



# SUMMARY REPORT ON THE 2022 CREDIT RISK BENCHMARKING EXERCISE

RESULTS ON THE ANALYSIS OF THE VARIABILITY OF OWN  
FUNDS REQUIREMENTS BASED ON THE IRB APPROACH

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**EBA**

EUROPEAN  
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# 1. Executive Summary

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**The actions taken at EU level in response to the Covid-19 pandemic, coupled with the support measures adopted by the Member States, have continued to play an important role in explaining the trend of decreasing default rates and decreasing average PD estimates throughout 2021.**

**The observed decrease of average PD estimates is likely triggered by a series of concomitant factors: a) re-calibration procedures, b) supporting measures and/or the different obligors' behaviour in covid times and/on, c) different origination policies.**

The analyses on December 2021 data have shown a decreasing trend in the median of 1 year and 5 years default rate common to all asset classes. This trend is likely driven by the moratoria and the other national support measures implemented in the response to the COVID-19 pandemic. The analyses show that moratoria, public guarantee schemes (PGS) and other support measures were still applied to significant shares of the analysed institutions exposures.

Equally the analyses show a decreasing trend of PDs. However, given the time needed for model recalibration and where relevant model change approval coupled with the principle, published in a clarification by the EBA, to postpone recalibration of credit risk parameters at least until the effects of the crisis have fully materialized in the observed default and loss rates, make a cause-and-effect relationship between the trend of decreasing default rates and decreasing PDs unlikely.

Although, the decreasing trend in default rates observed during the COVID-19 crisis is not likely the driver of the observed drop in average PD estimates, both, the drop in default rates and the drop in average PD estimates might have common triggering factors that are – among others – the supporting measures and/or the different obligors' behaviour in covid times and/or different origination policies. Further, the in-depth case-by-case analysis, conducted in the course of 2022 based on the benchmarking data submission as of 31.12.2021, revealed that for some institutions the decreases in the median PDs was caused by recent rating system recalibrations, where the time-window of defaults reflected in the long-run average default rate was changed towards years with more favourable economic conditions or more favorable 1-year default rates. The latter was triggered by various factors, among others (a) the inclusion of the latest default data observed before the COVID crisis or (b) a potential discarding of default rate observations stemming from

former crisis or (c) the introduction of the requirement to reflect the likely range of variability of default rates in the calibration. In this regard, supervisors and institutions risk controllers should be vigilant to ensure that the long-run average default rates used for (re-)calibration of PD estimates reflect the likely range of variability of default rates relevant to a considered type of exposures as required in Article 46(3) of the RTS on IRB assessment methodology.

In addition, the impact on IRB parameters of the short-term and structural changes of the macro-economic environment caused by the COVID-19 crisis is a core aspect of this analysis and should remain on the regulators and supervisor's radar.

**There were no anticipations or signals of the current economic outlook and the energy crisis as of 31<sup>st</sup> of December 2021.**

In the current exercise, EBA staff has in addition investigated the incidence of energy firms in the IRB portfolio of the institutions in the benchmarking sample and has evaluated whether there were already any expectations or signs of the economic uncertainties related to the energy crisis, which started already in 2021 and accelerated with the Russian invasion of Ukraine, in the credit risk parameters. The analyses have shown a rather limited incidence of exposures to the energy firms. Further, the risk parameters of the energy firms are rather stable between 2020 and 2021 and there are no significant statistical differences between the energy firms and the other companies.

**The introduction of the Basel III reforms is expected to reduce the RWA variability across institutions that apply the IRB approach. In addition, the institutions revision of their IRB models to achieve compliance with the IRB roadmap shall reduce unwarranted RWA variability.**

In the context of the finalisation of the Basel III framework, which reduces the scope of application of the IRB approach and enhances the risk sensitivity of the Standardized Approach, the benchmarking data implies that around 80% of the large corporates exposure (LCOR EAD) relates to obligors for which only FIRB or SA will be available following the full Basel III implementation.

However, the RWA variability of the IRB approach remains rather stable in this year's benchmarking top-down analysis compared to earlier years. A potential impact from the harmonisation of terminology and concepts set out in the products of the IRB roadmap is yet to be observed, as for a majority of the institutions the supervisory review process related to the according model changes was still in progress at the time of the 2022 supervisory assessment.



## 2. Introduction

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Institutions, which apply the IRB approach, calculate their own funds requirements based on a set of parameters which they partially (under the foundation internal ratings-based (FIRB) approach) or completely (under the advanced internal ratings-based (AIRB) approach) estimate themselves. Article 78 of the CRD provides for the monitoring and assessment of risk-weighted exposure amounts (RWAs), which determine the own funds requirements, that result from the application of the institutions' own estimates for pre-defined benchmarking portfolios.

The annual benchmarking exercise, mandated in this article, aims to monitor the variability of the RWAs for institutions applying the IRB approaches in EU Member States. Excessive variability of RWAs among EU institutions and thus non-comparable resulting own funds requirements have been a concern since the IRB approach was implemented as an EU regulation in 2013<sup>1</sup>.

Since then, EBA has put forward a regulatory review of the IRB approach by setting out and completing several guidelines and technical standards, which are aimed at limiting unjustified variability by harmonising practices. This package is referred to as EBA's IRB roadmap, and institutions are in the process of reviewing their IRB approaches to achieve compliance with the harmonised practices.

In addition, since then, the ECB has carried out a large-scale review of the IRB approaches, which are supervised by the Single Supervisory Mechanism (SSM), referred to as the Targeted Review of Internal Models ("TRIM").

Section 3 of this report summarises the main results of the 2022 benchmarking exercise (based on data as of 31 December 2021 that has been collected between April 2022 and September 2022<sup>2</sup>).

As in last year's benchmarking report<sup>3</sup> (based on data as of 31 December 2020) the focus of this year's analysis remains on the potential impact of two aspects on the development of RWAs:

- the impact on IRB parameters of the short-term and structural changes of the macro-economic environment caused by the COVID-19 crisis;
- the impact on IRB parameters stemming from the implementation of the IRB roadmap, in light of the entry into force of the GL on PD and LGD starting from 1 January 2022;

As regards the development in RWA variability compared to last year's exercise the usual top-down analysis remains rather stable. For HDP the initial variability has again decreased (Figure 27, chart pack), while for LDP the initial variability is slightly higher compared to last year, which might be driven by a more homogeneous share of defaulted exposure (Figure 26, chart pack).

Section 3.2.2 of this report contains an analysis of IRB banks exposures into energy firms. This has been chosen as an area of interest due to the increased uncertainty that firms in this sector started to experience already in 2021, before it accelerated in 2022 with the Russian invasion in the Ukraine. It

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<sup>1</sup> EBA's report on comparability and procyclicality of own funds requirements under the IRB approach published in December 2013.

<sup>2</sup> The initial submissions in April are subject to a data quality process, which eventually leads to resubmissions, which are accepted until September.

<sup>3</sup> [https://www.eba.europa.eu/sites/default/documents/files/document\\_library/Publications/Reports/2022/1027369/EBA\\_Report\\_on\\_the\\_2021\\_Credit\\_Risk\\_Benchmarking\\_Exercise.pdf](https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Reports/2022/1027369/EBA_Report_on_the_2021_Credit_Risk_Benchmarking_Exercise.pdf).

should be noted that the data underlying the analysis refers to 31.12.2021 and thus does not yet reflect the economic developments observed after the Russian invasion in the Ukraine.



## 3. Results of the 2022 credit risk benchmarking exercise

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### 3.1 Development in estimated and realised IRB parameters

The COVID-19 specific circumstances continue to explain the main trends in EAD and average PDs and default rates. The complexity of how the COVID-19 crisis may impact IRB parameters is recalled in subsection 3.1.1. Another important driver of developments observed for average PDs in benchmarking portfolios between 31.12.2020 and 31.12.2021 for single institutions is the continued review of IRB models to achieve compliance with the IRB roadmap.

#### 3.1.1 COVID-19 impact on IRB risk parameters

National and EU-wide measures with partially significant impact on the economy were implemented starting from February 2020. As regards the EU banking sector, a number of measures were taken by national governments and at EU level to address and mitigate the adverse systemic economic impact triggered by Covid-19 on the EU banking sector. Alongside these measures, *“the EBA has provided clarity to banks and consumers on the application of prudential and supervisory measures to support lending into the real economy, together with alleviating the operational burden on banks where possible, whilst maintaining high standards of conduct, consumer protection and measures to tackle financial crime”*<sup>4</sup>.

