes the 27 EU countries, plus Norway and the United Kingdom.

¹⁹ In this exercise NACE Rev. 2 classification was used. This classification is structured as follows: i) a first level consisting of headings identified by an alphabetical code (sections); ii) a second level consisting of headings identified by a two-digit numerical code (divisions); iii) a third level consisting of headings identified by a three-digit numerical code (groups); and iv) a fourth level consisting of headings identified by a four-digit numerical code (classes). See <https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF>. For simplicity, in this report NACE Rev. 2 level codes will be mentioned without specifying the revision (i.e. NACE level 1 section or NACE level 4 class)

²⁰ In this exercise, the consistency of obligor NACE 2 level 4 classes among banks was not checked. This means that different banks may have used different NACE 2 level 4 codes to classify the same obligor.

14. Regarding financials, only three NACE classes from the Financial section (K) were considered relevant and included in the scope of the exercise²¹.

Figure 1: Breakdown of total original exposure collected in the pilot exercise by a) status and b) supervisory approach (EUR bn).



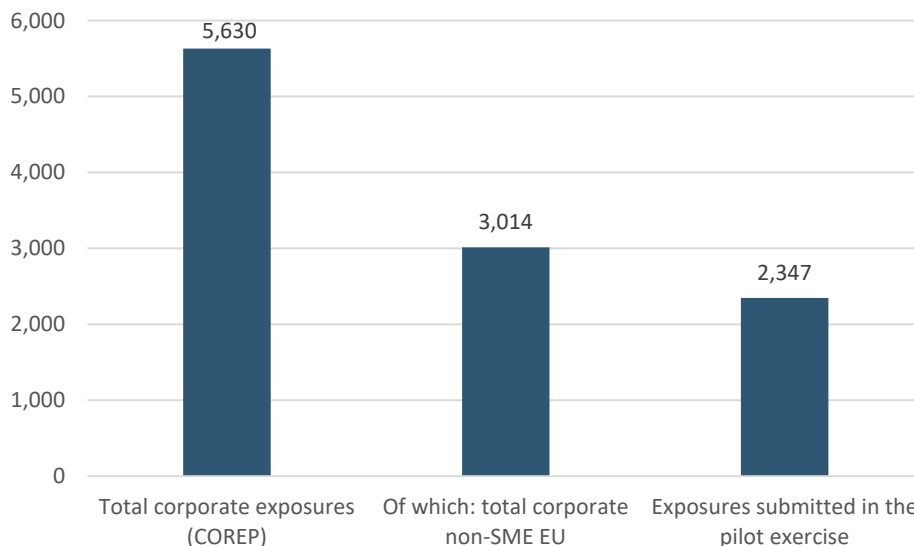
15. Figure 2 provides a comparison between COREP data from participating banks and the data collected for the pilot exercise. The total original exposure submitted by banks amounts to EUR 2.35 trillion. This represents 42% of total corporate exposure²² and 78% of non-SME corporate exposures to obligors domiciled in EU countries²³.

²¹ NACE level 4 classes included in the exercise are 64.10 (Monetary intermediation), 64.20 (Activities of holding companies) and 64.30 (Trusts, funds and similar financial entities). These classes might contain loans given directly to holding companies, or ‘other monetary intermediation’, but then used by a subsidiary to finance climate relevant activities.

²² COREP 07.00.a and 08.01.a.

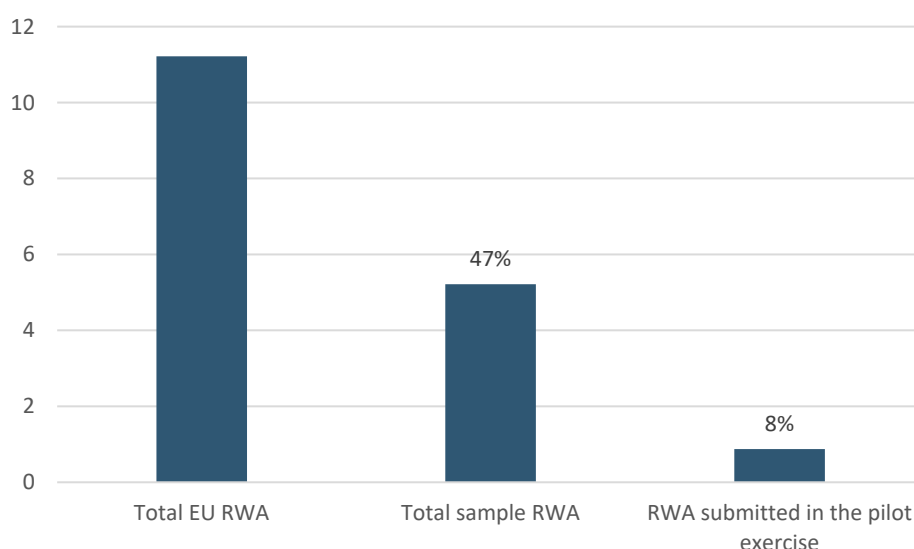
²³ COREP 09.01.a and 09.02. The remaining 22% of non-SME corporate exposures to EU obligors includes exposures to financials that are outside the scope of this exercise. In addition, it includes those exposures that were not submitted by some banks as explained in section 5.1 of the Annex.

Figure 2: Total original exposures collected in the pilot exercise and comparison with COREP data (EUR bn)



16. The data were collected from a sample of 29 banks from 10 countries representing 50% of the EU banking sector’s total assets²⁴, and 47% of total EU RWA. Figure 3 provides a comparison of total EU RWA (EUR 11.2 trillion²⁵, RWA of the banks in the sample (EUR 5.2 trillion) and RWA for the exposures submitted in the exercise (EUR 0.9 trillion).

Figure 3: RWA collected in the exercise over the total RWA (in EUR tn and as a share of total EU RWA)

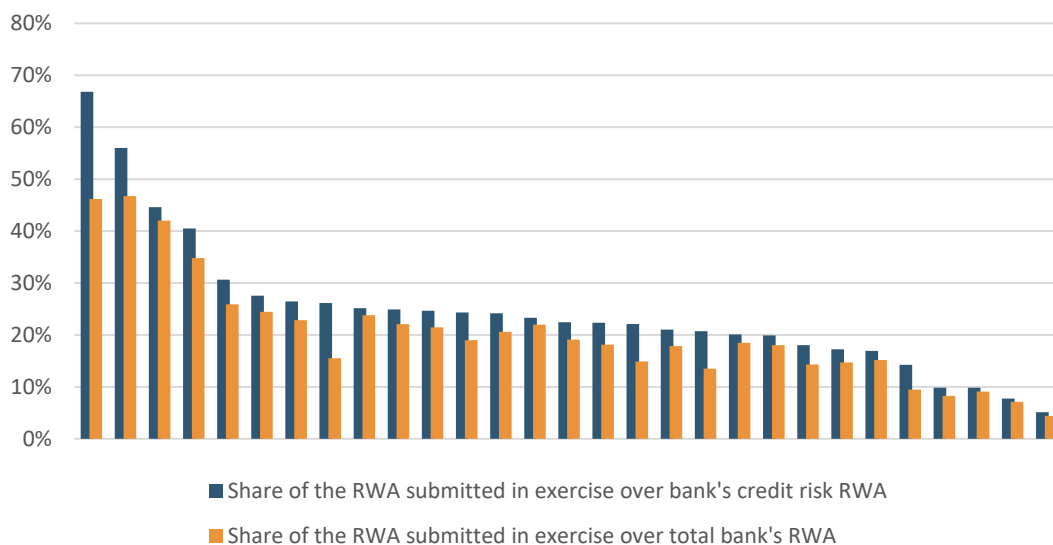


²⁴ Based on consolidated banking data covering domestic banking groups and stand-alone banks, foreign (non-EU) controlled subsidiaries and foreign (non-EU) controlled branches.

²⁵ Total EU RWA refers to Q1 2020, as the EU 27 figure was not available for the observed reference period.

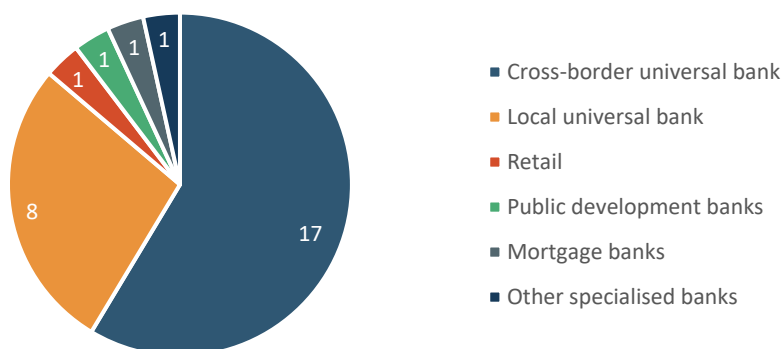
17. The share of the RWA submitted under the scope of this exercise as a part of total banks' RWA varies significantly across banks and ranges between 4.4% and 46.7% (Figure 4). The dispersion across banks is explained by their different business models and also by the fact that some banks were not able to provide the full scope of the data (for more details see Annex 5.1).

Figure 4: Share of RWA



18. The sample of participating banks covers a wide range of business models²⁶ (Figure 5), ownership and size. It includes seven global systemically important institutions (G-SIIs) and 15 other systemically important institutions (O-SIIs).

Figure 5: Overview of business models covered by the sample



²⁶ Information on business models as collected for the purpose of the Basel III monitoring exercise.

2 Data classification approaches

19. One of the first steps in designing a robust climate risk assessment framework is to construct indicators and develop definitions that would allow exposures to be compared across institutions and sectors consistently.
20. So far, some of the initiatives run by competent authorities²⁷ to measure transition risk have relied on a method that maps the standard EU classification of economic activities (i.e. the NACE) into categories that are relevant for climate transition risks. In this way, banks' exposures could be classified based on the sector of the counterparty. This is known as the Climate Policy Relevant Sectors (CPRS) methodology (Battiston et al. 2017).
21. The advantage of the CPRS approach is that it allows a climate-relevant assessment to be made of a large part of financial assets (equity holdings, corporate bonds, loans) 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 (thus complementing the EU Taxonomy). This allows a picture to be obtained of the level of environmental sustainability of banks' positions with currently available information.
22. One limitation may apply when companies operate in multiple business lines. In this case, using a NACE code which is based on the main activity of the company does not capture all the transition risk. Finally, the CPRS approach only allows data to be classified into climate relevant sectors without providing a grading scale across activities or sectors. In light of this, the CPRS approach delivers a first insight into exposures that might be more relevant for assessing transition risks than others rather than providing a quantification of the actual transition risk.
23. Another widely used approach to quantify transition risk consists of using carbon footprints and mapping GHG emissions to individual borrowers or to their sectors. 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.
24. However, data definitions, coverage and accuracy²⁸ pose some challenges when comparing results based on this approach (see also section 5.4 of the Annex). In addition, accounting only for GHG emissions to assess exposure to transition risks would correctly identify large emitters, but, for instance, 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.

²⁷ EIOPA and ECB have conducted an assessment of climate transition risk of EU financial institutions following the CPRS methodology by Battiston et al. (2017), see ECB (2019, 2020) and EIOPA (2018) Financial Stability Reviews. In contrast, DnB analysis relies on carbon intensity; see Vermuelen et al. (2019).

²⁸ See ESRB 'Positively green: Measuring climate change risks to financial stability'

https://www.esrb.europa.eu/pub/pdf/reports/esrb.report200608_on_Positively_green_-_Measuring_climate_change_risks_to_financial_stability~d903a83690.en.pdf?c5d033aa3c648ca0623f5a2306931e26.

25. Banks' corporate exposures are classified according to the two data classification approaches mentioned above. The findings of this assessment should provide empirical evidence on the advantages and the weaknesses of the two approaches. Given the methodological and data limitations, the figures should serve as a starting point for future work on data classification.

2.1 A sector-based classification approach

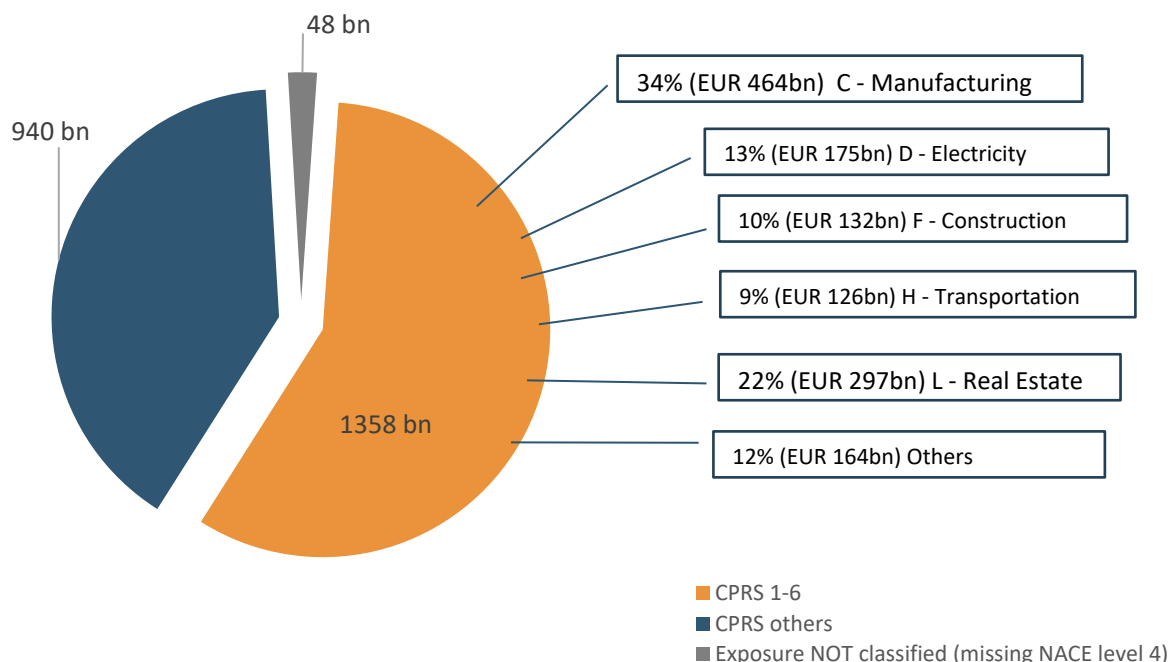
26. In this section, the CPRS classification by Battiston et al. (2017) is applied to banks' exposures²⁹. The CPRS, in its most aggregate level, consists of eight categories (1. Fossil fuel, 2. Utility, 3. Energy-intensive, 4. Buildings, 5. Transportation, 6. Agriculture, 7. Finance and 8. Others). Exposures to CPRS 1 to 6 (CPRS 1-6) are defined as those exposures that may be potentially affected by climate transition risks³⁰.
27. Overall, almost 98% of the EUR 2.34 trillion of exposures submitted by banks in this exercise were classified according to the CPRS approach³¹.
28. 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 (Figure 6).
29. Regarding defaulted exposures, which amount to EUR 59 billion, more than 95% were classified using the CPRS approach and 60% of them were allocated to climate relevant policy sectors 1-6.

²⁹ The CPRS approach is explained in Annex 5.3. See also Battiston, S., Mandel, A., Monasterolo, I., Schuetze, F. and Visentin, G., 2017, 'A climate stress-test of the EU financial system', *Nature Climate Change*, vol. 7, pp. 283-288.

³⁰ It should be noted that the main purpose of the CPRS approach is to group exposures into a manageable number of categories, to be further analysed, based on sector specific considerations. For instance, exposures to NACE section D- electricity and gas, have to be further broken down depending on the source of energy used to produce electricity (e.g. coal versus renewables). For this reason, the CPRS approach provides only a rough proxy of the transition risk embedded in banks' exposures.

³¹ The analysis was run on original exposures in order to take into account the share of the exposures that are guaranteed as specified in section 5.2 of the Annex.

Figure 6: CPRS classification at EU level and for selected NACE level 1 sections (EUR bn)

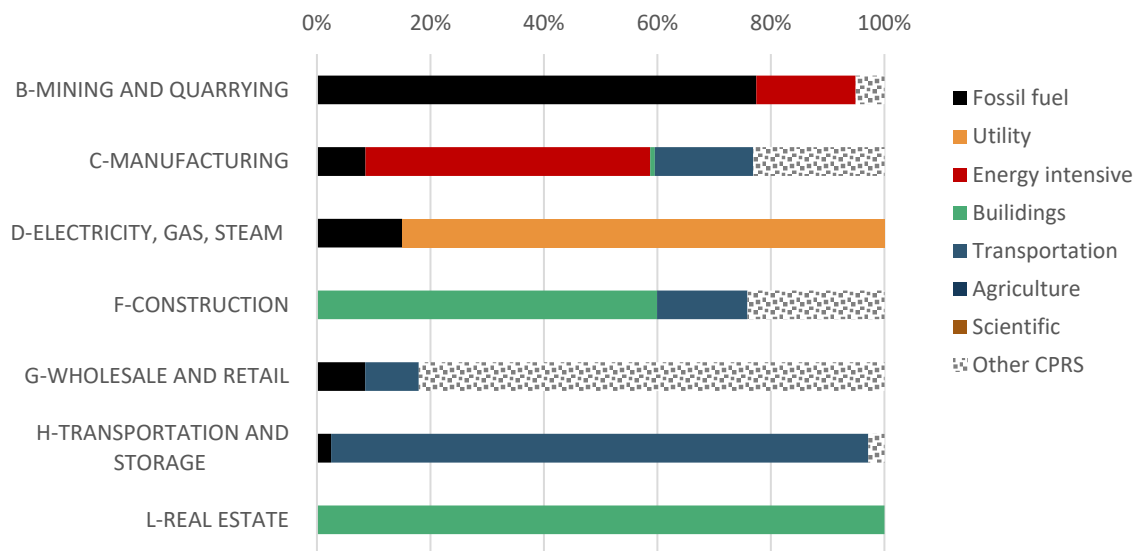


30. Figure 6³² shows the NACE level 1 sections in which CPRS 1-6 exposures are more concentrated. Most are allocated to five NACE level 1 sections (³³): Manufacturing (C), Electricity, gas, steam and air conditioning supply (D), Construction (F), Transporting and storage (H) and Real estate activities (L), amounting to almost EUR 1,195 billion (50% of total exposures submitted). In addition, Figure 7 provides the breakdown of exposures by NACE 2 level 1 sections into the six key climate policy relevant categories.

³² A more detailed chart by NACE level 1 section is provided in Annex 5.3 for both ‘total original exposures’ and ‘original exposures of which defaulted’.

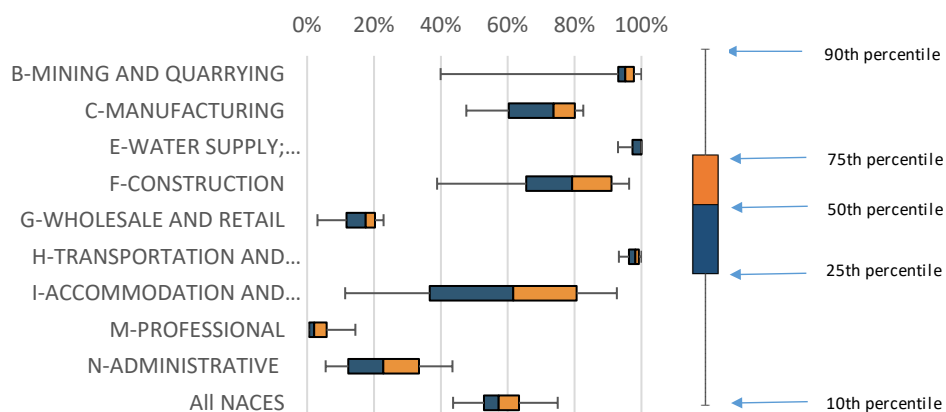
³³ Exposures to Agriculture, which is a key sector from a climate perspective, are marginal compared to others as it is composed mainly of SMEs. The median share of EU non-SME exposure in Agriculture as a part of total exposure by bank is 0.5%.

Figure 7: Breakdown of exposures by NACE level 1 section into CPRS 1-6 categories, (% of total exposures)



31. The share of CPRS 1-6 exposures over total exposures across NACE 1 sections sheds further light on the degree of transition risk that banks’ corporate loan books might embed. Figure 8 shows the distribution of this ratio across banks³⁴. In particular, for half of the banks in the sample the share of CPRS 1-6 related exposures to Manufacturing (C), Construction (F), Transportation (H), Water supply (E)³⁵ and Mining and quarrying (B) is greater than 70%.

Figure 8: Share of CPRS 1-6 related exposures as a percentage of total exposures by NACE 1 sections – banks’ distribution (10th, 25th, 50th, 75th and 90th percentiles)



³⁴ This analysis excludes those NACE sections (i.e. A-Agriculture or D-Electricity) that are entirely mapped in one CPRS 1-6 category.

³⁵ The high share of CPRS 1-6 exposures in some NACE sections (like B, E and H) could also be partially explained by the fact that those sectors have a high number of classes classified as CPRS 1-6. For instance, within NACE 1 section E (Water and supply), 16 out of 19 NACE level 4 classes are defined as CPRS 1-6.

32. Banks show an amount of original exposures to Financial and insurance activities (K) of EUR 168 billion. As explained in paragraph 14, these corporate loans are provided directly to the holding company without further information on the sub-sector in which they are employed. Therefore, more detailed information³⁶ on the related activity would be needed to run a more accurate assessment.

2.2 A GHG emission-based classification approach

33. To complement the CPRS analysis, an alternative data classification approach, based on the greenhouse gas (GHG) emission intensity³⁷ 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.
34. Carbon emissions can be either direct (scope 1) or indirect (scope 2 and 3) emissions (see section 5.4 of the Annex). Scope 1 and 2 emissions are easily available and therefore reported by companies in their carbon emission footprint disclosure. Scope 3 emissions, however, are more complex to quantify and can represent the largest source of emissions for a company³⁸. Unfortunately, scope 3 emissions are not often disclosed and available, posing significant challenges when comparing GHG intensities among companies, while at the same time, they represent a large share of total indirect emissions made by companies.
35. The data submitted by banks were mapped with data on GHG emissions in order to build up a distribution of banks exposures based on the emission intensity of the obligors. One of the limitations of this approach is that GHG emission intensities are available only for 17% of the obligors in the sample. For the 65% of the exposures collected, either the average GHG intensity of the NACE level 4³⁹ class or that of the parent⁴⁰ were used. The rest of the exposures (18%) could not be matched due to missing GHG emission data. The methodology followed to assign GHG emission intensity is explained in section 5.4 of the Annex.

³⁶ For instance, a pro-rata attribution of exposures to holding companies in the corresponding sub-sector of activity may be undertaken using, for instance, the share of subsidiaries' assets in total group assets using proprietary databases.

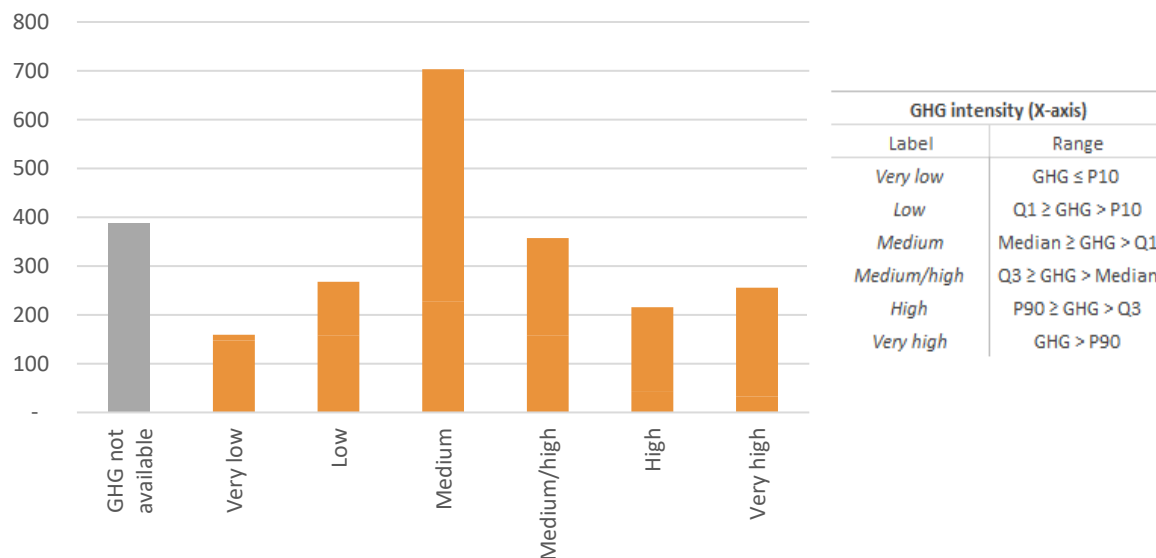
³⁷ The source of the GHG emission intensity is Trucost (S&P Global) <https://www.trucost.com>. Data as of 2019.

³⁸ See https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporting-Standard_041613_2.pdf.

³⁹ The approximation is applied at NACE level 4 class as this is the highest available information at sector level collected in this exercise. Dispersion in GHG emission intensity for some NACE level 4 classes can still be observed.

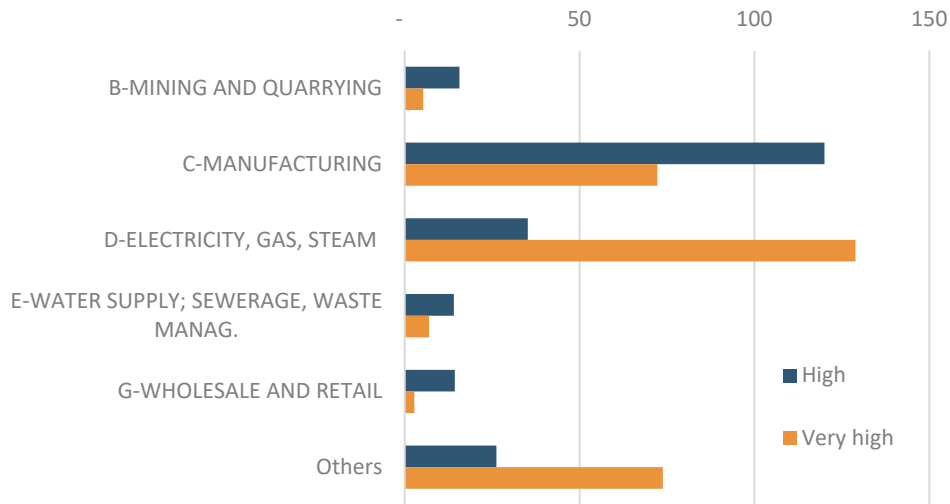
⁴⁰ Only if the parent operates in the same NACE level 4 class of the obligor.

Figure 9: Original exposures to GHG emission intensity buckets (buckets computed based on percentiles, EUR bn)



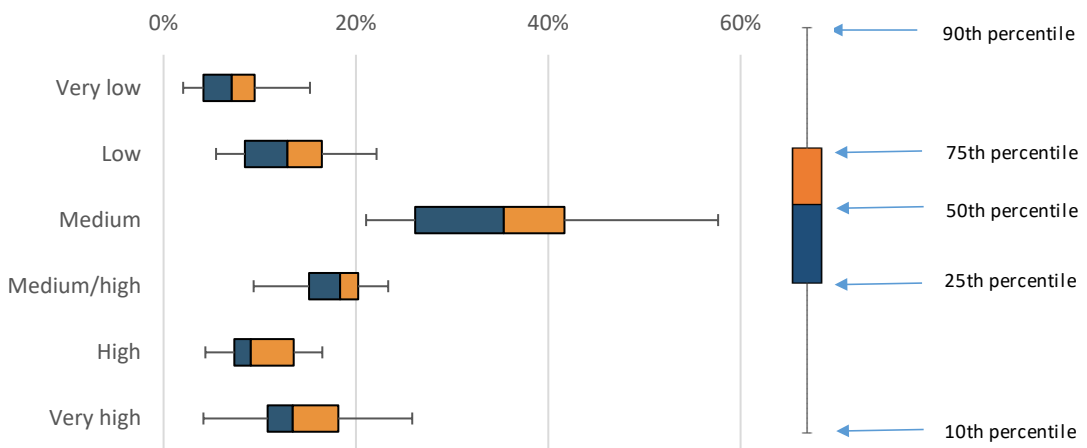
36. According to the results of the GHG intensity classification (Figure 9), of the EUR 1.96 trillion of exposure classified (80% of the total submitted), almost EUR 828 billion (35% of the total submitted) of the exposures are assigned to obligors with GHG emission intensity above the median (medium/high, high or very high buckets), which are more sensitive to the possible introduction of transition policies aimed at reducing GHG emissions (e.g. introduction of a carbon tax, cutting fossil fuel subsidies, etc.).
37. A further breakdown of the last two GHG buckets ('high' and 'very high') is provided in Figure 10. Electricity (E) and Manufacturing (C) represent the most GHG intensive sectors in terms of total amount of exposures, containing 45% and 25% of all exposure to obligors with 'very high' GHG emissions intensities respectively. Manufacturing (C) also exhibits a significant amount of exposure to 'high' emitters (almost 55% of all exposures to obligors with 'high' GHG emission intensity) which could be driven by the concentration of total exposures in Manufacturing (C) (see paragraph 30).

Figure 10: Original exposures to 'high' and 'very high' GHG buckets by selected NACE 1 section (EUR bn)



38. Figure 11 shows the distribution of banks' exposures⁴¹ across GHG buckets. In particular, the median of 'very high' emission obligors is almost 15% and for some banks more than a quarter of their exposure is to these obligors.

Figure 11: Share of exposure in GHG bucket over total exposures – banks' distribution (10th, 25th, 50th, 75th and 90th percentiles)

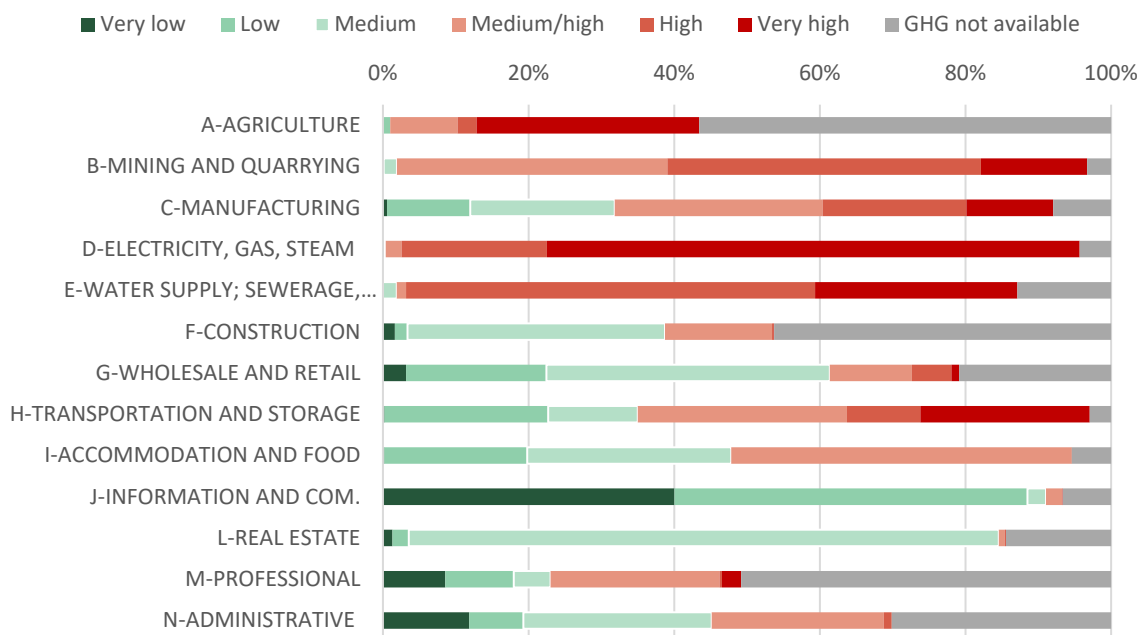


39. The breakdown of the distribution by NACE level 1 section and GHG emission buckets gives some insights into the heterogeneity, in terms of GHG emissions, among obligors within the same NACE section (Figure 12). In particular, Manufacturing (C) and Transport (H) exhibit a high

⁴¹ For each bank, the ratio of the exposures in the GHG bucket and the total exposure of the banks under the scope of the emission based approach analysis is computed.

dispersion while others sectors like Electricity (D) and Mining (B) show a low dispersion and a significant concentration of high emitters.

Figure 12: Exposures associated to GHG emission intensity buckets in NACE 1 sections (% of total)



40. The high level of heterogeneity within NACE 1 sections confirms the need to define more granular reporting requirements at sector level to achieve further accuracy when analysing environmental risk. The current supervisory reporting framework incorporates only a NACE level 1 section breakdown for non-financial corporate exposures. Combining, for instance, the NACE level 1 section (or even level 2) breakdown with GHG emission intensity buckets could provide an insightful picture of the carbon intensity of banks' credit portfolios. This is also in line with the EBA proposal, provided in the consultation paper related to the ITS on Pillar 3 disclosure for ESG risks⁴², which, for instance, suggests to include the average share of high carbon technologies (oil, gas, coal) or the average CO2 tones, for some key NACE level 2, 3 or even 4 digits.

⁴² <https://www.eba.europa.eu/eba-launches-public-consultation-draft-technical-standards-pillar-3-disclosures-esg-risks>

2.3 A comparison between the CPRS and GHG emission based approach

41. In order to help interpret the results of the data classification exercise, this chapter provides a comparison between the two data classification methods applied. A summary of the main features of the two classification approaches used is provided in Table 1.

Table 1: Summary of the CPRS and the GHG emission approaches

| | CPRS approach | GHG emission based |
|---------------------------------|--|--|
| Scope | EUR 2.3 trillion were classified (98% of the EUR 2.35 trillion of exposures collected from banks). | EUR 1.93 trillion were classified (80% of the EUR 2.35 trillion of exposures collected from banks). |
| Estimate | EUR 1.36 trillion (58% of the total) of exposures to obligors that operate in NACE level 4 classes potentially subject to transition risk. | EUR 828 billion (35% of the total) of exposures to obligors with GHG emission intensity above the median. |
| Methodology | NACE 4 digit activities are classified into CPRS categories based on 3 quantitative criteria. | Climate relevance of the obligor defined based on the GHG intensity of the obligor (directly matched or proxied). GHG intensity buckets based on the distribution (percentiles) of the full data available. |
| Source | Academia. | External data provider and EBA calculation. |
| Data coverage | High: NACE 4 codes available for 98% of the submitted data. | Low: 17% of total obligors have been matched with individual GHG emissions. For 65% of total obligors a proxy was applied as an individual GHG emission was not available ⁴³ . 18% of exposures were not included in this classification. |
| Forward looking features | None. Static approach | None. Static approach |

42. Given the limitations in terms of data coverage for GHG emission intensity, in order to obtain more robust results the comparison is run on a subset of exposures (representing 17% of the total exposures submitted⁴⁴) that includes only those obligors for which individual GHG emission intensity is available⁴⁵.