The potential impact of the COVID-19 implied crisis on IRB parameters is complex and has been explained in more detail in last year’s benchmarking report. In essence, the COVID-19 implied crisis can impact the IRB parameters (i.e., RWs, PDs, LGDs, CCFs) in two dimensions:

- (a) It may trigger re-assignment of obligors (facilities) to different PD- rating grades (LGD- or CCF-grades) and
- (b) it may trigger re-estimation of PDs and LGDs (or CCF) for the corresponding grades and pools, taking into account the realisations of those risk parameters, which may be impacted by economic developments implied by the pandemic.

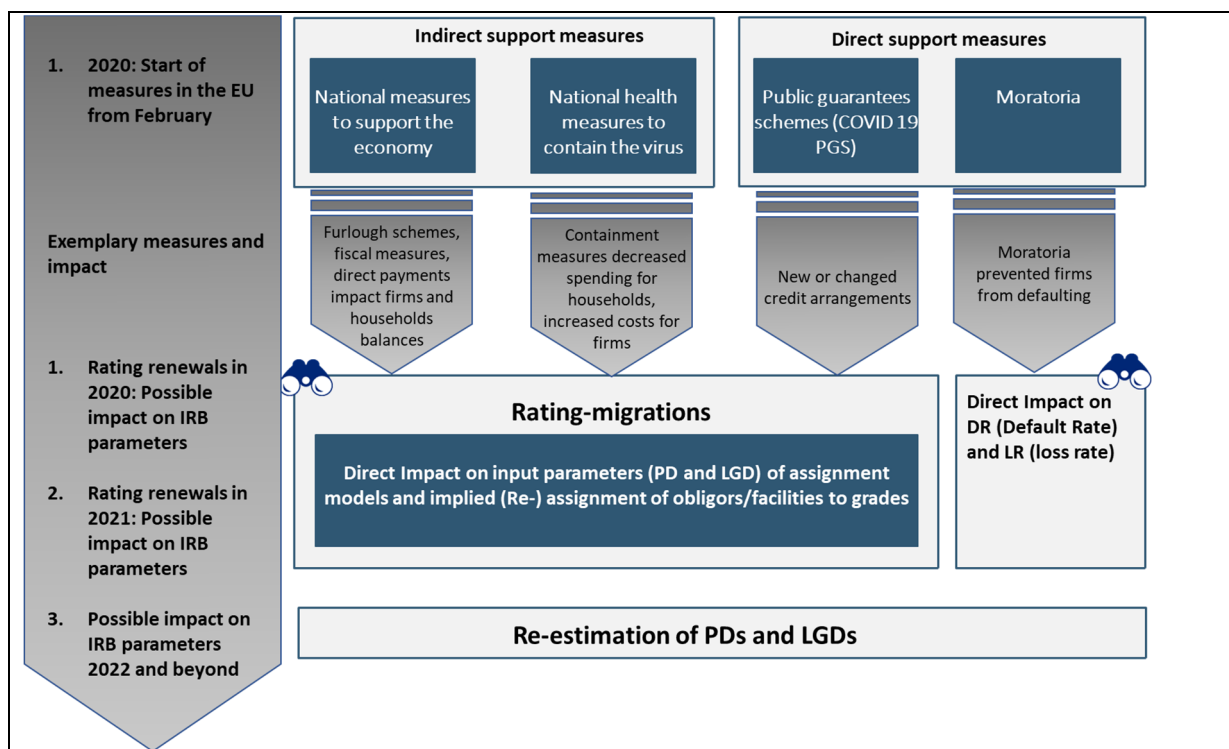
Impact on the rating assignment depends on the relevant input factors considered (and the extent to which these were impacted by the crisis) and on the frequency of the re-rating process. Impact stemming from potentially changed default- and loss rates may influence the PD or LGD estimates assigned to obligor or facility grades once an institution recalibrates taking the new historical evidence into account. Given that data collection- and cleaning as well as re-estimation of IRB parameters and model approval take some time it is unlikely that historical default or loss experience from the COVID-19 crisis is already incorporated in the estimates.

Figure 1 below illustrates the potential impact that the various support measures may have had on the IRB parameter estimates.

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<sup>4</sup> Page 6, EBA CLOSURE REPORT OF COVID-19 MEASURES, 16.12.2022.

Figure 1: Potential COVID-19 implied impact on IRB risk parameters



However, while most of the health measures could luckily be lifted in the course of 2021 (or at least in 2022, which is however not covered by the data that is being analysed), many support measures fade out at a different pace. Figures 6 and 7 of the chart pack indicate that there was still a significant share of loans under moratoria as of 31.12.2021 and Figure 8 and 9 of the chart pack indicate that there was still a significant share of loans covered by COVID-19 implied PGS as of 31.12.2021.

### 3.1.1 The IRB roadmap impact on IRB risk parameters

The IRB roadmap describes a set of regulatory products which the EBA developed between 2016 and 2021 in order to clarify and harmonise the application of the IRB approach. Table 1 recalls the single products:

Table 1: Products of the EBAs IRB roadmap

Phase	Regulatory products (amendments)	Implementation date for institutions
<b>Phase 1: IRB assessment methodology</b>	Final draft RTS under Articles 144(2), 173(3) and 180(3b) on the assessment methodology	Finalised (opinion) 12/2020 To be applied since Q2/2022 <sup>5</sup>
<b>Phase 2: definition of default</b>	Final draft RTS under Article 178(6) on the materiality threshold for past due credit obligations	Finalised 12/2016 To be applied since 01/2021 <sup>6</sup>

<sup>5</sup> [EUR-Lex - 32022R0439 - EN - EUR-Lex \(europa.eu\).](https://eur-lex.europa.eu/eli/reg/draft/2020/0439/oj)

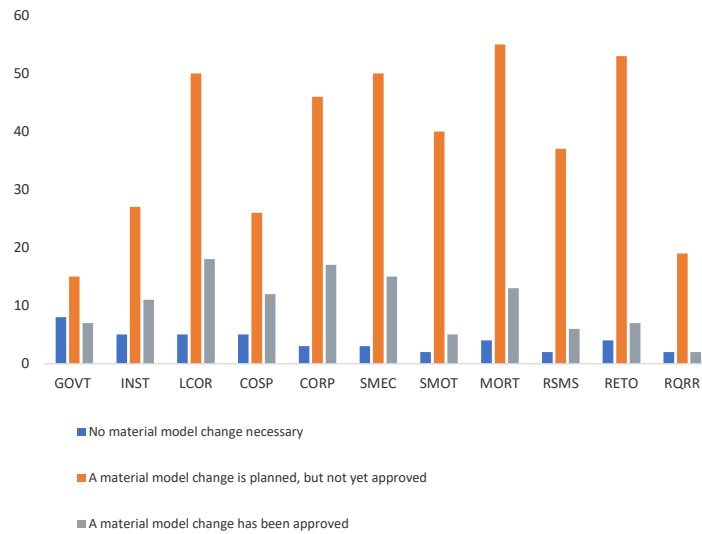
<sup>6</sup> [EBA publishes report on progress made on its roadmap to repair IRB models | European Banking Authority \(europa.eu\).](https://www.eba.europa.eu/en/press/news/2021/01/13/eba-publishes-report-on-progress-made-on-its-roadmap-to-repair-irb-models)

Phase	Regulatory products (amendments)	Implementation date for institutions
	GL under Article 178(7) on the application of the definition of default	
	Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures (GL on PD and LGD estimation)	Finalised Q4 2017 To be applied since 1/2022 <sup>7</sup>
<b>Phase 3: risk parameter estimation and treatment of defaulted assets</b>	Regulatory technical standards specifying the nature, severity and duration of an economic downturn referred to in Article 181(1), point (b), and Article 182(1), point (b), of that Regulation	Finalised Q4 2018 To be applied since Q2/2021
	GL on downturn LGD estimation (an addendum to the GL on PD and LGD estimation)	To be applied since 01/22
<b>Phase 4: credit risk mitigation</b>	Guidelines on credit risk mitigation for institutions applying the IRB approach with own estimates of LGDs	To be applied since 01/22

In last year’s benchmarking report it was already analysed where institutions stand with the revision of their definition of default (phase 3 products in the table above). This year, in the course of the CA assessment of the benchmarking supervisors were asked to provide information on the state of implementation of model changes to reach compliance with the GL on PD and LGD. The chart below shows that the majority of the institutions planned a material model change, but the supervisory review process was still in progress at the time of the exercise. Thus, it can be concluded that a major impact from the implementation of the IRB roadmap is yet to come.

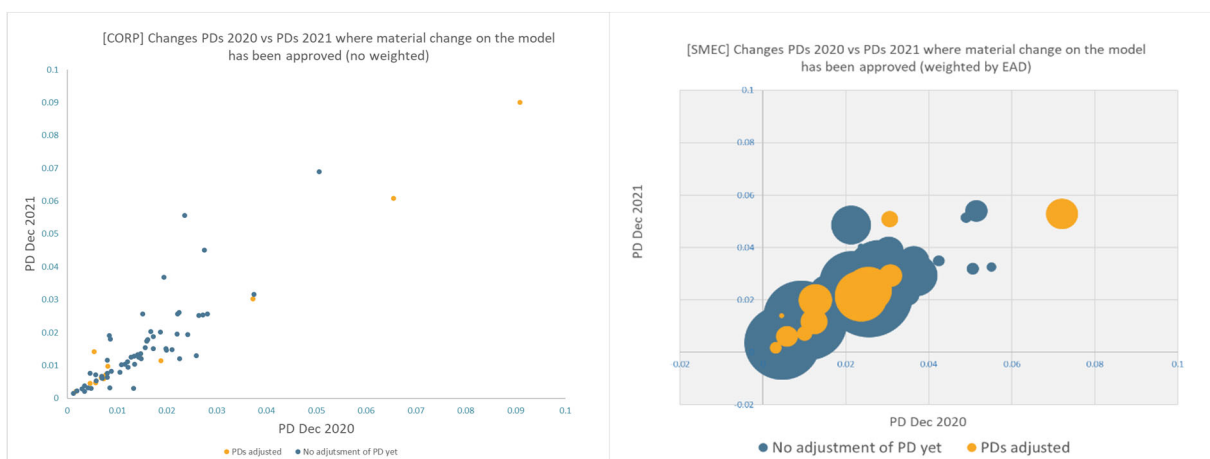
<sup>7</sup> For most IRB models, implementation delayed for the models, which are no longer expected to be in scope under the EU Basel III implementation. Details published here [EBA publishes report on progress made on its roadmap to repair IRB models | European Banking Authority \(europa.eu\)](https://www.eba.europa.eu/en/press-statements/feature/1227).

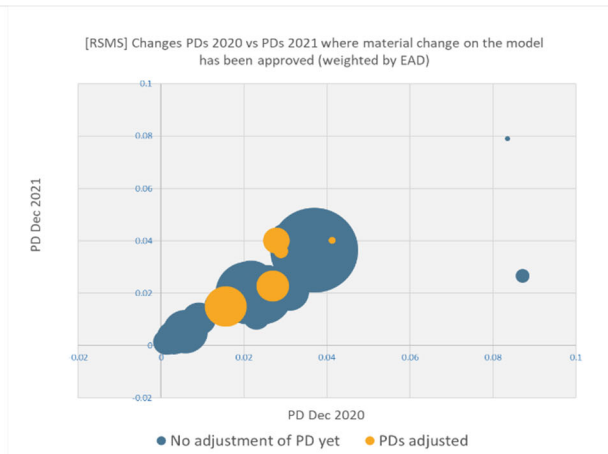
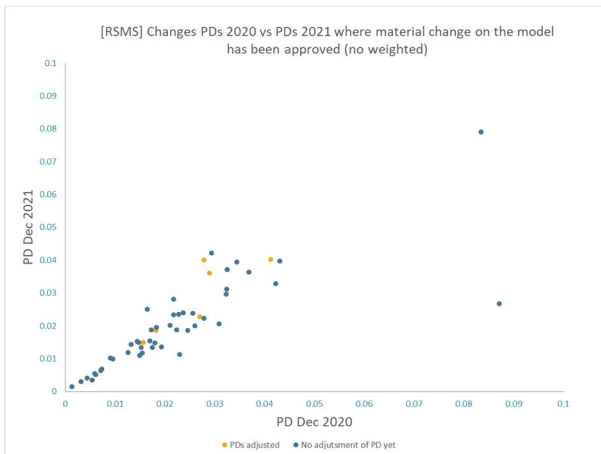
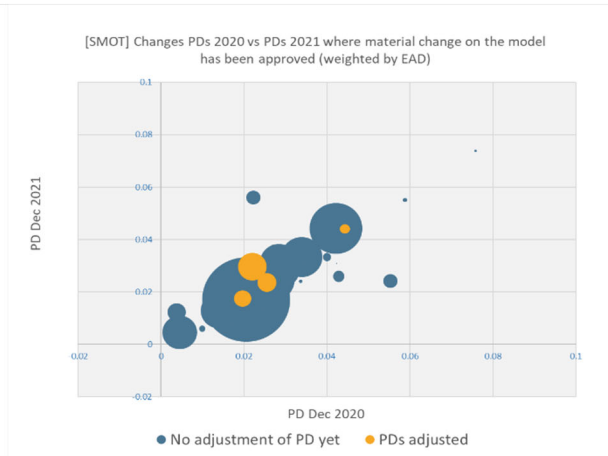
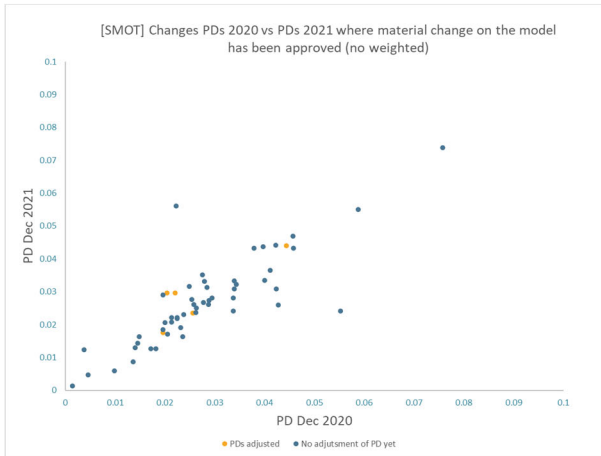
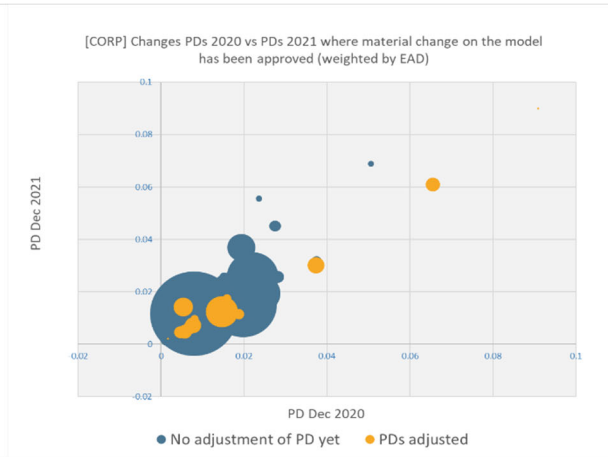
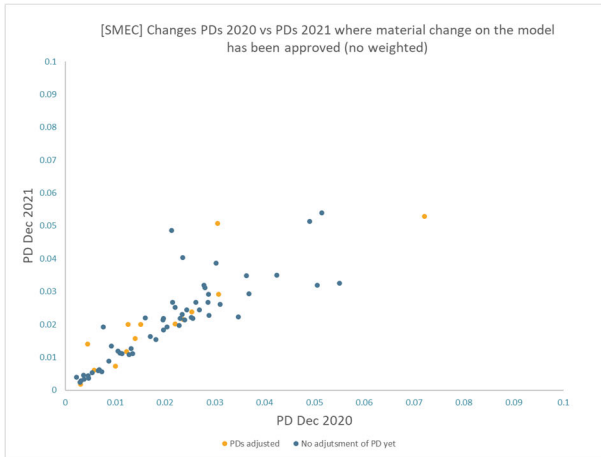
Figure 2: State of compliance with the GL on PD and LGD for material IRB exposure



Analysing the development of average PDs for benchmarking portfolios as of 31.12.2020 and 31.12.2021 there is no indication that the IRB roadmap implementation has had a major impact on the general trend of decreasing median PDs from end 2020 to end 2021. For this conclusion, the chart set in Figure 4 has been considered, which provides the average PDs observed as of December 2020 compared to the average PDs observed as of December 2021 per exposure class. The PD adjusted marked in yellow indicates the PD of institutions that have a material model change approved. The circles indicate the size of the relevant portfolio in terms of EAD.

Figure 3: Chart set on average PDs observed as of December 2020 compared to the average PDs observed as of December 2021. The circles indicate the size of the relevant portfolio in terms of EAD.