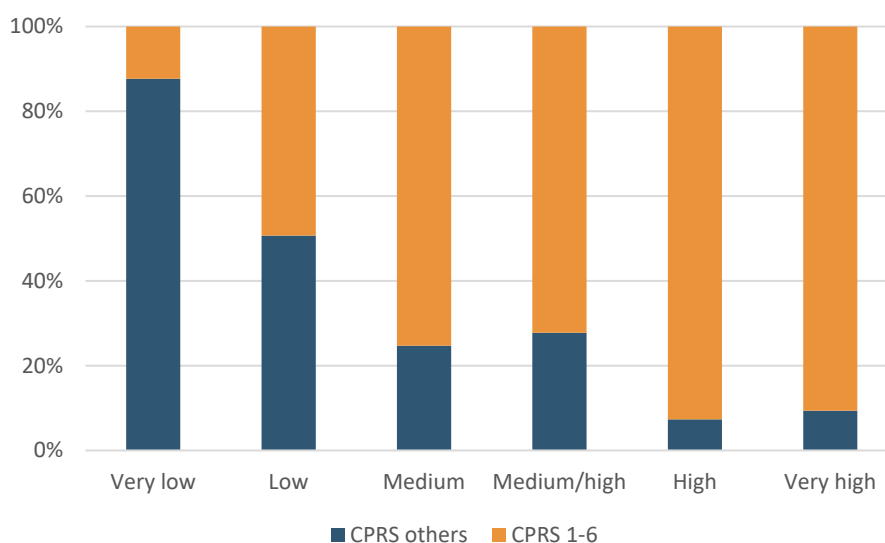
⁴³ The findings on data coverage are based on the scope of emission data as provided by Trucost (S&P Global).

⁴⁴ Financials are also excluded.

⁴⁵ For robustness purposes, the analysis was also run on the full sample and very similar results were found in terms of distribution across GHG emission buckets.

43. The results show that there is some correlation between the CPRS 1-6 and GHG estimates (Figure 13). However, for high GHG emission buckets ('high' and 'very high') there are, on average, 10% of outliers which means that some companies belonging to the 'high' and very high' GHG buckets can still conduct their main activity in sectors with low climate relevance (CPRS-others).

Figure 13: CPRS exposures by GHG emission intensity buckets (% of total)



44. On the other hand, sectors of activities in CPRS 1-6 can still contain counterparties with production technologies that allow goods to be produced with lower emissions than their peers, as shown by the share of outliers in the 'low' and 'very low' GHG buckets. This suggests that climate risk assessment at sector level should be also complemented with an exposure level analysis in order to capture possible idiosyncratic components.

45. The share of outliers in these low GHG buckets can be also driven by the way GHG emissions (especially scope 3) are quantified and reported by companies and external providers, which might undermine comparability across obligors. Another element is the inconsistency in reporting the NACE level 4 class for the same obligors. In particular, it was observed that some obligors were classified by banks with a different NACE level 4⁴⁶.

46. It is not possible to draw any similar conclusion for the 'medium' and 'medium high' buckets for which the level of GHG emission intensity does not provide extreme values (values are lying around the median) and therefore does not allow for a clear categorisation of the obligors from an environmental perspective.

47. In conclusion, it should be highlighted that the data classification exercise represents a static analysis aimed at providing a snapshot of the composition of the non-SME corporate exposure

⁴⁶ The consistency among banks of how NACE level 4 information is reported for same obligors was not checked (given the lack of unique identifiers for all obligors).

portfolio of the banking system from a climate transitional risk perspective. In particular, it does not take into account forward-looking elements (such as the transition strategy of the obligors, including the capital expenditure (capex) allocation strategy for low-carbon electricity and the potential ability of sectors/activities to adopt lower carbon-intensive technologies for producing goods in the future) that in some cases could reduce the climate relevance of carbon-intensive obligors. Furthermore, the data quality issues for both GHG emission and sector information (NACE 4 class) that have been highlighted in this section might also pose significant challenges when comparing results across banks. Finally, it should be noted that each CPRS may still include a heterogeneous set of activities, which are related to different technologies, with a low degree of substitution across sectors⁴⁷. Therefore, care should be taken when comparing firms inside each CPRS and, consequently, in the results presented.

2.4 A scenario analysis⁴⁸

48. Once exposures have been mapped to their climate relevance, the next step consists of assessing their 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.
49. 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.
50. 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.

⁴⁷ For instance energy intensive activities in manufacturing might use lower carbon intensive technologies than in mining.

⁴⁸ The scenario analysis run in this section is also part of a joint ESA project on climate risk monitoring coordinated by the ESRB, which involves ESAs and the ECB.

Box 1: ECB climate risk top-down tool

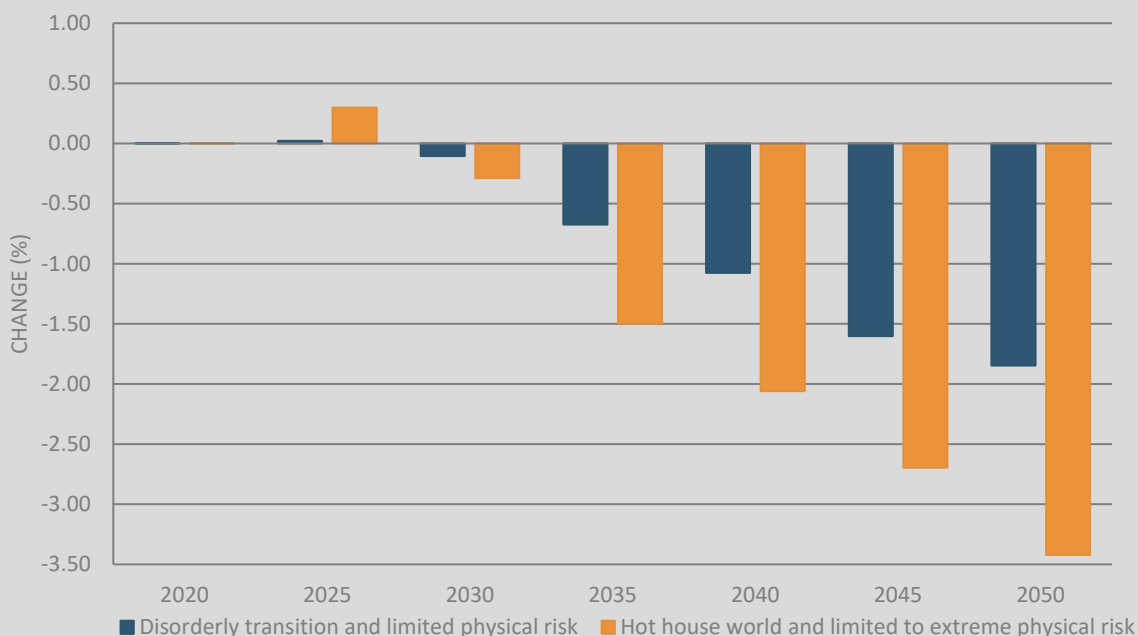
The scenario analysis performed in this section employs the parameters sourced from the new ECB climate risk stress test framework⁴⁹, which tracks the impact of both transition and physical risk. The ECB climate stress test framework ensures comparability of results and full transparency in terms of identification and quantification of the transmission channels. It integrates transition and physical risk and their interactions, as well as the interactions between the non-financial and financial corporate sectors over long time horizons.

Climate scenarios

The analysis employs two adverse scenarios, out of the four designed by the NGFS⁵⁰: the ‘disorderly’ and the ‘hot house world’ scenarios. 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. 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 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 clearly assess the macroeconomic impact deriving from the interplay between the cost of policy action (transition risk) and inaction (physical risk).

Figure 14: GDP evolution under different climate scenarios



Source: ECB calculations based on NGFS scenarios Source

⁴⁹ The ECB top-down climate stress test is described in the Blog Post published on the ECB website on 18 March. The full methodology and results will be published as an ECB paper by mid-2021: contact authors are S. Alogoskoufis, T. Emambakhsh, M. Kaijser, C. Kouratzoglou, M.A. Muñoz García, L. Parisi, C. Salleo.

⁵⁰ Please see footnote 9.

Figure 14 shows how much GDP would change under the disorderly transition and hot house world scenarios, with respect to the reference scenario (orderly transition): while policy inaction would maximise GDP growth in the short run, transitioning towards a greener economy in an orderly manner maximises GDP growth in the medium-to-long run. Additionally, even the relatively higher costs associated with a disorderly transition would be significantly lower than any costs coming from higher physical risk in the hot house world scenario.

Climate risk mapping at firm-level

A unique collection of climate and financial data for millions of firms worldwide has been constructed at the ECB, and used for the assessment of climate risks in the non-financial corporate sector. Each bank's counterpart⁵¹ has been mapped to both its carbon footprint, using Urgentem⁵² data, and to its vulnerability to physical risk, thanks to Four Twenty Seven data⁵³. Other data sources have been used to complement firm-level climate information with financial variables, such as Orbis⁵⁴ and Eikon⁵⁵.

Climate risk assessment and firm-level PD calculation

The scenarios and firm-level data have been complemented by proprietary top-down models to assess the economic impact of future climate scenarios on firms' profitability and solvency. In particular, green policies to facilitate the transition, such as a carbon tax, can increase the prices of some goods (for example those that rely heavily on carbon emissions during the production process) and of brown energy. As a result, firms' revenues could decrease and operating costs increase, especially for carbon-intensive firms. Changes in firms' debt are also quantified, due to the possible disruption of physical capital caused by natural disasters on the one hand and/or by technological substitution in the transition to a greener production chain. Operating costs are also assumed to be affected by changes in insurance risk premia, especially for firms located in vulnerable geographical areas.

The combined impact of transition and physical risk on firms' profits and debt allows for the estimation of firms' default probabilities under different climate scenarios, and over a 30 year time horizon. Changes in firms' operating costs and revenues have an impact on their earnings, while changes in firms' levels of debt directly affect leverage: all these effects ultimately lead to changes in firms' probabilities of default (PDs⁵⁶).

⁵¹ As banks' counterparts non-financial corporates were considered including SMEs.

⁵² <https://www.urgentem.net/>.

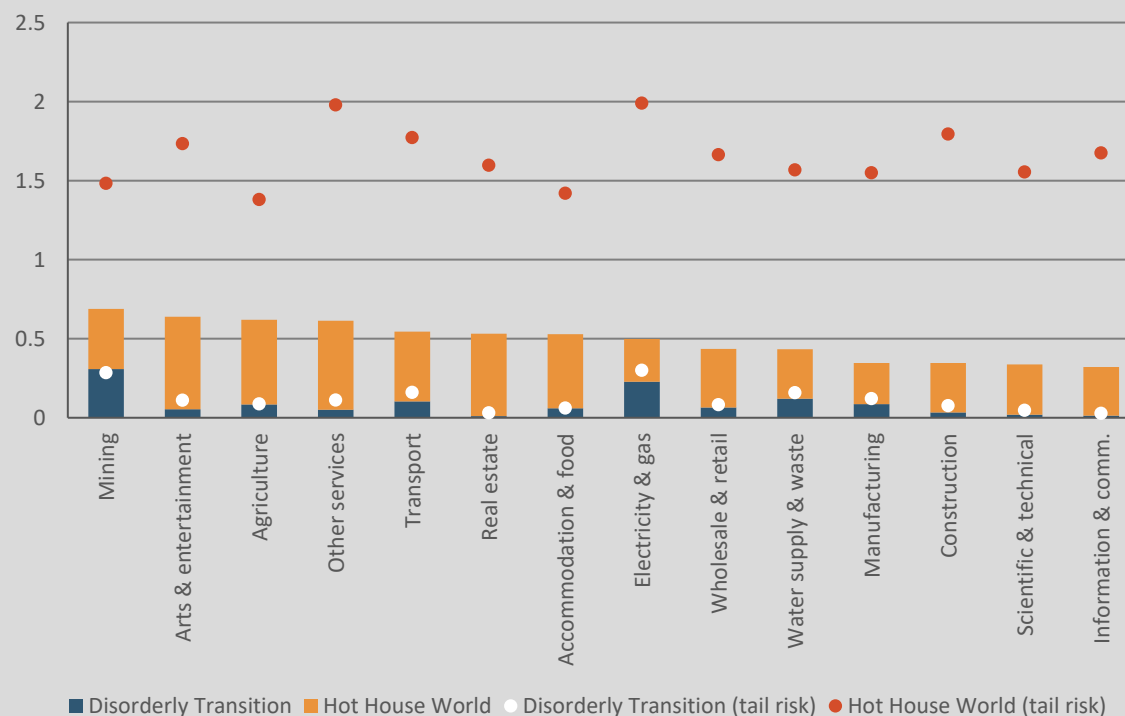
⁵³ <https://427mt.com/>.

⁵⁴ <https://www.bvdinfo.com/en-us/our-products/data/international/orbis>

⁵⁵ <https://eikon.thomsonreuters.com/index.html>.

⁵⁶ The PDs used in the top-down model are taken from Moody's Expected Default Frequencies (EDFs).

Figure 15: Sectoral changes (pp) in EUR firm-level PDs with respect to the orderly transition scenario (2020 to 2050)



Source: ECB calculations based on NGFS scenarios, 427 and Urgentem data, Orbis and Eikon

Figure 15 shows two sets of results. First, how much firm-level PDs would change on average by sector and in each scenario: these outcomes are represented by the bars. Second, how much PDs would increase when focusing on the firms that are most vulnerable to physical risk, again averaged by sector: these are represented by the dots⁵⁷. The outcomes show that default probabilities would always increase more under the hot house world scenario, with respect to both orderly and disorderly transition. The results also highlight that the firms most vulnerable to physical risk may be subject to increases in their probability of default that are much larger than for average firms. This means that natural catastrophes work as amplifiers of tail risk: the potential disruption in firms’ businesses could thus be extreme in some geographical areas, especially if no new policies to reduce carbon emissions are introduced.

The information on the evolution of PDs is supplemented with the assessment of the impact of the same scenarios on LGD. The translation of scenarios into LGD rests on the earlier ECB top-down methodology, developed jointly with DNB that maps scenarios directly into bank sector level LGD without reference to firm-level information. The method allows LGD to be derived only on the NACE level 2 class and has been employed in a pilot macro-prudential climate scenario analysis in 2020⁵⁸.

⁵⁷ Note that these results are based on a sub-sample of the firms used for the ECB top-down climate stress test.

⁵⁸ https://www.esrb.europa.eu/pub/pdf/reports/esrb.report200608_on_Positively_green_-_Measuring_climate_change_risks_to_financial_stability~d903a83690.en.pdf?c5d033aa3c648ca0623f5a2306931e26

51. The analysis covers around 90% of the value of the exposures provided by the banks in the pilot exercise⁵⁹, excluding financials. The large majority of exposures (95% of the total) are treated under the IRB approach.
52. The shocks on PD and LGD, generated using the ECB model, are applied to the obligors' risk parameters by NACE level 4 class (for PD) and NACE level 2 section (for LGD).
53. The impact of the climate scenarios on each bank balance sheet is computed as follows⁶⁰:

$$\frac{\text{Expected loss}_{\text{adverse}} - \text{Expected loss}_{\text{starting point}}}{RWA_{EU \text{ non SME}}}$$

where $\text{Expected loss} = PD * LGD * \text{Exposure value}$

54. It should be emphasised that the expected loss is computed as the product of regulatory PD, LGD and the exposure value. Therefore, this represents a proxy of the accounting P&L impact (e.g. stages are not considered).
55. The EU weighted average and the distribution across banks of the additional expected loss are reported in Table 2 for both scenarios. 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 is concentrated in Electricity (D) and Real estate (L) as shown in Table 3.

Table 2: Banks' distribution in each scenario: percentiles (10th, 25th, 50th, 75th, and 90th) and EU average of additional expected losses as a share of RWA of submitted exposures- deviation from the starting point (bps).

| | Disorderly | 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 |

⁵⁹ Three banks were not included in the analysis as they did not provide risk parameter data.

⁶⁰ Since the pilot exercise is not run on the full credit risk portfolio (i.e. the scope is limited only to EU non-SME obligors), this measure should give a better picture of the magnitude of the impact relative to the scope of the exercise. In addition, it does not aim to quantify the impact on the CET1 capital ratio, which goes beyond the objective of the pilot exercise, but rather to express the results in a comparable way.