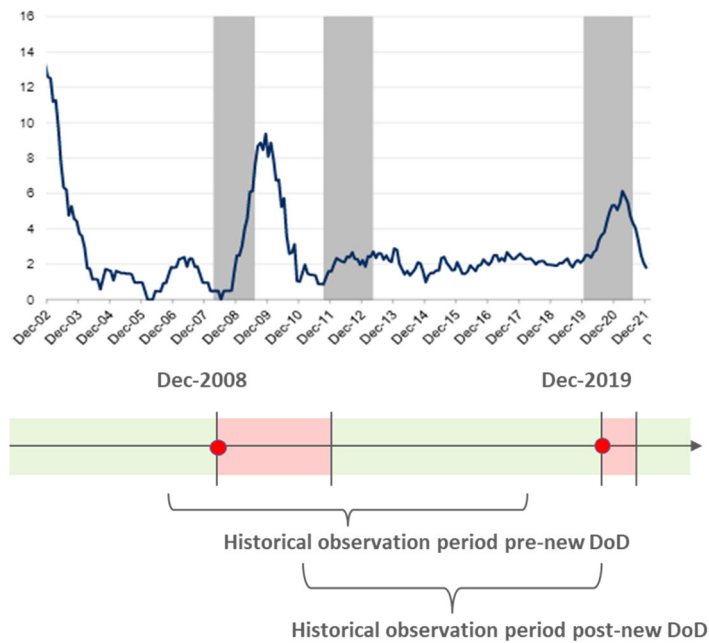


It should be noted there is some indication that certain institutions have experienced significant decreases in the average PDs reported due to the fact that the time-window of defaults reflected in the long-run average default rate has changed towards years with more favorable economic conditions or more favorable 1-year default rates.

In fact, there may be operational difficulties in the revision of the models to reach compliance with the IRB roadmap where, as a result, the defaults observed under the financial crisis 2008 may not be taken into account in the revised long-run average default rate. Therefore, supervisors and institutions risk controllers should be vigilant to ensure that the long-run average default rates underlying the revised PD calibration reflect the likely range of variability of default rates relevant to a considered type of exposures as required to in Article 46(3) of the RTS on IRB assessment methodology.

The following figure illustrates the possible impact of a changed historical observation period implied by issues encountered when implementing the EBAs GL on DoD.

Figure 4: Illustration of changes in the historical observation period

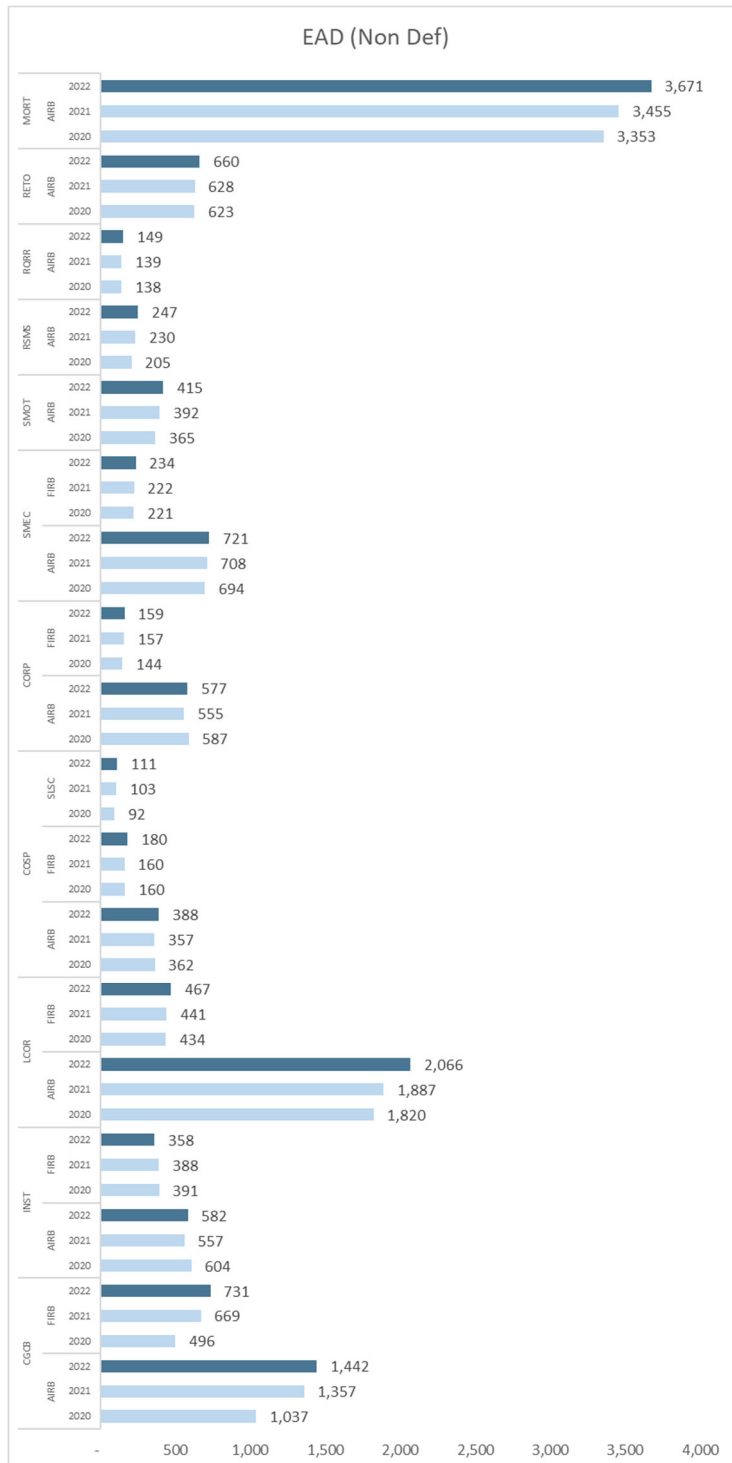


However, it is worth to outline that changes in a revised implementation of the default identification, potentially combined with changes in the calibration sample, do not necessarily lead to an increase or decrease in PD.

### 3.1.2 Changes in EAD and RWs

Figure 5 illustrates that for non-defaulted exposures, the EAD covered by the IRB approaches of institutions in the sample<sup>8</sup> has been increasing for all exposure classes, except for exposures to institutions, with more significant increases observed in the mortgage's exposure class (MORT; 6.2% increase) and the large corporates exposure class (LCOR; 9.5% increase).

Figure 5: Change in EAD by regulatory approach (million EUR), non-defaulted exposures



<sup>8</sup> The chart is based on a common sample for all years shown and is composed of 86 institutions.



It should be noted that the above chart illustrates the EAD and not the original exposure. In fact, the EAD may be lower than the original exposure for example in case of unfunded credit risk mitigation with an effect on the EAD. As can be seen from Figure 8 the exposure to SMEs in the corporate asset class (SMEC) and to retail SMEs which are not secured by immovable property (SMOT) which is benefitting from guarantees has nevertheless been increasing again in 2021, however not as significant as observed for 2020.

In addition, it should be noted that Figure 17 from the chart pack implies that for defaulted exposures, the according EAD has been decreasing in all exposure classes.

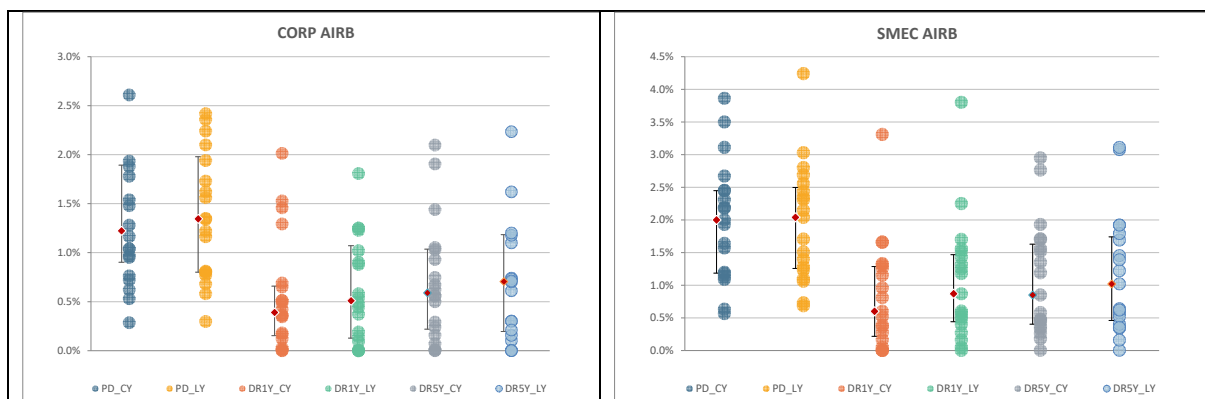
The increase in non-defaulted exposure that has been observed between 31.12.2020 and 31.12.2021 in some exposure classes, combined with COVID-19 support measures applied by member states, should give rise to vigilance regarding the appropriateness of own funds requirements arising from the IRBA approach as the underlying exposure might be structurally different from the experience incorporated in the historical observation periods. Equally the significant decrease of defaulted exposure observed in parallel to the significant increase in non-defaulted exposure should trigger some supervisory vigilance.

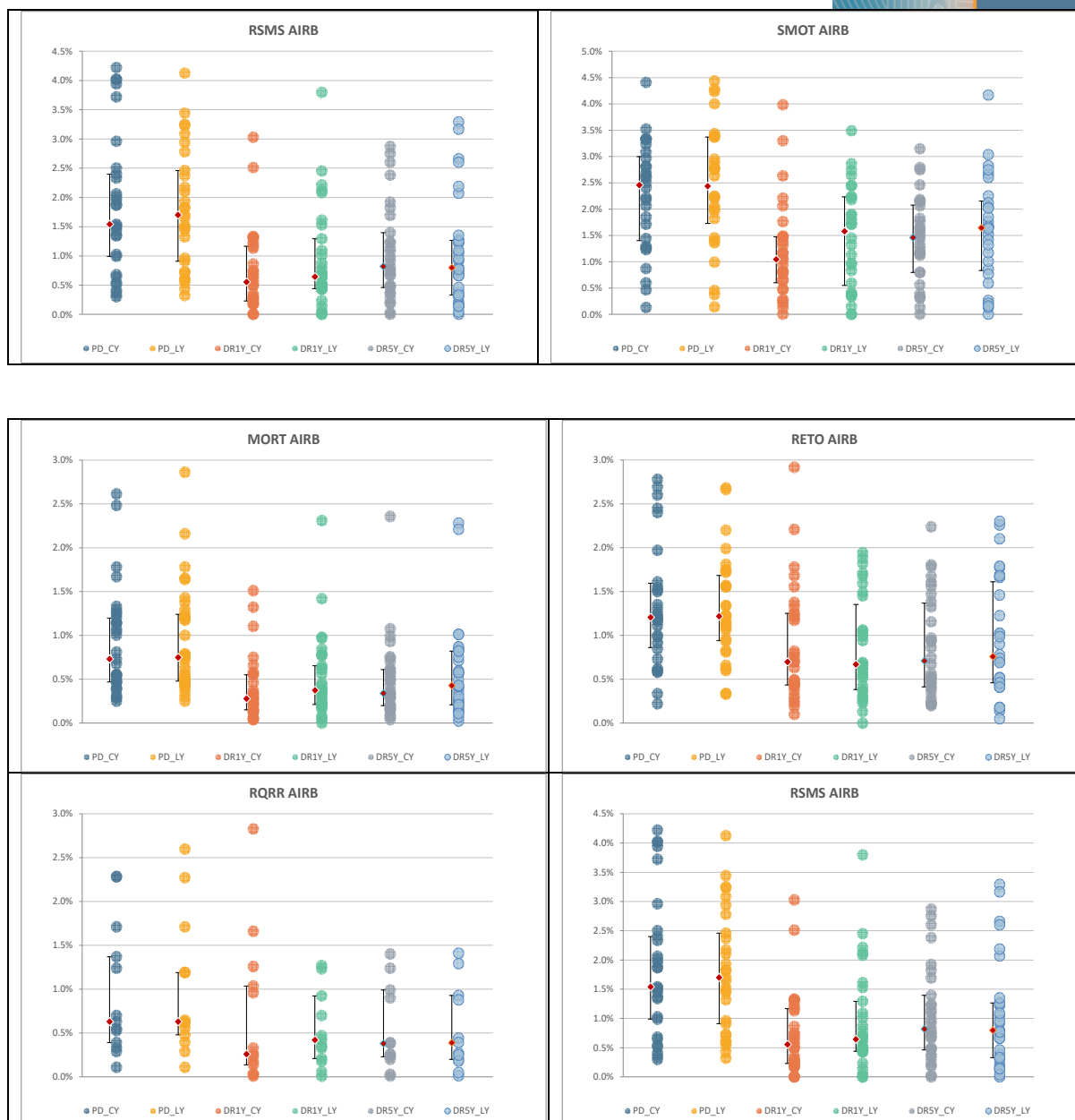
### 3.1.3 PD and DR developments

Figure 6 provides a comparison between the data collection in 2022 (data as of 31.12.2021) and in 2021 (data as of 31.12.2020) as regards the dispersion of PD estimates and one-year and five-year average default rates. This information is provided by exposure class.

As shown in the following figures, there is a slight decrease in the 1 year and 5 years default rate as well as a slight decrease in the PD. Furthermore, for CORP, there is a slightly lower dispersion of the PD values as of 31.12.2021.

**Figure 6: Comparison of the dispersion in the PD, one-year default rates (DR1Y) and five-year default rates (DR5Y) for 2021 (CY) and 2020 (LY)**





The red dot in the charts marks the median and the black line indicates the interquartile range, which is used to assess the dispersion.

The trend of decreased median of 1-year and 5-year defaults rates observed in the figures above is likely explained by the Moratoria and the other national support measures implemented in the response to the COVID-19 pandemic, but may as well be influenced by the implementation of new default identification processes in institutions.

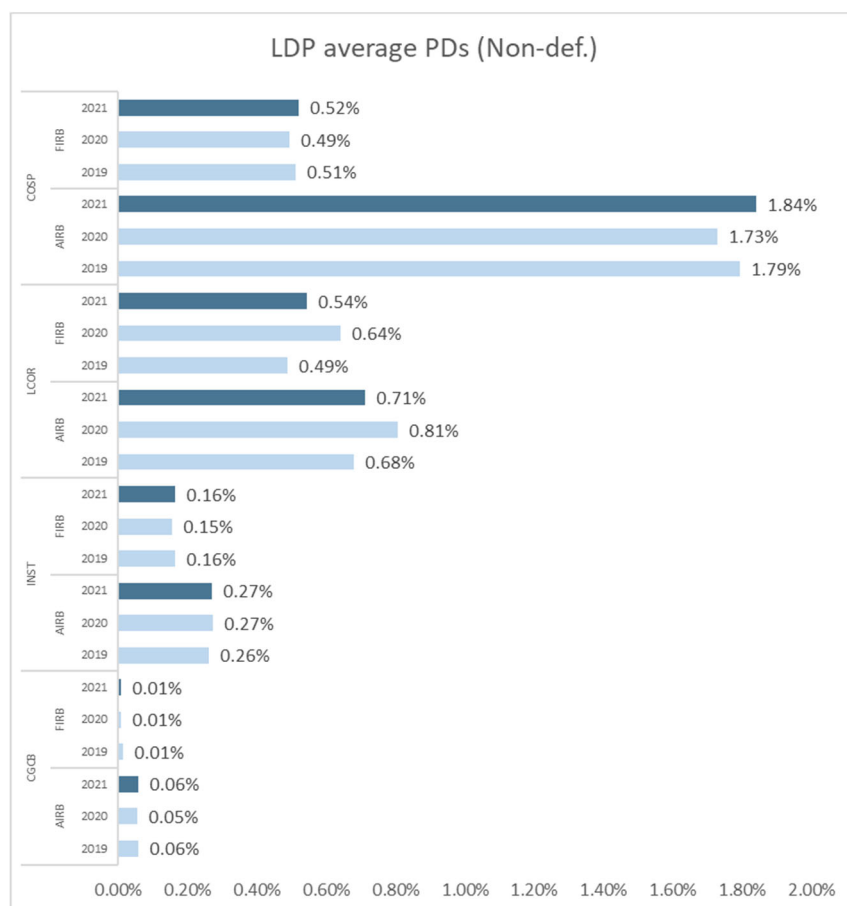
The trend of decreasing 1-year and 5-year default rates is unlikely to have caused the equally observable decrease of median PDs, given the clarification for the use of COVID-19-impacted data for internal credit risk models that EBA has published on the 21st of June 2022<sup>9</sup>. Moreover, it is unlikely that institutions (as of 31.12.2021) already recalibrated their rating systems with the most recent default rates from the crisis years (i.e. those of 2020) – given the time they need for model

<sup>9</sup> [EBA clarifies the use of COVID-19-impacted data for internal credit risk models | European Banking Authority \(europa.eu\)](https://www.eba.europa.eu/en/press-communications/press-communications/2022/06/21).

recalibration and model change approval. Further, in the above mentioned EBA clarification, the EBA recommends that potential downward recalibrations be postponed at least until the effects of the crisis have fully materialised in the observed loss rates. Therefore, it is unlikely that there is a cause effect relation between the trend of decreasing default rates and the trend of decreasing PDs both observed as of 31st December 2021 compared to 31st December 2020.