Table 3: Impact by selected NACE level 1 sections in each scenario: additional expected losses as a share of RWA of submitted exposures- deviation from the starting point (bps)

| | Disorderly | 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 total | 160 | 175 |

56. There are several limitations to the approach taken. First of all, its static nature: the framework does not consider a possible rebalancing of the corporate portfolio based on the adaptation strategy of the bank. Furthermore, the analysis covers only a subset of exposures which might not be representative of the corporate exposures portfolio of banks⁶¹ participating in the pilot exercise. In addition, it should be highlighted that the shocks on risk parameters are not calibrated using the pilot exercise data but are estimated separately by the ECB model, and then applied to the pilot exercise data. In particular, the shocks calibration is not based on the classifications applied in this chapter and therefore climate relevance is implicitly defined by the ECB model itself. Finally, although the model covers both transition and physical risks, it was not possible to isolate the impact from each of these.
57. In general, it should be highlighted that this is the outcome of a learning exercise and that methodologies for sensitivity and scenarios analysis are in their first phases of development and are constantly evolving. Therefore, the tools used in this section reflect meaningful progress in regard to the identification and measurement of physical and transition risks for the EU banking sector, but should not be taken as the only possible way forward. The findings of this analysis represent an empirical test and should contribute to the on-going discussion on how to model climate risk into banks' credit portfolios.

⁶¹ As shown in paragraph 15, the total exposure collected in this exercise represents 42% of total EU non-SME exposures of the participating banks (as reported in COREP).

3 Green taxonomy classification exercise

3.1 Introduction

58. The assessment of greenness is important as banks have the capacity and are able to channel capital flows towards environmentally sustainable activities. In this sense, banks' lending businesses can help the economy in general in the transition effort. A green taxonomy, such as the EU taxonomy, is designed for such purpose. In April 2021, the EU commission put forward its Sustainable Finance package which includes the EU Taxonomy Climate Delegated Act⁶².
59. The classification approaches applied in chapter 2 aimed at quantifying and categorising the share of banks' exposures that could be relevant from a climate perspective. In this section, the focus will be on the quantification of the green share of banks' submitted exposures in line with the EU taxonomy criteria. It should be highlighted that this analysis is explorative and represents a first attempt to approximate the greenness of the EU banking sector with the tools and information currently available to banks.
60. In March 2021, the EBA published Advice to the European Commission on key performance indicators to be considered in the banks' disclosures of the alignment of their activities with the EU Taxonomy (Article 8)⁶³. The advice includes the green asset ratio as a primary indicator proposed for the disclosures by banks. The proposed definition of the green asset ratio as a ratio of taxonomy-aligned exposures to taxonomy-eligible exposures is conceptually similar to the estimations made by the EBA in this green classification exercise.
61. In addition to the EU Taxonomy for sustainable exposures, there is an ongoing work by the platform on sustainable finance, established by the European Commission, to propose a possible approach for defining negative impact economic activities ('brown taxonomy') and no impact activities ('neutral activities'). While this work is in an early stage, it would eventually complete the categorisation tools for the full spectrum of activities from an environmental perspective.

⁶² For more information, see https://ec.europa.eu/info/publications/210421-sustainable-finance-communication_en.

⁶³ For more information see the EBA Report (EBA/Rep/2021/03) on the Advice to EC on Disclosures under Article 8 of the Taxonomy; https://www.eba.europa.eu/sites/default/documents/files/document_library/About%20Us/Missions%20and%20tasks/Call%20for%20Advice/2021/CfA%20on%20KPIs%20and%20methodology%20for%20disclosures%20under%20Article%208%20of%20the%20Taxonomy%20Regulation/963616/Report%20-%20Advice%20to%20COM_Disclosure%20Article%208%20Taxonomy.pdf.

3.2 The EU taxonomy

62. 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.
63. 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 sustainable⁶⁴:
- Make a substantial contribution to one of six environmental objectives⁶⁵;
 - Do no significant harm (DNSH) to the other five environmental objectives;
 - Meet minimum social and governance safeguards;
 - Comply with robust and science-based technical screening criteria.
64. 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 adaptation⁶⁶. Applying the taxonomy at 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. As the scope of the taxonomy does not cover the full list of NACE activities, not all exposures provided by banks in this pilot exercise can be assessed and classified according to the EU taxonomy.

⁶⁴ For more information about Regulation (EU) 2020/852 ('Taxonomy Regulation') on the establishment of a framework to facilitate sustainable investment see: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32020R0852> and https://ec.europa.eu/info/publications/210421-sustainable-finance-communication_en for information on the Sustainable finance package by the European Commission.

⁶⁵ The taxonomy regulation establishes six environmental objectives: (1) climate change mitigation, (2) climate change adaptation, (3) the sustainable use and protection of water and marine resources, (4) the transition to a circular economy, (5) pollution prevention and control, and (6) the protection and restoration of biodiversity and ecosystems.

⁶⁶ The EU taxonomy climate delegated act provides the following definitions: Climate change adaptation means that an economic activity pursuing this objective should contribute substantially to reducing or preventing the adverse impact of the current or expected future climate, or the risks of such adverse impact, whether on that activity itself or on people, nature or assets. Climate change mitigation refers to an economic activity pursuing this objective should contribute substantially to the stabilisation of greenhouse gas emissions by avoiding or reducing them or by enhancing greenhouse gas removals. The economic activity should be consistent with the long-term temperature goal of the Paris Agreement.

3.3 Determining greenness

65. This section provides an overview of banks' efforts to apply the EU taxonomy at obligor level and gauges information on the alignment with the EU taxonomy, or 'greenness', in the European banking sector. To facilitate estimation efforts, two approaches for estimating greenness are being considered: a 'bank estimation' and a top-down tool.
66. The 'bank estimation' is based on a best effort basis by banks to classify the exposures according to the EU taxonomy. Banks were encouraged to apply the EU taxonomy directly, however, as the taxonomy is activity based, they needed to adapt and approximate it to a counterparty/obligor level in line with the information submitted in the exercise. When conducting the mapping to the EU taxonomy, participating banks reported three major challenges: i) the lack of client/counterparty data to run the classification of the EU taxonomy; ii) considerable resources are required for its application; and iii) interpretation issues with the criteria specified by the taxonomy⁶⁷.
67. An important caveat is that banks' estimates may be based on different objectives and/or criteria of the EU taxonomy⁶⁸. Moreover, they may have employed diverging methods and tools to approximate the level of greenness. In addition, banks may also have applied their method only to a subset of its exposures (e.g. certain subsectors) and used different scales for greenness. This may have an impact on the comparability of the banks' outcomes.
68. Further, the EBA applied a top-down tool approximating the application of the EU taxonomy - 'TAC estimate'. The tool was developed by Alessi et al. (2019)⁶⁹ and includes the taxonomy alignment coefficient (TAC). Alessi et al. (2019) provide a list of TACs, i.e. sector-specific standardised coefficients, for all NACE sections that are covered by the EU taxonomy as of 2020⁷⁰. The TAC for any specific sector approximates the sectoral alignment based on the features of the relevant technical screening criteria and relevant characteristics of the sector as a whole.
69. The TAC represents the approximate degree of greenness for a given NACE class and could be compared with the bank estimation obtained by aggregating counterparty-level estimates for the relevant NACE class. It has to be acknowledged that the two approaches may lead to

⁶⁷ See Section 3.5 for further information.

⁶⁸ Further information on the differences in bank estimates is provided in the Annex (Section 5.6).

⁶⁹ Alessi, L., Battiston, S., Melo, A. and Roncoroni, A. (2019). 'The EU Sustainability Taxonomy: a Financial Impact Assessment', European Commission, available at: <https://ec.europa.eu/jrc/en/publication/eu-sustainability-taxonomy-financial-impact-assessment>.

⁷⁰ In April 2021 the European Commission released a sustainable Finance package with an amendment to the scope. For example, agriculture and certain energy sectors have not been included in the Delegated Act. However, these sectors may be considered in the next Delegated Act. Alessi et al. (2019) builds upon the work by Technical Expert Group (TEG) and utilise the outlined criteria. The criteria share commonalities with the final package. For more information, see https://ec.europa.eu/info/publications/sustainable-finance-technical-expert-group_en.

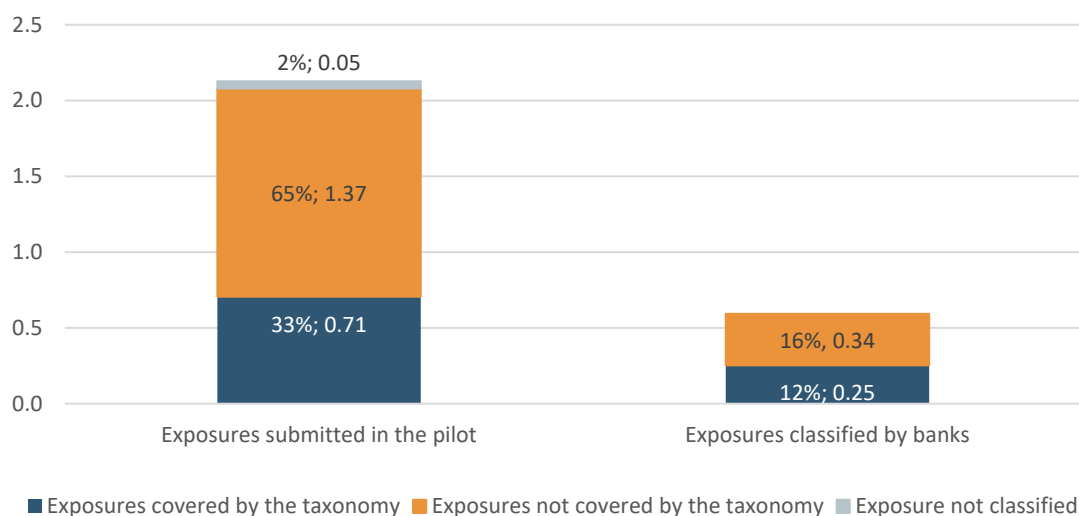
different results owing to a number of factors⁷¹. For the purpose of this explorative exercise, both estimates are used to provide an indication on the alignment of greenness.

The green sample

70. 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 exposures⁷².

71. Figure 16 shows the submitted total exposures of EUR 2.1 trillion (left bar) by banks. 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)⁷³. Exposure to obligors whose main activity is in the NACE classes covered by the EU taxonomy amounts to around EUR 0.7 trillion⁷⁴. Only part of this exposure is compliant with the taxonomy criteria and hence, taxonomy-aligned. Moreover, 2% of the exposures are not classified by NACE classification.

Figure 16: Coverage overview (green classification sample, in EUR tn)



72. The right bar of Figure 16 gives an overview of the exposure classified by banks. Banks were able to classify in total around EUR 0.6 trillion (28%) of exposures of the total exposures

⁷¹ For example, the TAC estimate considers the ‘do no significant harm’ condition only for manufacturing. Moreover, the TAC estimate can be applied to the whole portfolio at the same time. In comparison, the bank estimate may also include information on the greenness of the activities of an obligor that fall outside the obligor’s main activity.

⁷² The exposures include non-SME corporate exposures to non-financial obligors domiciled in EU countries. The list of banks that took part in the green classification can be found in the Annex (Table 6).

⁷³ EU taxonomy coverage is based on the work by Technical Expert Group (TEG) on sustainable finance and its list of economic activities which are subject to technical screening criteria when assessing substantial contribution to climate change mitigation and climate change adaptation. In detail, for climate change mitigation, the EU taxonomy covers using the TEG proposal in 70 out of 615 NACE classes and 68 classes for climate change adaptation activities. For more information, see https://ec.europa.eu/info/publications/sustainable-finance-technical-expert-group_en.

⁷⁴ Here it is important to mention that various bank portfolios may have different degrees of taxonomy alignment.

submitted. Within this amount, banks classified EUR 0.25 trillion of exposures to obligors whose main activity is in the NACE sections covered by the taxonomy (12% of banks' submitted exposure). In addition, banks classified EUR 0.34 trillion of exposures as taxonomy-aligned although these were exposures to obligors that are classified in a NACE sector which is out of scope of the EU taxonomy.

73. The reason for classifying some exposures as taxonomy-aligned even if they were provided to obligors that are classified in a NACE sector which is outside the scope of the taxonomy is that, as the EU taxonomy is activity based, there is the possibility that a bank may give a loan financing an activity that is inside the scope of the taxonomy although the obligor's main activity is outside the scope of the taxonomy⁷⁵. Another explanation is the NACE misclassification of the obligor by a bank, or that the current EU taxonomy may not cover all relevant green exposure.

EU taxonomy and NACE sections

74. Out of the 21 available NACE sections, only 10 are identified as containing activities that are covered by the EU taxonomy⁷⁶. Figure 17 shows that the bulk of exposures to counterparts whose main activity is covered by the EU taxonomy (taxonomy-relevant) is located in five NACE level 1 sections. This amounts to EUR 0.6 trillion (around 90% of the EU taxonomy-relevant exposure). The highest volumes are located in Real estate activities (L) and Construction (F)⁷⁷. For other sections aligned with the EU taxonomy, the amount of the exposures is less relevant⁷⁸.

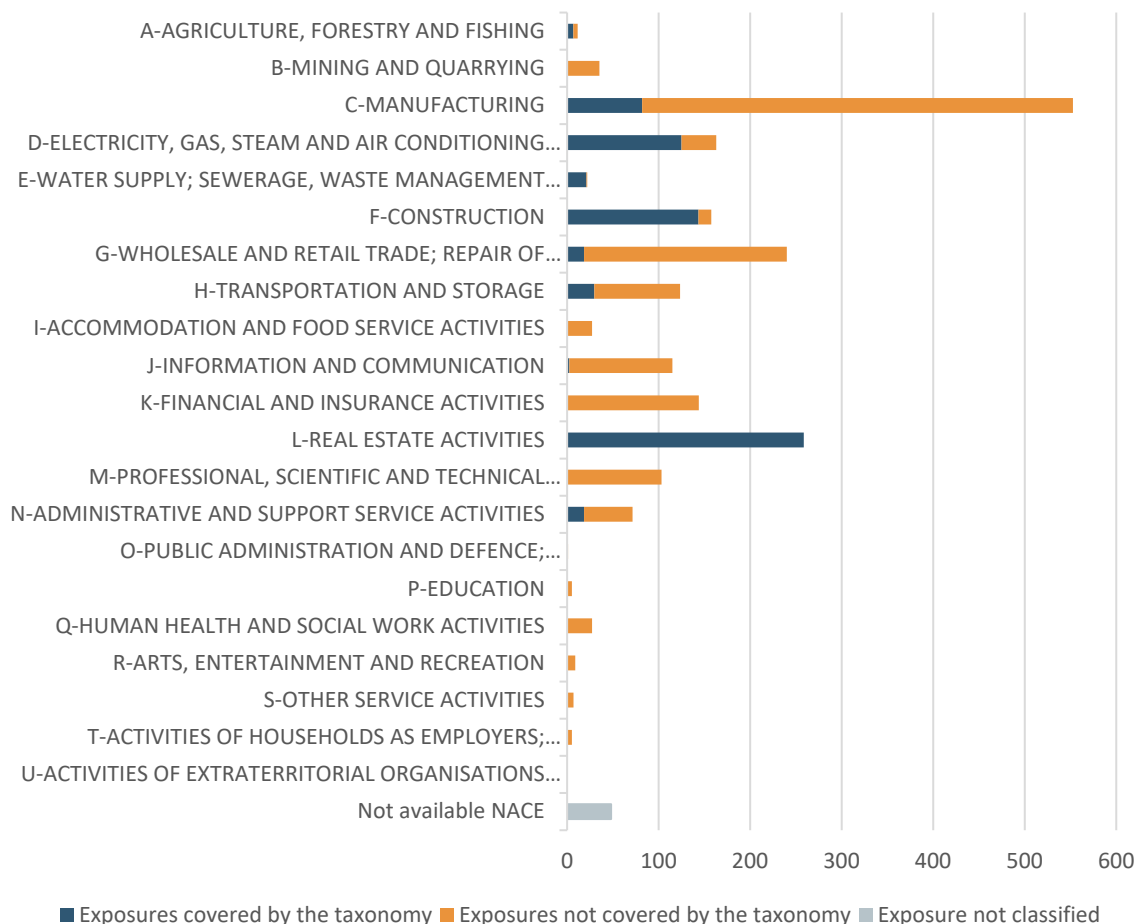
⁷⁵ One example is the Financial section (K). For example, the NACE code 62.40 (Activities of holding companies) is not covered by the taxonomy. Still, banks may have information on the taxonomy alignment of the specific activity that the loan is financing, which may belong to a NACE section which is covered by the taxonomy.

⁷⁶ The ten sections (NACE level 1) that include exposures in line with the EU taxonomy are: Agriculture, forestry and fishing (A); Manufacturing (C); Electricity, gas, steam and air conditioning supply (D); Water supply; sewerage, waste management and remediation activities (E); Construction (F); Wholesale and retail trade; repair of motor vehicles and motorcycles (G); Transporting and storage (H); Information and communication (J); Real estate activities (L); and Administrative and support service activities (N). Note that parts of the relevant section might be outside the EU taxonomy.

⁷⁷ The other sections are Electricity, gas, steam and air conditioning supply (D), Manufacturing (C) and Transporting and storage (H).

⁷⁸ The less pronounced sections are Agriculture, forestry and fishing (A), Water supply; sewerage, waste management and remediation activities (E), Wholesale and retail trade; Repair of motor vehicles and motorcycles (G), Information and communication (J) and Administrative and support service activities (N).

Figure 17: Taxonomy breakdown by NACE sections (EUR bn)



75. The data also show that about EUR 1.1 trillion (around 80% of the total exposures) is not taxonomy-relevant and is concentrated in five NACE sections. The highest amounts of exposures that are not covered by taxonomy are in the sections of Manufacturing (C) and Wholesale and retail trade; Repair of motor vehicles and motorcycles (G)⁷⁹. It should be mentioned that due to the hierarchal NACE system, sections may include classes that are both inside and outside the scope of the EU taxonomy⁸⁰.