It was pointed out in last year’s benchmarking report that impact from the COVID-19 support measures on LDP portfolios was unlikely observed as of 31.12.2020 as (a) a regular re-rating for LDP exposure is often only scheduled once a year and (b) IRB models for these firms often rely on information from the annual reports – which at that point in time (31.12.2020) will have referred to 2019. Now Figure 7 below, showing the average PDs for LDP exposure classes implies that for exposure to large corporates (LCOR) the support measures may have now (i.e. as of 31.12.2021) been incorporated in the rating grade assignments:

Figure 7: EAD-weighted average PDs per asset class



It should be noted that while for LCOR the average PDs seem to revert to pre-crisis levels, the average PDs for some HDP portfolios are significantly below the 2019 levels (as can be seen from Figure 13 of the chart pack).

## 3.2 Specific analysis: from Covid-19 progress to incumbent energy crisis

### 3.2.1 COVID-19 related analysis

As described in the introduction, the pandemic crisis and the related measures to contain it continued to have an impact on risk parameters and on financial institutions as a whole in 2021. For these reasons, EBA has continued to monitor the use and impact of these measures. In this regard, it is important to remind that the member states and the EU implemented measures to counter the health and the related economic crisis via two channels:

- (a) **Directly**, in the case of the use of moratoria and public guarantee schemes (PGS) and other regulations that led to changes in the contracts with the obligors, and
- (b) **Indirectly**, via other COVID-19 support measures that do not change the institutions' contracts with the obligors, but which impacted among others the obligors' financials or behaviour.

An overview of measures implemented by EU member states can be obtained from the ESRB website<sup>10</sup>. Among the most used measures issued by the EU member states national governments there are certainly the public guarantee schemes (PGS), which support obligors generally viable facing liquidity shortages due to COVID-19 restrictions. Following the GL on CRM<sup>11</sup>, the IRB institutions have the following possibilities of adjusting their IRB risk parameters in order to recognise the effects of guarantees and credit derivatives:

- i. The **modelling approach**. This reflects the effects of the UFCP in the estimation of risk parameters, in particular, by considering the UFCP in the estimation of LGD, and, in some cases, also in the estimation of PD.*
- ii. The **substitution of risk parameters approach**. This is understood as an adjustment of PD and LGD, in which both the PD and LGD of the obligor are substituted with the PD and LGD that the institution would assign to comparable direct exposures to the guarantor whose direct exposures are treated under the AIRB or FIRB approach (AIRB guarantor and FIRB guarantor respectively).*
- iii. The **override**. In accordance with Article 172(3) of the CRR and Section 8.2 of the EBA GL on PD and LGD estimation, if there are individual and exceptional circumstances related to a given UFCP that the model cannot reasonably take into account, institutions have the option of adjusting risk parameters in the application of the model, through overrides in the grade assignment process.*
- iv. The **substitution of risk weight approach**. In the case of guarantors whose direct exposures are treated under the SA (SA guarantors), according to Article 183(4) of the CRR, institutions may recognise the UFCP in accordance with the requirements (eligibility criteria and methods)*

<sup>10</sup> [Covid-19 Policy Measures by Country \(europa.eu\)](https://www.europa.eu).

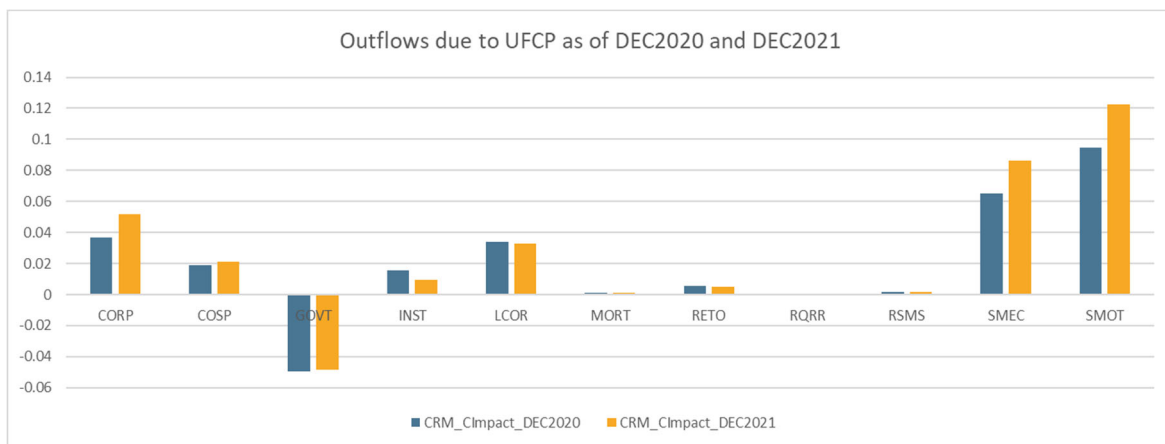
<sup>11</sup> [Guidelines on Credit Risk Mitigation for institutions applying the IRB approach with own estimates of LGDs | European Banking Authority \(europa.eu\)](https://www.europa.eu).

of Chapter 4 and therefore by applying the SA risk weight that the institutions would assign to comparable direct exposures to the guarantor.

v. The **double default treatment**: Finally, UFCP may be recognised via the treatment proposed under Article 153(3), Article 154(2), Article 161(4) and Article 164(3) of the CRR provided that the requirements under Articles 202 and 217 of the CRR are met.

Figure 8 and Figure 9 provide a visualization of the use of the risk parameter and the risk weights substitution approach (points (ii) and iv) above) for December 2020 and December 2021 to evaluate the evolution of this measure during the COVID-19 outbreak. In order to get an indication of the use of PGS via substitution, it was compared the original exposure pre CRM to the exposure post CRM (and pre CCF). Following the reporting instructions, in case of substitution, the guaranteed exposure is deducted from the obligor’s original exposure in the reporting of the exposure post CRM (outflow) and added to the guarantors exposure post CRM (inflow). However, the analysis in this section needs to be interpreted carefully, as the data fields c0080 (original exposure) and c0090 (Exposure post CRM substitution effects pre-conversion factors) have only been use since last year’s analysis. Moreover, the reporting only provides an aggregated view (aggregation of in- and outflows). The methodology applied is described in more detail in a box related to these charts in the chart pack.