Green estimation efforts

76. Figure 18 provides an insight into the extent of green estimation efforts carried out by the banks. It shows the share of exposures classified as green in relation to the total submitted exposures for both bank and TAC estimates⁸¹. The classified exposures refer to the sum of

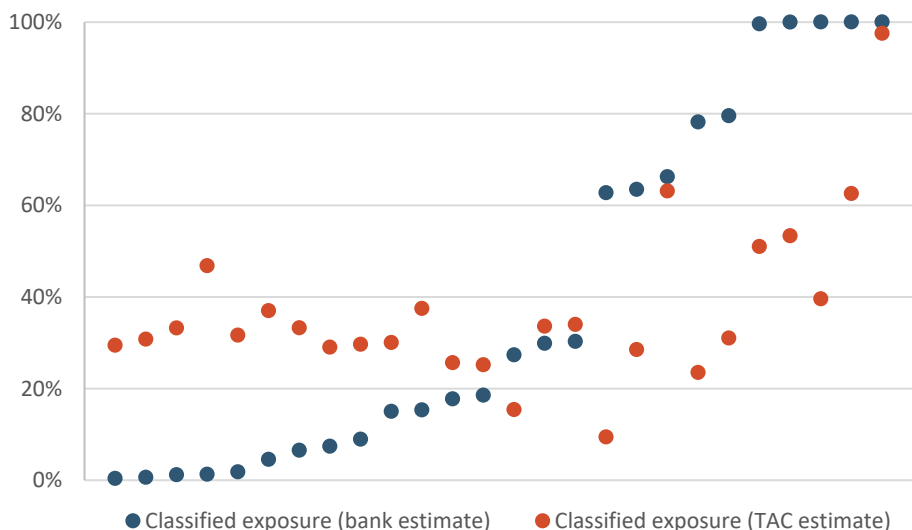
⁷⁹ Other sections are Financial and insurance activities (K), Information and communication (J) and Professional, scientific and technical activities (M).

⁸⁰ For example, the NACE sections Manufacturing (C) or Electricity, gas, steam and air conditioning supply (D) include NACE classes that are considered part and non-part of the taxonomy.

⁸¹ The nominal exposure is considered green if the bank estimate or the TAC estimate is greater than zero. In case the bank or TAC estimate is zero, the exposure is still considered in the exercise.

exposures for which a bank or TAC estimate are available. The TAC estimate is only available for exposure inside the scope of the EU taxonomy, whereas the bank estimate can also consider exposure outside the EU taxonomy.

Figure 18: Share of green estimation efforts



77. The efforts of banks to estimate the greenness of obligors are diverse. Depending on their current capabilities, banks are either able to classify a small proportion (up to 30%) or a large proportion (over 65%). Five banks were only able to classify a relatively small sub-sample (below 2%), whereas five banks classified almost all their submitted exposures. This suggests that banks’ expertise is either well advanced or they submitted the exposures that they were able to classify. The average ratio of the bank estimate is 40%. In comparison, using the TAC methodology, around 37% of the total exposure can be estimated and classified. Due to the comparability, the dispersion of TAC estimates is smaller and no general pattern is observable.

78. A set of banks is assigned a low ratio of the green exposure, although the top-down estimate gives medium ratios. This is driven by the fact that some banks employed the EU taxonomy only for a subset of their exposures or in a stricter way (using additional criteria) than the TAC estimates⁸². Once again, the best-effort basis of the exercise needs to be stressed as banks with a lower share might only have concentrated on a specific NACE class. However, TAC estimates facilitate comparison across banks and provide consistent estimates across the bank sample.

⁸² For more information see Section 5.5.

3.4 Greenness – A first estimate

79. To obtain a first estimate of greenness within the European banking sector, the focus is shifted to green coefficient estimates. To estimate the degree of greenness and the taxonomy alignment banks provided estimate at obligor-level. In contrast, the TAC is an estimate for a specific NACE class and it is available for 88 classes in ten NACE sections⁸³.

Coefficients of greenness

80. Table 4 compares the average coefficient of greenness applying both estimation techniques (TAC and bank estimates). To facilitate the comparison only exposures to obligors whose main activity is within the scope of the taxonomy are considered⁸⁴.

Table 4: Comparison of greenness coefficients

| NACE Section | TAC | Banks |
|--|-------|-------|
| A-AGRICULTURE, FORESTRY AND FISHING | 0.0% | 44.7% |
| C-MANUFACTURING | 11.6% | 31.9% |
| D-ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY | 41.3% | 63.3% |
| E-WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES | 0.0% | 56.8% |
| F-CONSTRUCTION | 33.1% | 54.3% |
| G-WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES | 1.8% | 17.6% |
| H-TRANSPORTATION AND STORAGE | 39.7% | 75.1% |
| J-INFORMATION AND COMMUNICATION | 0.0% | 34.4% |
| L-REAL ESTATE ACTIVITIES | 15.0% | 46.2% |
| N-ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES | 1.8% | 15.7% |

81. The comparison reveals that banks provide a higher estimate of the green coefficient than the top-down estimate. For the section Agriculture, Forestry and Fishing (A), the bank estimate of greenness for considered obligors is around 44.7%, whereas the TAC estimate is 0%⁸⁵. An

⁸³ For 40 out of 88 NACE classes the estimation provides a coefficient that is greater than zero. Zero is also assigned to a section if the TAC estimate does not have sufficient available data to make an estimate. This is applicable to Agriculture, Forestry and Fishing (A); Water Supply; Sewerage, Waste Management and Remediation Activities (E); and Information and Communication (J).

⁸⁴ It has to be stressed that the coefficients have been derived from a divergent number base of obligors for each NACE section. The average is constructed using the simple average of banks' estimates. The bank estimation itself is also based on the simple average of all available coefficients within the corresponding NACE section. In comparison, for the TAC, all obligors and their estimate in the NACE section are considered.

⁸⁵ This is also the case for other sections such as Water Supply; Sewerage, waste management and remediation activities (E) and Information and communication (J). For these sections, the TAC is not able to provide an estimate due to unknown data and therefore zero percent is assigned. See Alessi et. al. (2019) for more information.

explanation for the higher bank estimates is that they incorporate detailed information of the obligor, whereas the TAC assigns a standardised coefficient based on the NACE class of the obligor without considering obligor-level information. For this reason, the TAC estimate may be more useful as an approximation for obligors where no information is available.

- 82. Another reason is that most banks are not likely to have a full methodology for measuring EU taxonomy alignment in place, and hence their estimates are only approximations. Due to this and the assumed simplification in bank methodologies, there could be an overstatement of greenness in banks’ assessments. In contrast, the TAC assigns the same coefficient for the entire NACE class without considering any activity- or obligor-specific criteria sources.
- 83. Banks are also able to provide a green coefficient for obligors whose main activity is not covered by the taxonomy and therefore assign some level of greenness to these obligors⁸⁶. For instance, the average value for Mining (B) is 18.7% and for Financials (K) it is 43.5%. The reason for this classification would be that banks are aware of the greenness of financed activities but the relevant obligors are allocated to a NACE code which is outside the scope of the EU taxonomy⁸⁷. It also highlights a potential limitation of using NACE codes to approximate the activity-based taxonomy.

Differences in assessing a counterparty

- 84. This section analyses the difference in the assessment performed by banks concerning the greenness of the same obligor and also applying the TAC. Table 5 shows the difference between the bank assessments and the TAC method for five obligors⁸⁸.

Table 5: Comparison of coefficients for specific obligors

| NACE 1 / 4 | Part of Tax | NACE Class Name | #Banks | #Green | Bank estimates | | | TAC |
|---------------|----------------|---|--------|--------|----------------|--------|-------|-------|
| | | | | | Min | Max | AVG | |
| C / 2910 | yes | Manufacture of motor vehicles | 14 | 8 | 0.0% | 85.6% | 12.2% | 1.8% |
| D / 3522 | no | Distribution of gaseous fuels through mains | 12 | 5 | 0.0% | 98.7% | 37.7% | 0.0% |
| F / 4222 | yes | Construction of utility projects (electricity & telecom) | 12 | 4 | 0.0% | 100.0% | 37.7% | 20.9% |
| F / 4299 | no | Construction of other civil engineering projects | 12 | 5 | 0.0% | 100.0% | 72.7% | 0.0% |
| J / 6120 | no | Wireless telecommunications activities | 13 | 4 | 0.0% | 100.0% | 25.0% | 0.0% |

⁸⁶ A table including the bank estimation for obligors outside the taxonomy scope is included in the Annex (5.5).

⁸⁷ An alternative interpretation is that a bank might have misclassified an obligor. A potential reason could be lack of information. See also the explanation to Figure 16. A concrete example is the NACE code 62.40 (Activities of holding companies), where banks are able to estimate the degree of greenness of an obligor.

⁸⁸ Five counterparties with different areas of activity with the highest coverage among the banks were selected.

85. Considering the first obligor, 8 out of 14 banks were able to classify greenness. The average share of greenness is 12%, ranging from 0% to 86%. For comparison purposes, the top-down tool using the sectorial approach estimates greenness of only 1.8% for that NACE class. A similar pattern is visible for the other obligor that is part of the taxonomy - a telecommunications infrastructure provider. This shows that estimates are subject to a high degree of variability across banks.
86. Looking at the second row, this obligor is a large distributor of natural gas and an electrical energy utility company. The underlying assigned NACE code is not within the scope of the EU taxonomy and therefore the TAC for this NACE class is zero. However, 5 out of 12 banks made an estimate of greenness, ranging from zero to 100%. The same is true for two other counterparties in the last two rows. This shows that banks may use firm-level information to assess the greenness of an obligor. This may reflect banks' knowledge of the sustainable and environmental strategy of its obligor. However, due to the lack of a clear and harmonised classification framework, banks' assessments differ largely for the same obligor.
87. In addition, Table 5 sheds light on the various development stages and approaches of banks. For some exposures, banks are able to determine the greenness coefficient with a sophisticated estimate of the share of greenness. Taking into account the banks' description of their methodology, a set of banks invested a great deal of effort in the green estimation of an obligor and should arguably be able to offer reasonable estimations. Generally, bank estimates of the greenness of their counterparts tends to be larger than based on general proxies. Other banks used a simpler and broad-brushed approach with sectoral proxies assigning either 0% or 100% to the greenness of an obligor depending on their proxies. This is mainly driven by the estimation techniques banks already have in place.
88. Bank estimation techniques are, however, applied differently and may differ in various dimensions. Moreover, it has to be stressed that in some cases, banks' estimates are only based on an approximation of the EU taxonomy (for instance, when activity specific information by clients are not available). In addition, the results could be influenced by the amount of green activities that are actually financed by a bank for a specific obligor, and not by differences in applying the EU taxonomy⁸⁹. Therefore, the comparability of the bank estimation outcomes is reduced⁹⁰.

The green amount

89. To analyse the greenness of banks' exposures, the coefficient stemming from the bank assessment or the TAC method, representing the degree of greenness of the exposure, is

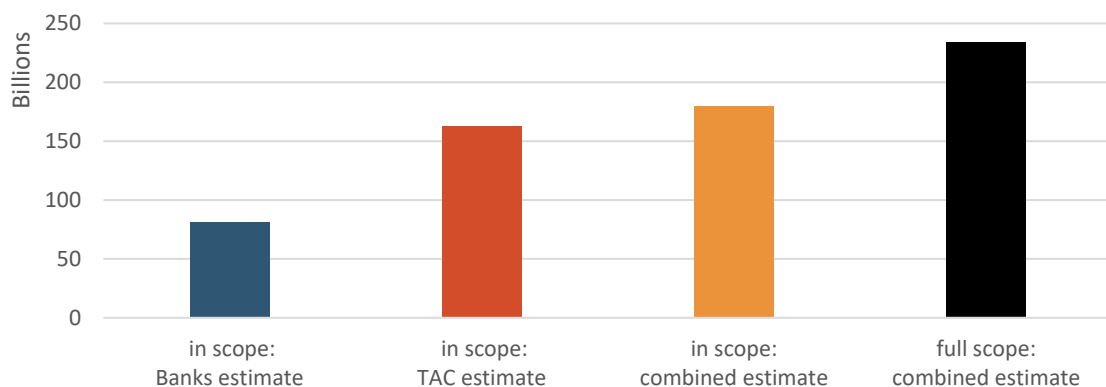
⁸⁹For instance, consider an obligor A, which is involved in green and in brown activities. If bank Y has only financed the green activities of A, then the resulting greenness coefficients reported by bank Y for obligor A would be relatively high. In comparison, if bank X has financed only brown activities of A the resulting green coefficient reported by X for obligor A would be lower.

⁹⁰For more information see Section 5.5.

multiplied by its corresponding original non-defaulted nominal exposure value. This is called the green amount.

90. Figure 19 exhibits the total green amounts. The green amount of bank estimates associated with obligors whose main activity falls within the scope of the taxonomy stands at around EUR 81 billion (the blue bar in the chart), whereas the green amount according to the TAC estimates is EUR 162 billion. The yellow bar represents EUR 179 billion and shows the combination of the bank and TAC estimates (i.e. the bank estimate plus the TAC estimate for obligors where no bank estimate is available). Lastly, if the potential green exposure identified by banks for obligors whose main activity is outside the scope of the taxonomy is considered, the notional amount would be around EUR 230 billion (black bar in the chart).

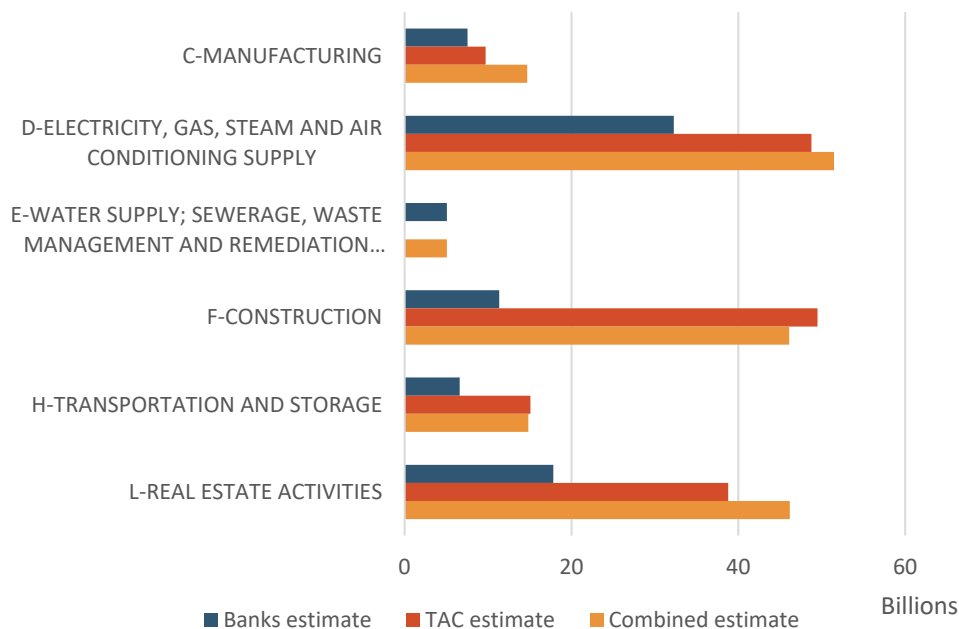
Figure 19: Green exposure amounts (EUR bn)



91. Figure 20 illustrates the largest green amounts of NACE sections within the scope of the EU taxonomy following the same distinction as for the green exposure amounts (i.e. bank estimate, TAC estimate and combined estimate). Using the combined estimate, 25% of the total exposure in the scope of taxonomy can be identified as green exposure⁹¹.

⁹¹ The nominal exposures covered by the EU taxonomy total EUR 705 billion (see Figure 16). Around EUR 180 billion of this is considered as 'green' (see yellow bar). This reflects roughly 25%.

Figure 20: Green exposures in selected NACE sections (in EUR bn)



92. Banks are able to classify high amounts for most sections directly with their estimates. The blue amounts are higher in the Electricity (D, EUR 32 billion), Real estate (L, EUR 18 billion) and Construction (F, EUR 11 billion) sections⁹². Taking into account both the TAC and the bank estimates (combined estimate), the amounts can be increase significantly to EUR 51 billion for Electricity (D) and around EUR 46 billion for Real estate activities (L). Moreover, the covered amounts in the Construction section (F) also increase to around EUR 46 billion⁹³. One exception is Water supply (E) where the amounts remain the same⁹⁴.

Green asset ratio

93. There is an on-going discussion on how banks could show the greenness of their activities in a comparable and harmonised way. In its recent advice to the European Commission the EBA proposed a common definition and methodology⁹⁵. Taking into account the proposed methodology but also considering the availability of data in the pilot exercise, a conceptually

⁹² Amounts for the other sections: E (Water, EUR 5 billion), H (Transport, EUR 7 billion) and C (Manufacturing, EUR 7.5 billion).

⁹³ The combined amounts are smaller than the TAC estimate for sectors such as F (Construction) or H (Transport). This is because the bank estimate is used a basis and for some obligors the value is smaller than the TAC estimate.

⁹⁴ The reason is that banks were able to classify all potential obligors in the Water section (E) directly.

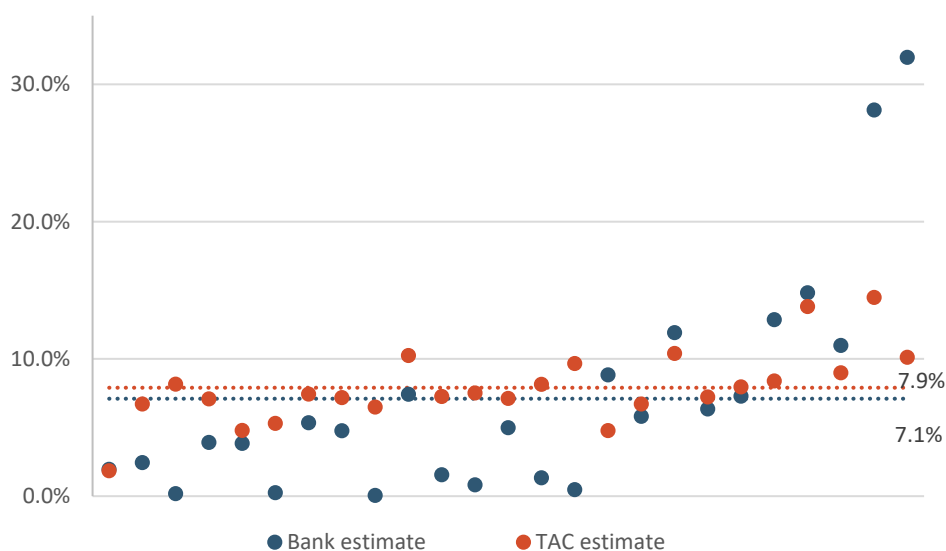
⁹⁵ For more information see the EBA Report (EBA/Rep/2021/03) on the Advice to EC on Disclosures under Article 8 of the Taxonomy;

https://www.eba.europa.eu/sites/default/documents/files/document_library/About%20Us/Missions%20and%20tasks/Call%20for%20Advice/2021/CfA%20on%20KPIs%20and%20methodology%20for%20disclosures%20under%20Article%208%20of%20the%20Taxonomy%20Regulation/963616/Report%20-%20Advice%20to%20COM_Disclosure%20Article%208%20Taxonomy.pdf.

consistent approach has been employed. The green asset ratio (GAR) is constructed for each bank by dividing the green amount - available only for a subset of exposures - by the total original exposure⁹⁶. The green amount is constructed using either the bank or TAC estimate.

94. However, a further word of caution is required. The bank coefficient is estimated at the obligor level and, depending on banks' estimation techniques and information available, it may consider only some of the criteria defined by the EU taxonomy. In addition, there are differences in banks' estimation techniques⁹⁷. Considering the best effort nature of this exercise and the absence of a common and consistent methodology applied by banks, the bank estimates should be treated with caution and are not fully comparable. With regard to the TAC estimate, it should be considered that this is only a sectoral estimate and the EU taxonomy covers more conditions and criteria than the TAC estimation incorporates.

Figure 21: Green asset ratio



95. For counterparties whose main activity is within the scope of the EU taxonomy, Figure 21 shows the GAR for both bank estimates and TAC estimates⁹⁸. 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 figures⁹⁹.

96. Figure 21 also shows the challenges of comparing the estimation approaches. In eight banks, their own estimates are higher than the TAC estimates. This provides further indication that bank approaches may tend to overestimate the greenness of the exposure. In addition, for

⁹⁷ See Section 5.5 for an overview of the estimation techniques used by banks.

⁹⁸ One bank reports nearly its entire submission as green. We consider this as an outlier and it will therefore be excluded from this chart.

⁹⁹ Also considering the excluded bank, the ratio for the TAC estimate would remain at 7.9%. The combined ratio (bank estimates complemented with TAC estimates) would be 13.7% for the same sample.

seven cases, the TAC estimate is considerably higher - 5 percentage points - than the bank estimate. This indicates that banks may have used their green estimation methodology only for a small subset of their submitted exposure.

97. The figure also reveals that bank estimates are widely dispersed and that no common pattern is observable. The reason may also lie in the different underlying approaches and techniques used by banks to assess greenness. Therefore, a bank with a low ratio of bank estimates does not have necessarily a low share of green assets as it may have only concentrated its efforts in this exercise on a specific NACE class. Moreover, a bank might consider further additional criteria compared to other banks or the TAC estimates and may have a more specific estimate. This can be seen for many banks with low GARs. Using the bank estimate, a bank may have a low GAR but using the more general TAC estimate the resulting GAR is considerably higher¹⁰⁰.
98. This first estimation of GAR reveals that much more work is required. Creating a common level playing field and employing common data definition and methodology appear to be essential. Banks should already start to prepare themselves for the disclosure requirements of Pillar 3 and to disclose the GAR when it becomes a binding obligation¹⁰¹.

3.5 Banks' views on the application of the EU taxonomy

99. In addition to the green classification exercise, banks were invited to participate in a questionnaire on the application of the EU taxonomy¹⁰². The answers provided further information on the coverage and the challenges of running the EU taxonomy classification in the EBA pilot exercise¹⁰³.
100. The questionnaire reveals that many of the participating banks are already equipped with some kind of an environmental 'taxonomy'. These alternative tools are mainly internal methodologies for specific asset classes or sectors, classification systems for environmentally friendly or harmful activities or for social activities. Banks have made efforts to build up knowledge in the respect of environmental methodologies and classification systems more generally.
101. In respect to the EU taxonomy, the key challenge for banks is the availability of client data and their standardisation. Employing the taxonomy to activities where less information is

¹⁰⁰ There is an alternative interpretation. Banks may not have appropriate tools to assess the greenness of obligors and therefore underestimate the greenness. However, this would be in contrast to the findings before that banks have used more specific estimates.

¹⁰¹ See also the EBA Report (EBA/Rep/2021/03) for more information on this subject.

¹⁰² The questionnaire contained 10 questions. In total, 26 out of 29 banks submitted their responses. Note that the list of participants who submitted responses to the questionnaire is not the same as the list of participants that took part in the green classification exercise. See Table 6 of the Annex for more information.

¹⁰³ A more comprehensive overview and the questionnaire is provided in Section 5.6 of the Annex.

available seems to cause difficulties. Given these conditions, applying the EU taxonomy and qualifying activities as environmentally sustainable is a challenge to banks at this stage.

102. In this respect, it is important to mention that banks also experience different levels of complexity across NACE sections when employing the taxonomy. Banks consider the sections Manufacturing (C), Construction (F) and Agriculture (A) as rather complex. This may serve as a further indication that NACE sections are relatively heterogeneous and that the tools available to banks might not cover the full scope of the sections.
103. The questionnaire also sheds light on the fact that banks are on different development paths in employing the EU taxonomy. One third of the banks was able to classify nearly all of the submitted exposure to this exercise, whereas another third was able to classify less than 10% of the submitted exposure. This seems to be driven by either internal methodologies or different business models across banks. This means, in turn, that some banks may have more information on the activities and the counterparties available.
104. The large majority of banks (80%) think that the ability of their clients to provide taxonomy-based information in 2022 is below 30%. The rest of the banks are more optimistic and believe that their clients would be able to provide such information for 30% to 60% of their total exposures. However, this result suggests that in the absence of available client data it will be challenging for banks to employ the EU taxonomy.
105. The questionnaire also provides insight into what kind of further assistance would be helpful for banks. Banks would benefit from both developing common industry-wide methodologies and providing implementation data tools (mappings, central database). Banks also flagged that data services offered by professional third parties for verification and monitoring would be helpful.
106. After the completion of the questionnaire, the situation has developed and some of the concerns have been already taken up. The EBA has published proposals to facilitate disclosures by banks until data are available - disclosing information in terms of estimates and proxies for transitional periods¹⁰⁴. The EBA has also recommended to the European Commission actions to create an enabling data environment. This could help to alleviate the on-going data scarcity. Moreover, it is expected that new data will become available once non-financial reporting directive (NFRD) corporates start disclosing the information specified in Article 8 of the Taxonomy Regulation or following ongoing policy initiatives, such as the EU COM Sustainable Finance package¹⁰⁵ or the building of centralised public databases. In this regard, the EBA welcomes the Commission's work on a European single access point.

¹⁰⁴ See also the EBA Report (EBA/Rep/2021/03) for more information.

¹⁰⁵ For more information see https://ec.europa.eu/info/publications/210421-sustainable-finance-communication_en. The package includes beside the EU taxonomy climate delegated act also a proposal for a corporate sustainability reporting directive.

4 Conclusions and next steps

107. 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 and map environmental friendly or 'green' exposures given the related data and methodological limitations that supervisors and the banking sector are currently dealing with. 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 should represent the starting point for future EBA work on climate risk.
108. 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 (C), Electricity, gas, steam and air conditioning supply (D), Construction (F), Transporting and storage (H) and Real estate activities (L), amounting to 50% of total exposures submitted in the exercise.
109. As sector information is generally available, classification methods based on the sectors of the counterparty allow higher coverage and compute estimates to be obtained more easily with current available information. However, assigning the climate relevance of a counterparty based on its main activity does not give a comprehensive and precise picture of its level of environmental sustainability (as the company might be still involved in other carbon-intensive activities as part of its business). This is confirmed by the presence of relatively high emitters in sectors considered to be not relevant from a climate perspective. On the other hand, using methods that rely on the carbon emission of the counterparty, allows banks' environmental profiles to be analysed more accurately but might be significantly affected by data limitation (coverage and consistency). Further, both classification methods, i.e. sector classification as well as GHG emission intensity, should be complemented with information on forward-looking targets of the companies to fully assess transition risk.
110. In terms of results, the amount of exposures to high carbon emissions reported by banks in the sample represents almost 25% of their corporate non-SME holdings. On the other hand, banks showed more or less the same amount of exposures to obligors with low carbon emissions, which could counter-balance the effects of adverse environmental scenarios on the banking sector. However, forward-looking elements, like reliable and comparable transition targets of obligors and the development of greener technologies in the production chains of counterparties' sectors, should be also taken into account before drawing a final a conclusion on the environmental sustainability of EU banking exposures. Finally, improving the disclosure on carbon footprint and transition strategies and developing interpolation methods for non-reporting firms in the coming years, will contribute to bridge this gap.
111. Regarding the quantification of the expected credit risk losses due to adverse climate risk scenarios on banks' balance sheets, the framework employed in this exercise shows that there

is dispersion across banks in terms of impact. The results are mainly driven by the impact on exposures to electricity and real estate. Non-SME corporate exposures to high carbon-intensive sectors, like mining and agriculture, represents less than 5% of the total exposures analysed in this exercise, therefore their contribution to the aggregated results is marginal.

112. 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. In particular, it shows that banks apply different estimation approaches and that a high degree of heterogeneity in terms of practices is observed across them. Despite the operational challenges, 25% out of the total submitted notional exposure in NACE sections covered by the EU taxonomy in this pilot are identified 'green'. The large share of the submitted exposure is outside of the EU taxonomy and so the sustainability of this part of exposures remain unknown.
113. Moreover, 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.
114. **Finally, it should be noted that the findings shown in this report are subject to limitations and caveats.** Firstly, since the evaluation of climate-related risks requires a different and broader set of information with respect to standard risk assessment tools, limited data availability and reliability can affect results in terms of comparability. Progress in disclosing GHG emissions and transition strategies by companies or more granular client information collected by banks will help to bridge this gap and contribute to running more accurate and consistent estimates. These limitations also affect the scenario analysis results. The reference scenarios currently available are a good starting point and more work would be needed to improve their usability for climate risk stress testing purposes.

5 Annex

5.1 Sample descriptions

Table 6: Sample of participating banks

| Country | Bank name | EU taxonomy sample | Questionnaire sample |
|-------------|--|--------------------|----------------------|
| Spain | ABANCA Corporación Bancaria S.A. ¹⁰⁶ | Yes | Yes |
| Netherlands | ABN AMRO Bank N.V. | Yes | Yes |
| Spain | Banco Santander S.A. ¹⁰⁶ | Yes | Yes |
| Ireland | Bank of Ireland Group plc | Yes | Yes |
| Poland | Bank Polska Kasa Opieki SA ¹⁰⁷ | Yes | No |
| Spain | Bankia S.A. | Yes | Yes |
| Spain | Banco Bilbao Vizcaya Argentaria | Yes | Yes |
| France | BNP Paribas S.A. | Yes | Yes |
| Spain | CaixaBank S.A. ¹⁰⁶ | Yes | Yes |
| Netherlands | Coöperatieve Rabobank U.A. ¹⁰⁶ | Yes | Yes |
| France | Groupe Crédit Mutuel | No | No |
| Germany | DekaBank AG ¹⁰⁸ | Yes | Yes |
| Germany | Deutsche Bank AG | Yes | Yes |
| France | BPCE S.A | Yes | Yes |
| Netherlands | ING Groep N.V. | Yes | Yes |
| Italy | Intesa Sanpaolo S.p.A. | Yes | Yes |
| Germany | Landesbank Baden-Württemberg | No | Yes |
| Germany | Landeskreditbank Baden-Württemberg - Förderbank ¹⁰⁷ | Yes | Yes |
| Netherlands | Nederlandse Waterschapsbank | Yes | No |
| Germany | Norddeutsche Landesbank Girozentrale | Yes | Yes |
| Finland | Nordea Bank Abp | Yes | Yes |
| Denmark | Nykredit Realkredit A/S ¹⁰⁷ | Yes | Yes |
| Finland | OP Financial Group | No | Yes |
| Austria | Raiffeisen Bank International A.G. | Yes | Yes |
| France | Société Générale S.A. | Yes | Yes |
| Germany | State Street Bank International GmbH ¹⁰⁶ | Yes | Yes |
| Netherlands | Triodos Bank N.V. | Yes | Yes |
| Spain | Unicaja Banco S.A | Yes | Yes |
| Italy | UniCredit S.p.A. | Yes | Yes |

¹⁰⁶ The bank submitted a subset of exposure.

¹⁰⁷ The bank submitted anonymised data.

¹⁰⁸ The bank submitted data on NACE division level.

5.2 Data definitions and treatment

115. Data were submitted by participating banks using ad-hoc templates, which were designed in line with supervisory reporting standards and definitions but with higher granularity.
116. The templates cover information on obligor-level exposures, regulatory risk parameters¹⁰⁹ and risk exposure amounts. Regarding the exposures amount, both the original exposures and exposure values were collected. In particular, the former are used in the data classification analysis in order to broaden the scope and to include in the classification the share of exposures related to guarantee adjustments and credit risk mitigation (CRM) techniques. The exposure value, which is more suitable for credit risk analysis, was considered for the scenario analysis.

Table 7: List of collected variables

| | | |
|----------|--|---|
| Obligor | Country | Country of the obligor |
| | Name | Name of the obligor |
| | NACE code - level 4 | NACE Rev. 2 level 4 code on the basis of the principal activity. |
| Parent | Country | <i>ISO alpha 2 code</i> |
| | Name | Name of the ultimate parent of the obligor. |
| | LEI | Legal Entity Identifier of the ultimate parent of the obligor. |
| | ISIN | Referring to the ultimate parent. |
| | NACE code - level 4 | NACE Rev. 2 level 4 code on the basis of the principal activity. |
| Exposure | Approach | IRB for internal model, STA for standardised approach. |
| | Original exposure pre conversion factors | IRB: as in COREP 09.02 column 010. STA: as in COREP 09.01.a column 010. |
| | Original exposure pre conversion factors: of which defaulted | IRB: As in COREP 09.02 column 030. SA: COREP 09.01.b column 020 row 070. Defaulted Corporate exposures Secured by mortgages on immovable property (reported in COREP 09.01b column 020 row 090) are also included. |
| | Exposure value | IRB: As in COREP 09.02 column 105. SA: As in COREP 09.01.a column 075. |
| | Exposure value: of which defaulted | Amount of Exposure value which have been classified as 'defaulted exposures' according to CRR article 178. |
| | PD of non-defaulted exposures assigned to the obligor | PD assigned to the obligor deriving from the IRB model. In the case that no IRB model PD is available, banks should input either the PD from the IFRS 9 model or an external provider PD. |
| | LGD exposure, weighted | IRB: Weighted average LGD, by exposure value. SA: IFRS 9 model LGD (weighted by exposure value) or LGD estimated from impairments. |

| | | |
|-------------|--|--|
| | RWA pre SME-supporting factor | IRB: As in COREP 09.02 column 110. SA: As in COREP 09.01a column 080. |
| | Average non-defaulted exposure maturity value | IRB: As in COREP 08.02 column 250. SA: As in COREP 08.01 column 250. |
| | Credit risk adjustments (defaulted and non-defaulted) | IRB: Sum of COREP 09.02 column 050 and 055. SA: Sum of COREP 09.01.a column 050 and 055. |
| EU taxonomy | % of green original non-defaulted exposures (EU taxonomy definition) | Percentage of the original exposure value (non-defaulted) which can be classified as green according to the EU taxonomy. |
| | % of green original defaulted exposures (EU taxonomy definition) | Percentage of the original exposure value (defaulted), that can be classified as green according to the EU taxonomy. |

117. Banks were asked to report NACE Rev. 2 code on the class level for the principal activity of each obligor. This information was provided for around 90% of the obligors, covering over 94% of the total original exposure.

118. To maximise the amount of data available for the analysis, data for obligors with missing NACE codes were populated using Bloomberg (additional 2% of the total original exposure) or cross-filled using the data reported by other banks (around 1% of the total original exposure). As a result, over 98% of the reported data was used for the analysis.