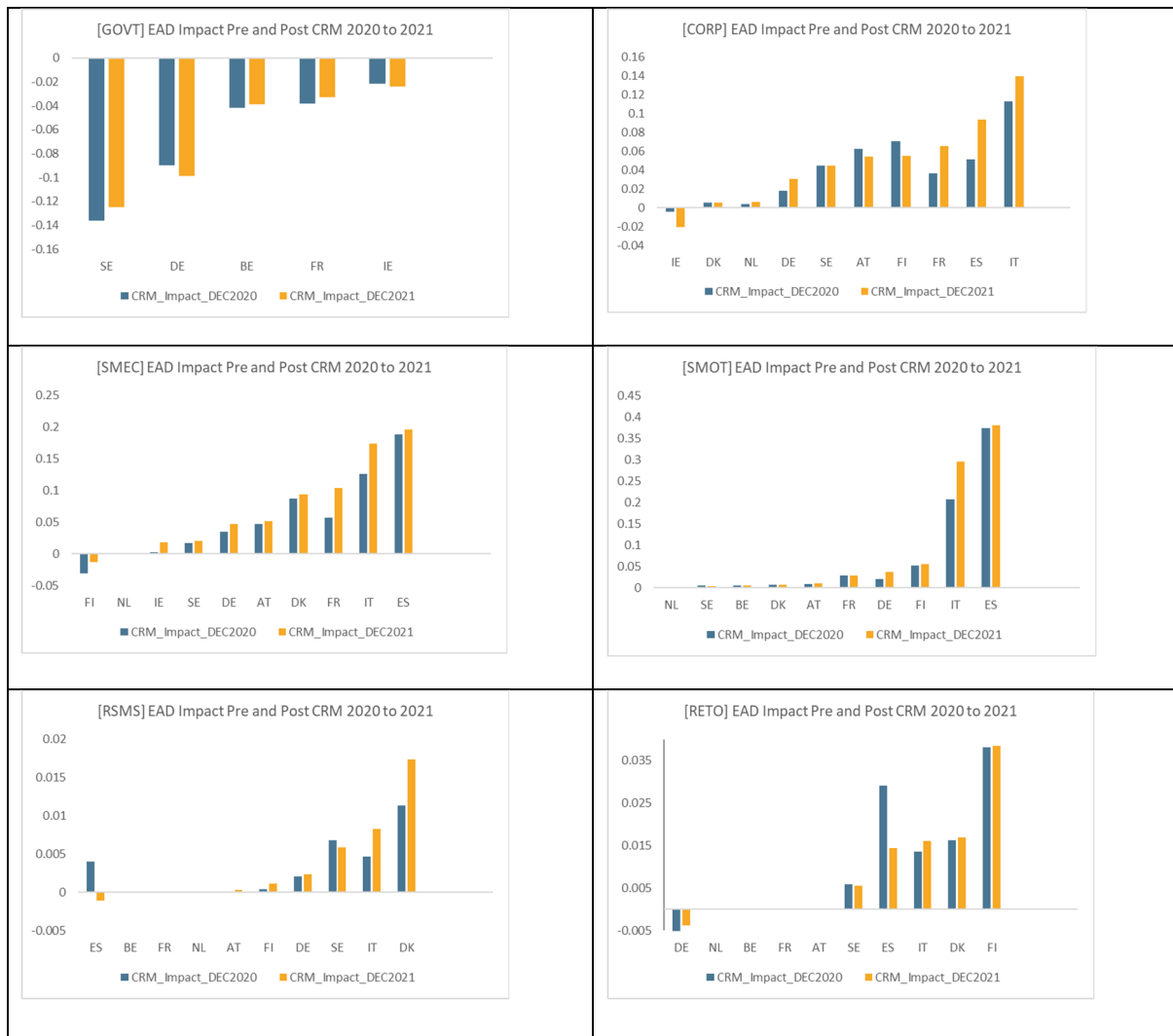
**Figure 8: The use of RW substitution by exposure class**



The visibly increased relative outflows observed in CORP, SMEC and SMOT as of December 2021 indicate an increased use of substitution in these portfolios compared to December 2020, indicating an increasing trend in the use of COVID-related guarantees throughout 2021.

The negative relative inflow observed for the exposure class governments (GOVT) reflects the extent to which exposure has been added to GOVT obligors as a result of risk parameter and RW substitution. It should be noted that GOVT exposures are only covered by this analysis to the extent they are treated under the IRB approach. GOVT exposures under the SA are out of scope of the benchmarking exercise and the corresponding inflows thus cannot be depicted in this analysis.

Figure 9: Outflows due to RW substitution by exposure class and by country



The above set of charts illustrate the use of substitution approaches across EU member states for a selection of asset classes deemed most relevant for the purposes of the analysis. For GOVT asset class, Sweden and Germany have the most relevant share of exposure, which has been added to GOVT as a result of risk parameter substitution<sup>12</sup>. For the other asset classes reported, it can be observed that the increased outflows are mainly driven by a few jurisdictions Italy, France (only for SMEC and CORP), Denmark (only for RSMS) and Spain (only for CORP)<sup>13</sup>.

<sup>12</sup> This is likely due to a higher use of the IRB approach for the GOVT exposure class in DE and SE than in other EU countries.

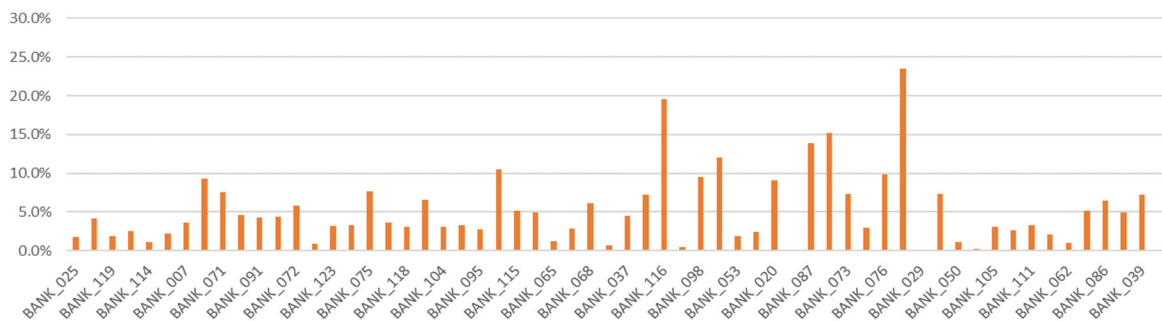
<sup>13</sup> This is consistent with the use of PGS as reported by the institutions (and illustrated in Figure 8 and 9 in the chart pack).

### 3.2.2 Energy Firms Related analysis

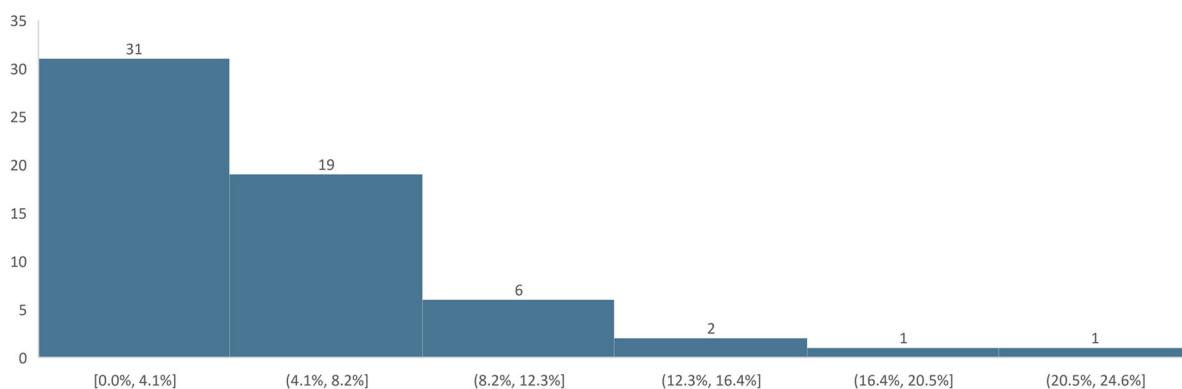
As described in the introduction, EBA investigated the engagement of IRB institutions into energy firms and analysed the IRB risk parameters of energy firms over time and in comparison to the other companies in the institutions’ portfolios. The objectives of the following analysis are to evaluate the incidence of energy firms in the IRB portfolio of the banks in the benchmarking sample and to evaluate whether there were already any expectations or signs of the energy crisis.

First, it was analysed for the institutions in the benchmarking sample the share of exposures in terms of loans to “*Electricity, gas, steam and air conditioning supply*” (i.e. NACE Code D) companies with respect to the total. The data used for this analysis are those relating to the Finrep template F06.01 containing the breakdown of non-trading loans and advances other than held for trading to non-financial corporations by NACE codes. The following graphs show for the institutions in the benchmarking sample, the percentage of loans to NACE Code D out of total loans to non-financial corporations as of 31 December 2021.

**Figure 10: Incidence of Energy Firms in loans portfolio of IRB Institutions as of 31.12.2021**



**Figure 11: Distribution of the incidence of Energy Firms in non-financial corporation loans portfolio of IRB Institutions**

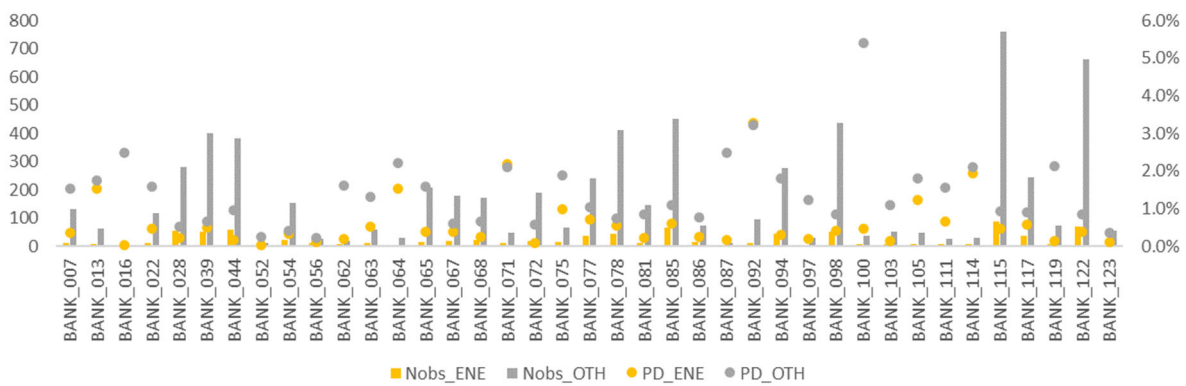


As can be observed from the graphs above, there are 60 institutions in the benchmarking sample that have loans to companies in the sector “*Electricity, gas, steam and air conditioning supply*” in their portfolio. For 10 out of 60 institutions, exposures to energy firms exceed 8.2% of the total exposures to non-financial corporations.