Table 8: Proxy for missing NACE level 4 classes- main steps

| Step | Description |
|--|--|
| Update NACE code from Bloomberg data using LEI or ISIN | Since LEI and ISIN are collected only for parents, in this step the NACE value was updated for the parents where the LEI or ISIN was provided and a NACE class code was available in the Bloomberg database. Additionally, the obligor's NACE code was updated in cases where parent and obligor are the same entity. |
| Update NACE code from Bloomberg data using obligor's name and country | For the top 300 obligors based on the total original exposure amount, the NACE code was updated with available values from the Bloomberg database by matching the obligor's name and country. |
| Update NACE code from the data submitted by other banks using LEI or ISIN | The parent's LEI or ISIN were matched across the data submitted by banks and missing NACE codes were updated using the most frequently reported value. Additionally, the obligor's NACE code was updated in cases where parent and obligor are the same entity. |
| Update NACE code from the data submitted by other banks using name and country | The name and county code were used to match the entities across the data submitted by banks. NACE codes were updated using the most frequently reported value. The same algorithm was executed separately for parents and obligors. Prior to this step, entities' names were processed and cleaned of any special characters, in order to harmonise them and improve matching. |
| Update obligors' NACE codes using parents' data | In cases where parent and obligor are the same entity and a valid 4-digit NACE code is available for the parent, but not for obligor, the same value is set for the obligor. |

5.3 The CPRS approach

119. CPRS¹¹⁰ is a methodology that allows a climate relevant classification of large part of financial assets (equity holdings, corporate bonds, loans) to be performed, at different levels of granularity, building on standardising available climate, business and financial information of statistical offices and data providers.

120. CPRS are defined as economic activities that could be affected (including being transformed into 'stranded assets') in a disorderly transition, i.e. they are relevant for assessing climate transition risk. CPRS allows economic and financial risk to be assessed when firms and sectors are (mis)aligned with the climate and decarbonisation targets specified in the Paris Agreement or with other defined policy objectives.

¹¹⁰ See also Battiston, S., Mandel, A., Monasterolo, I., Schuetze, F. and Visentin, G., 2017, 'A climate stress-test of the EU financial system', *Nature Climate Change*, vol. 7, pp 283-288.

121. CPRS have been identified by using the following criteria: (1) their direct and indirect contribution to GHG emissions; (2) their relevance for climate policy implementation (i.e. their cost sensitivity to climate policy or regulatory change, e.g. the Carbon Leakage Regulation); and (3) their role in the energy value chain.
122. Starting from the NACE classification, which does not provide any proxy of climate risk or does not carry any information on the technology mix, the above criteria yield six main climate-policy relevant sectors: fossil fuels, utilities, energy-intensive, buildings, transportation and agriculture. Then, by increasing the granularity of some of the six main CPRS sectors (e.g. fossil fuels/coal, fossil fuels/oil, fossil fuels/gas), 20 subsectors related to the main types of different technologies that are relevant for energy transition are obtained.
123. Figure 22 and 25 show the breakdown of CPRS exposures by NACE level 1 sections respectively for the total original exposures and for the defaulted original exposures submitted by banks in the pilot exercise.

Figure 22: CPRS classification of total original exposures for all NACE level 1 sections (EUR bn)

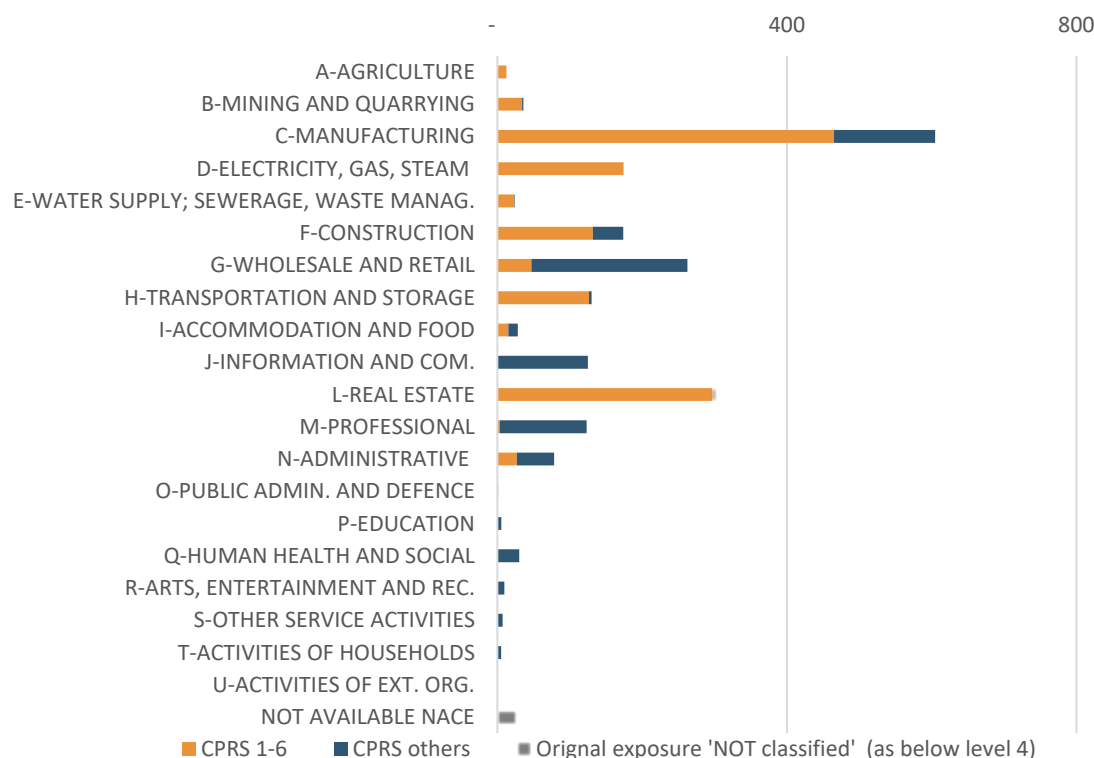
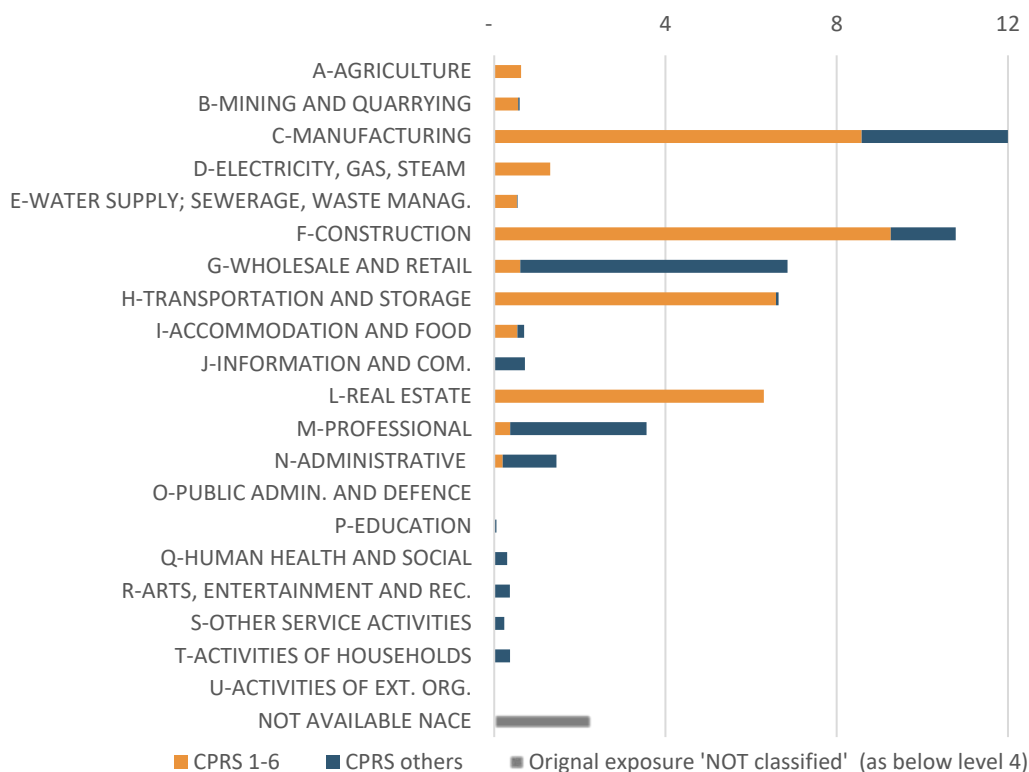


Figure 23: CPRS classification of defaulted original exposures for all NACE level 1 sections (% of total original exposures, EUR bn)



5.4 Matching of GHG emission intensities

124. Greenhouse gas emissions are grouped into three categories (scopes) by the Greenhouse Gas (GHG) Protocol¹¹¹:
125. Scope 1 relates to direct emissions from owned or controlled sources (emissions produced by manufacturing processes, burning diesel fuel in trucks, fugitive emissions such as methane emissions from coal mines, or production of electricity by burning coal).
126. Scope 2 covers indirect emissions from the generation of purchased electricity, steam, heating and cooling consumed by the reporting company.
127. Scope 3 includes all other indirect emissions that result from assets or activities not owned or controlled by the company, but that the company indirectly impacts in its value chain (for instance, purchased goods and services, business trips, employee commuting, waste disposal and use of sold products).

¹¹¹ <https://ghgprotocol.org/standards>.

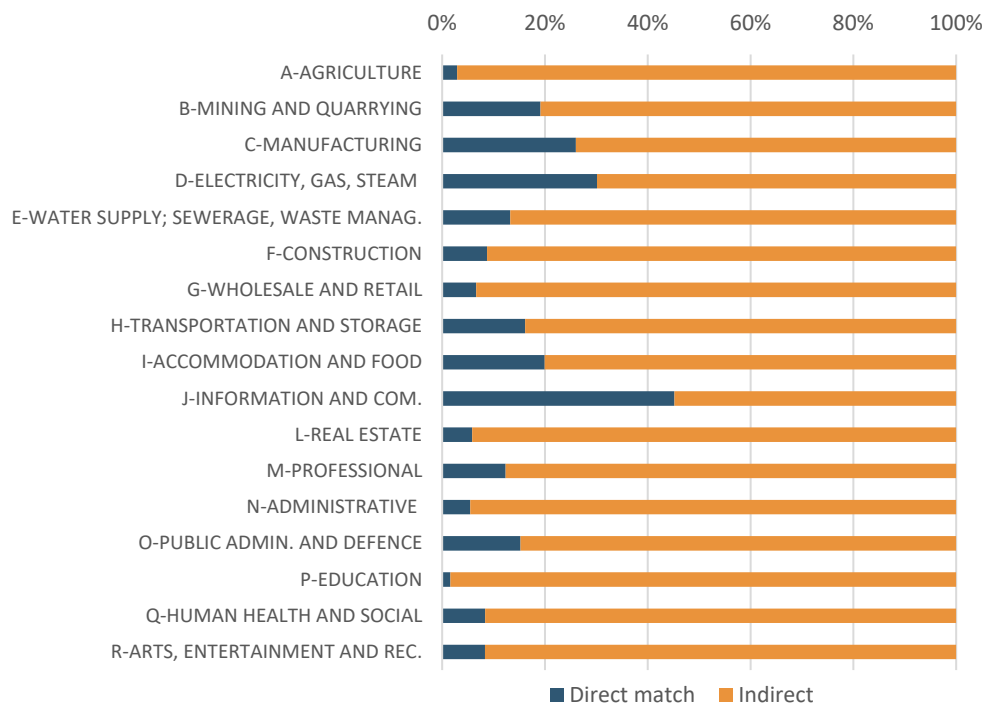
128. For this exercise, the total GHG emissions is defined as the sum between ‘*direct emissions*’ and ‘*first-tier indirect emissions*’. The first category corresponds to the GHG Protocol scope 1 emissions and any other emissions derived from a wider range of GHGs that are relevant to a company’s operations. ‘First-tier indirect emissions’ are defined as GHG Protocol scope 2 emissions, plus the company’s first-tier upstream supply chain (direct suppliers). The latter also includes scope 3 emissions from truck, rail and air transport sources (which belong to Transport and distribution under the GHG Protocol ‘Corporate Value Chain (scope 3) Standard’)¹¹².
129. The GHG emission intensity defined in terms of annual consolidated revenues in millions of US dollars (GHG emission/USD million) is considered¹¹³. The GHG emission intensity by company is then matched by ISIN or LEI with banks’ obligors (counterparties). As a result, only 17% of total original exposures within the scope of the pilot exercise are matched directly with individual GHG data.
130. For those obligors with no individual GHG data available but with the same NACE level 4 code of its parent, the GHG emission intensity of the parent is considered, if available. Otherwise, the average GHG emission intensity of the NACE level 4 class of the obligor is used.
131. The averages by NACE level 4 class, are computed using a sample of almost 8,500 companies located in developed countries¹¹⁴. By using this approach, 65% of the total original exposures could be assigned to the average GHG emission intensity of the obligors’ sector. The remaining 18% could not be classified.

¹¹² It should be noted that the lack of coverage in terms of scope 3 emissions could undermine the comparability of GHG emission intensity across bank’ exposures.

¹¹³ One of the caveats in regard to this metric is that GHG intensities are sensitive to the nominal variable in the denominator (in this case, revenues), which might make a firm with a better priced product less carbon-intensive. Thus, when comparing two firms from the same sector, the lower GHG intensity can be achieved due to a better competitive position. Therefore, firms in the higher GHG intensity buckets may just operate in a market where competition is higher.

¹¹⁴ It is assumed that the level of technology in developed countries is the same and therefore producing the same goods in these countries would have the same cost in terms of GHG intensity.

Figure 24: Share of exposures using GHG matching approach and NACE level 1



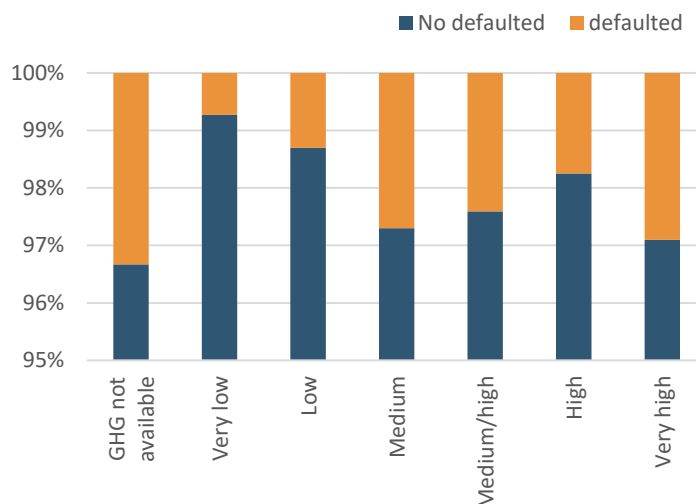
132. Finally, according to the obligor’s GHG emission intensity, the related exposure is mapped into different buckets of GHG emission intensity ranges, which are defined based on the distribution (percentiles) of individual companies’ GHG emission data. Following this approach, six buckets of GHG intensity, from ‘very low’ to ‘very high’, were identified (Figure 25).

Figure 25: Definition of GHG buckets

| GHG buckets | GHG range |
|--------------------|-------------------|
| <i>Very low</i> | GHG ≤ P10 |
| <i>Low</i> | Q1 ≥ GHG > P10 |
| <i>Medium</i> | Median ≥ GHG > Q1 |
| <i>Medium/high</i> | Q3 ≥ GHG > Median |
| <i>High</i> | P90 ≥ GHG > Q3 |
| <i>Very high</i> | GHG > P90 |

133. Figure 26 shows the share of defaulted and non-defaulted original exposures by GHG emission buckets.

Figure 26: Defaulted and not defaulted original exposures as a share of total by GHG bucket



5.5 Addendum to the green classification

Bank estimation methods

134. In this addendum additional information on the green classification is provided. Specifically, an overview of the differences in bank estimation approaches is given. This overview reiterates the explorative character of this report. Banks were encouraged on a best-effort basis to take part in the green classification and thus they have used different estimation approaches.

135. For the green classification, banks applied different methods to estimate the level of greenness which clearly impacts the comparability of the results. Admittedly, the major challenge for banks, is the lack of appropriate data to run the classification of the EU taxonomy for each obligor.

136. Banks were able to provide information about the estimation approaches used. Taking this information as a whole, six dimensions can be identified. Figure 27 provides an overview of these dimensions where the estimation approaches may differ.

Figure 27: Differences in the green estimation approaches taken by banks

| Six different dimensions | |
|--------------------------|------------------|
| Sample size | Scope |
| Coverage | Estimation scale |
| Methodology | EU taxonomy |

137. The first dimension is the sample size for which banks run their estimation irrespective of other constraints (e.g. scope of the EU taxonomy). A small number of banks run their estimations for all of their submitted exposures. Considering the potential costs involved in running the exercise, most of the banks chose to focus their efforts on a subset of the submitted exposures. Banks used different approaches for selecting the subsample. A set of banks may have acted according to the economic activity of their exposures such as NACE sections or classes. Others used exposure characteristics such as size (e.g. large exposures) or top counterparties, type of financing (e.g. project financing) or others to determine their subsample.
138. The second dimension refers to scope of the EU taxonomy. In the sample, some banks employed estimation techniques on the full sample and therefore on all exposure data. A set of banks restricted their efforts to obligors that are within the scope of the EU taxonomy. Other banks also employed a non-disclosed scope which may fall in between. In addition, some banks examined all the activities for each counterparty, whereas others only considered the top activities of the counterparty.
139. In line with the previous dimension, the third dimension highlights the different coverage ratios of the classified exposure. For illustrative purposes, the share of estimated obligors to the total submitted obligors is used to approximate the coverage. Five banks were able to classify all submitted obligors. In contrast, another five banks ran estimations for less than 1% of the submitted obligors. Seven banks were able to estimate greenness for the bucket of 1%-5% of the submitted obligors. A further five banks were able to run the estimation for 5% to 50% of the total obligors. Lastly, four banks ran the estimation for the remaining bucket of 50% to 100% of the submitted obligors. This demonstrates the range of estimation coverage. A couple of banks focused on a small set of obligors, whereas others employed a more general approach. Admittedly, banks in the higher bucket tend to submit a fairly small number of obligors.
140. The scale of the estimation technique is a further dimension. A set of banks chose to report only exposures that are fully green and therefore the reported greenness value is always 100%. Other banks introduced a binary scale and the estimation technique then has two outcomes: the exposure can be classified as non-green or green. In a further step, other banks used estimation techniques with a bucketing scheme assigning different buckets to estimated greenness (e.g. 0%, 50%, and 100%). Lastly, a set of banks made use of estimation techniques with a discrete scale which may be the most accurate but also requires most information.
141. The fifth dimension concerns the methodologies used for the estimates. The methodologies can be categorised into internal and external tools. Internal tools include using internal sustainability or ESG ratings, green bond frameworks, internal taxonomies or scorecard and judgmental decisions by analysts or experts. The external tools include employing environmental accounts (e.g. public databases), third party data providers (e.g. emissions data) or third party judgements (e.g. analysts, ratings). It should be noted that banks may have used a combination of tools to come up with their estimates.

142. The last and the most important dimension is the application of the EU taxonomy and its set of criteria. Banks considered one or more of technical screening criteria such as the ‘do no significant harm’ principle, minimum social safeguards or qualitative criteria. In respect to the later, banks considered climate change mitigation or climate change adaptation for environmental objectives. A set of banks tried to apply and comply with parts of the taxonomy directly, whereas other banks approximated the taxonomy. For example, some banks used proxies for sectors or specific criteria. Others also made use of the findings of the Technical Expert Group on Sustainable Finance¹¹⁵.

143. The six dimensions show that banks used different approaches to estimate the greenness of their obligors. It needs to be stressed that a bank may have also used different techniques for its obligors depending on the available data. All this has a significant impact on the comparability of the estimates. Nevertheless, it also gives an indication of the large efforts required by banks to apply the EU taxonomy.

Green coefficient estimates

144. Table 9 compares the average greenness coefficient deriving from both estimation techniques (TAC and bank estimates). In contrast to Table 4 that focuses on the EU taxonomy, the full scope is considered for bank estimates in Table 9¹¹⁶.

¹¹⁵ https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy_en.pdf.

¹¹⁶ Particular NACE classes and sections are not covered by the EU taxonomy; for these no TAC estimate is available.

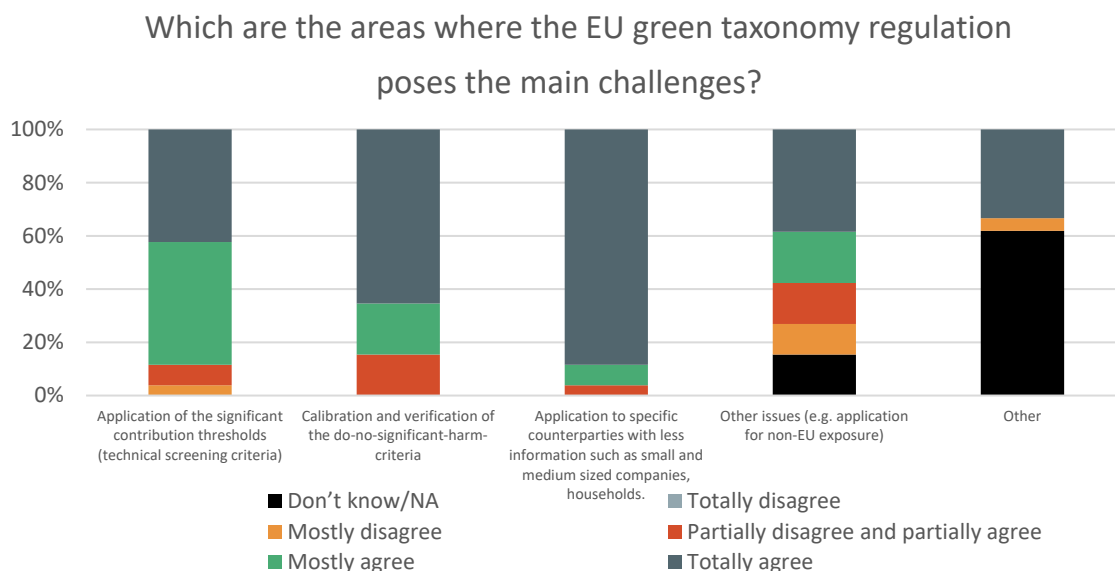
Table 9: Comparison of greenness coefficients across all NACE sections

| NACE Sector | TAC | Banks |
|--|------------|--------------|
| A-AGRICULTURE, FORESTRY AND FISHING | 0.0% | 48.2% |
| B-MINING AND QUARRYING | | 23.9% |
| C-MANUFACTURING | 11.6% | 41.8% |
| D-ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY | 41.3% | 63.4% |
| E-WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES | 0.0% | 56.8% |
| F-CONSTRUCTION | 33.1% | 54.4% |
| G-WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES | 1.8% | 24.6% |
| H-TRANSPORTATION AND STORAGE | 39.7% | 60.1% |
| I-ACCOMMODATION AND FOOD SERVICE ACTIVITIES | | 25.7% |
| J-INFORMATION AND COMMUNICATION | 0.0% | 35.2% |
| K-FINANCIAL AND INSURANCE ACTIVITIES | | 55.4% |
| L-REAL ESTATE ACTIVITIES | 15.0% | 46.2% |
| M-PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES | | 50.8% |
| N-ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES | 1.8% | 54.0% |
| O-PUBLIC ADMINISTRATION AND DEFENCE; COMPULSORY SOCIAL SECURITY | | 22.4% |
| P-EDUCATION | | 24.0% |
| Q-HUMAN HEALTH AND SOCIAL WORK ACTIVITIES | | 31.7% |
| R-ARTS, ENTERTAINMENT AND RECREATION | | 33.5% |
| S-OTHER SERVICE ACTIVITIES | | 40.4% |
| T-ACTIVITIES OF HOUSEHOLDS AS EMPLOYERS; UNDIFFERENTIATED GOODS- AND SERVICES-PRODUCING ACTIVITIES OF HOUSEHOLDS FOR OWN USE | | 51.8% |
| U-ACTIVITIES OF EXTRATERRITORIAL ORGANISATIONS AND BODIES | | 0.0% |

145. The table shows that banks provide an estimation of greenness for nearly all sections including those outside the scope of the EU taxonomy. The TAC estimates are limited to the EU taxonomy. For instance, the average value of the bank estimate for Mining (B) is 23.9% and for Financials (K) it is 55.4%. This suggests that banks are able to assess the greenness of the obligor beyond the EU-taxonomy related NACE sections. An explanation for this is that banks are able to locate greenness in financed activities, although the assigned obligors may be outside the scope of the EU taxonomy. An example would be a holding company in the NACE Financials section with an activity that finances renewable energy.

5.6 Questionnaire on the EU taxonomy classification

146. In addition to the green classification exercise, banks were invited to participate in a questionnaire on the application of the EU taxonomy.
147. According to banks, the implementation efforts concerning the EU taxonomy to identify environmentally sustainable exposures are for the purpose of contributing to climate change mitigation rather than climate change adaptation.
148. Banks were asked to provide areas in which the EU taxonomy regulation poses most challenges.



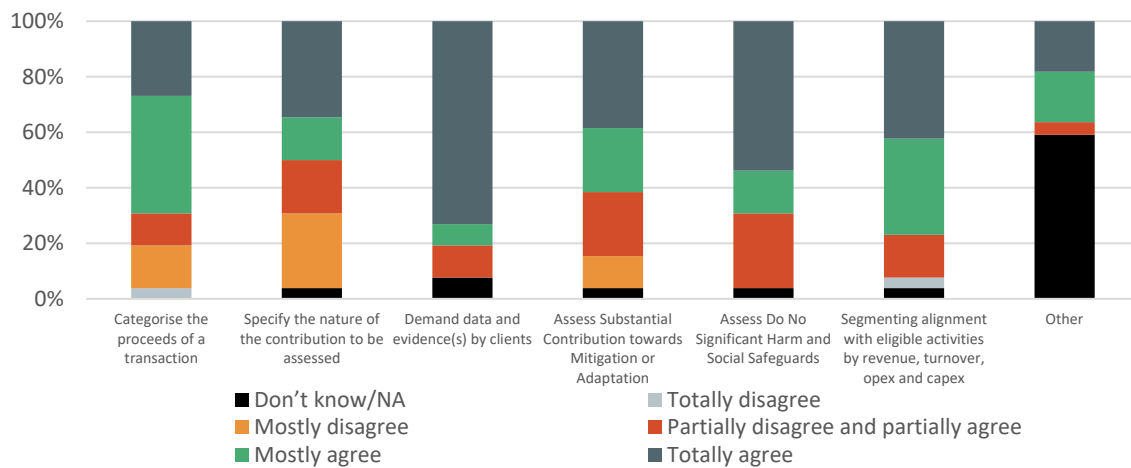
149. Banks flagged both the ‘application to specific counterparties with less information’ (such as small and medium sized companies and households) but also the ‘calibration and verification of the do-no-significant-harm-criteria’ as important areas. Moreover, most banks also see the ‘application of the significant contribution thresholds’ (technical screening criteria) as a potential challenge. Other issues (e.g. application for non-EU exposure) also pose a challenge for banks, but to a lesser extent.
150. The majority of banks already have some kind of an alternative environmental taxonomy in place. For example, banks use an internal risk taxonomy to provide estimates at an industry sub-sector level. Other banks apply exclusionary or inclusionary taxonomies for dedicated assets classes (e.g. loans, bonds or leasing). Some banks also link their taxonomies to an internal capital allocation model. However, only a couple of banks have a taxonomy for environmentally

harmful activities in force¹¹⁷. To a lesser extent, banks work with social taxonomies. One out of five banks have not implemented an alternative environmental taxonomy.

151. In addition, the vast majority of banks see differences in applying the EU taxonomy on their current stock of exposures with respect to new exposures. The background seems to be that for new exposures the required information is easier to collect.

152. A question was also asked to provide insight into the practical challenges that banks face with the application of the EU taxonomy.

Where did you face major challenges in the practical application of the EU taxonomy?

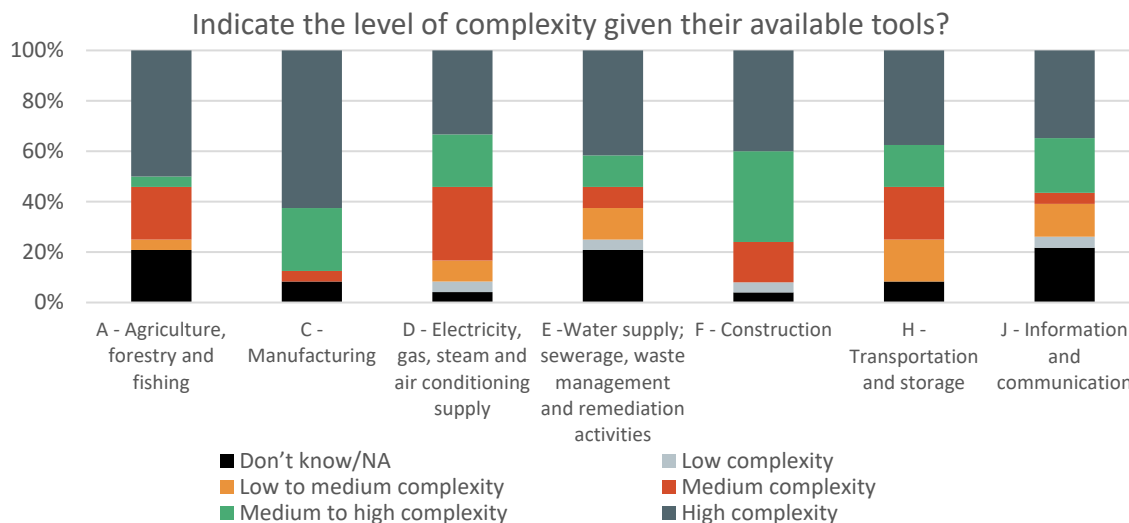


153. The main challenge is the lack of data or its standardisation. Further, the assessment of the contribution to environmental objectives (e.g. mitigation or adaptation), DNSH and social safeguards and segmenting the alignment with eligible activities (e.g. revenue, turnover, capex) appear to be difficult to be performed by banks. Categorising the proceeds of a transaction and specifying the nature of the contribution seem to cause problems to a couple of institutions.

154. Banks were also asked about the share of total exposures submitted to this exercise. About 1/3 of the banks were able to classify more than 90% of their exposure, whereas for another 1/3 of the participating banks less than 10% was classified. This dispersion may be traced back estimation methods and the different scope discussed in section 5.5.

155. Evidence on the potential challenges of classifying exposure in certain sections with given tools is provided in question 7.

¹¹⁷ Some authors (e.g. NGFS) note that not all such tools can be labelled as taxonomies, as only classifications that are both mandatory and widely-recognised can be considered as such. See https://www.ngfs.net/sites/default/files/medias/documents/ngfs_status_report.pdf.



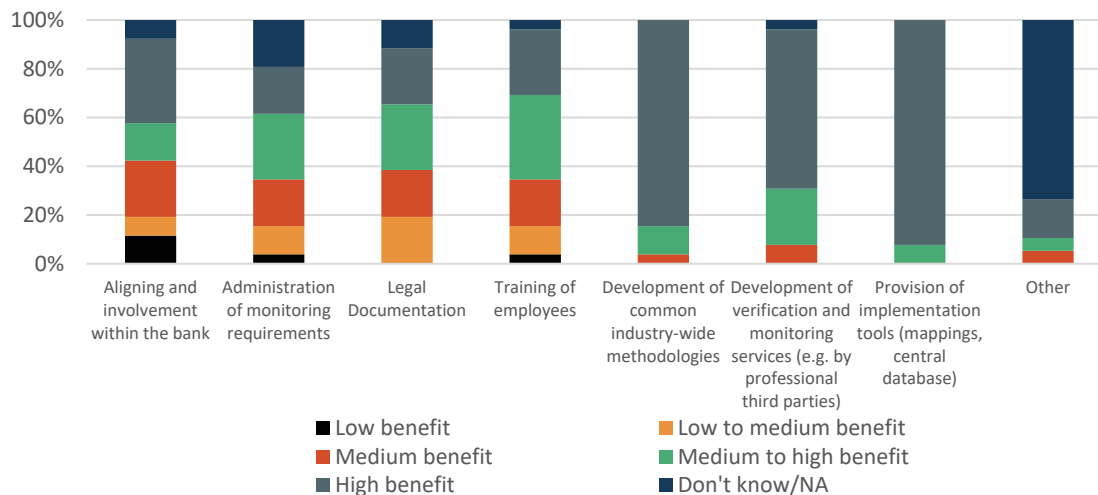
156. Banks indicate an increased level of complexity in specific NACE 2 level 1 sections. Interestingly, some banks assess sections as considerably complex, whereas others see them as having medium or low complexity. This seems to be driven by the estimation tools available to the bank. It should also be mentioned that a considerable number of banks are not able to assess the complexity of some NACE sections. This may be an indication that their available tools might be not in the position to cover the full scope of the sections.

157. Banks were also asked about the share of total exposures submitted for which the use of proceeds is known. The responses are split. The majority of banks (2 out of 3 banks) state that for less than 10% of the submitted exposure the use of proceeds is known. On the other hand, a quarter of banks know the use of proceeds for 60% or more. A small share of banks falls in between, knowing the use of proceeds for 30% to 60% of their submitted exposure. This gives an indication that for most banks the lack of available data is a major issue. Only a few banks are able to give information on the use of proceeds for most of their exposure.

158. Question 9 provides insight into the availability of banks' client information. The large majority of banks (4 out of 5) think that less than 30% of their clients would be able to provide taxonomy-based information in the course of 2022. The rest of the banks are more optimistic, believing that their clients would be able provide such information for 30 to 60% of their total exposures.

159. Lastly, banks provided some information on whether further assistance or support for applying the EU taxonomy would be beneficial.

Where do you think banks would benefit from further assistance/support when applying the EU green taxonomy?



160. Banks consider that the biggest benefits may come from developing common industry-wide methodologies and providing data implementation tools (mappings, central database). Banks also flag the development of verification and monitoring services (e.g. by professional third parties) as an important measure. Other aspects such as aligning and involvement within the bank, administration of monitoring requirements, legal documentation or the training of employees may also provide some kind of benefit to some banks. However, the main message is that they would benefit greatly from common practices and tools.