Then, starting from the SVB template 101, the counterparties belonging to the energy macro sector were identified using the institutions’ counterparty classification to the energy sector in the period 2020-2022 in the FINREP Template C.27. In this way, it was possible to identify 149 companies of

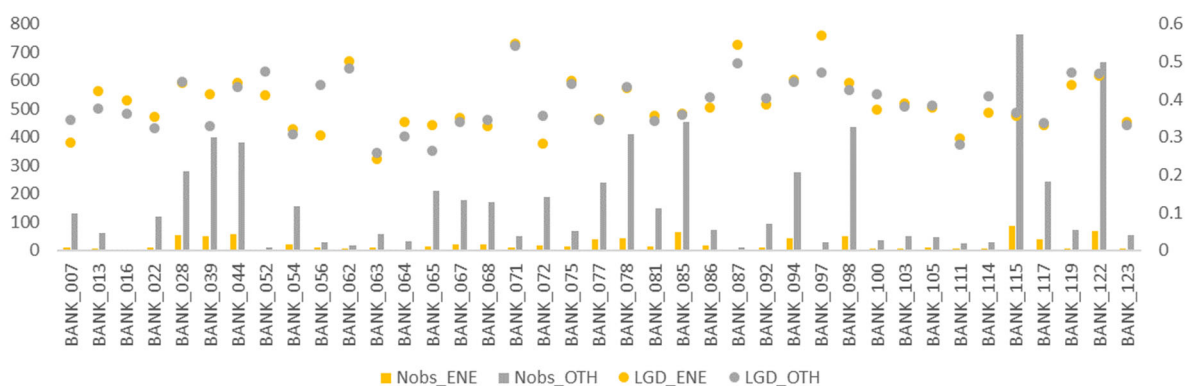
template C101 classified by the majority of institutions as operating in the energy sector. After that, the companies, which had been assigned as energy by a very limited number of institutions only, were individually verified. Following this check, seven companies were eliminated because they were considered to operate in other sectors. Using as a starting point the sample of 39 institutions, which appear to have an exposure to energy firms in template 101, an analysis on risk parameters were performed for the AIRB perimeter. In particular, Figure 12-Figure 14 Figure 14 provide a comparison of PD, LGD and CCF between Energy Firms and Others based on 2021 data, while Figure 15-Figure 17 provide a comparison of PD, LGD and CCF of energy firms between 2020 and 2021.

**Figure 12: Comparison of PD between Energy Firms and Others as of 31.12.2021**



In 2021, the PD of energy firms is slightly lower than PD of other companies, on average. The average absolute delta PD is equal to -0.80% with a standard deviation equal to 0.91%.

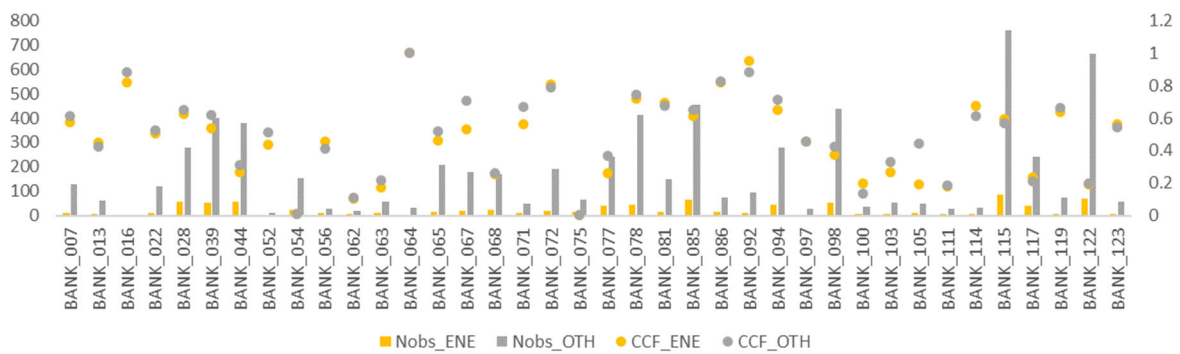
**Figure 13: Comparison of LGD between Energy Firms and Others as of 31.12.2021**



In 2021, the LGD of energy firms is slightly higher than LGD of other companies, on average. The average absolute delta LGD is equal to 0.13% with a standard deviation equal to 4.22%.

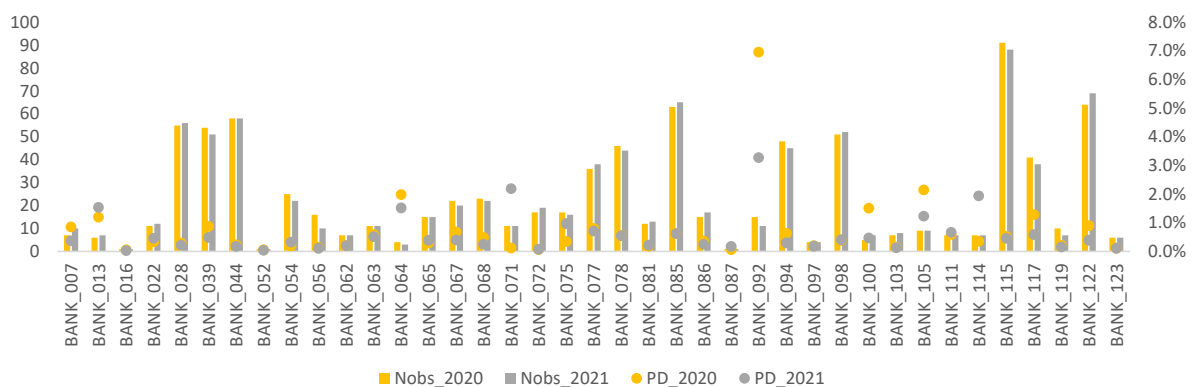


Figure 14: Comparison of CCF between Energy Firms and Others as of 31.12.2021



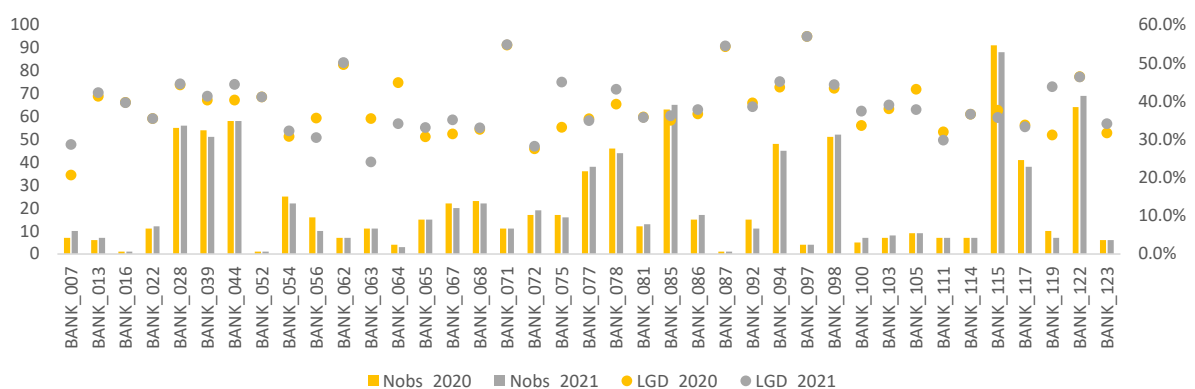
In 2021, the CCF of energy firms is slightly higher than CCF of other companies, on average. The average absolute delta CCF is equal to 2.66% with a standard deviation equal to 6.29%. A single institution was not considered for the purpose of calculating the statistics, due to reporting a CCF missing value for the only energy counterparty in its portfolio.

Figure 15: Comparison of PD of Energy Firms between 31.12.2020 and 31.12.2021



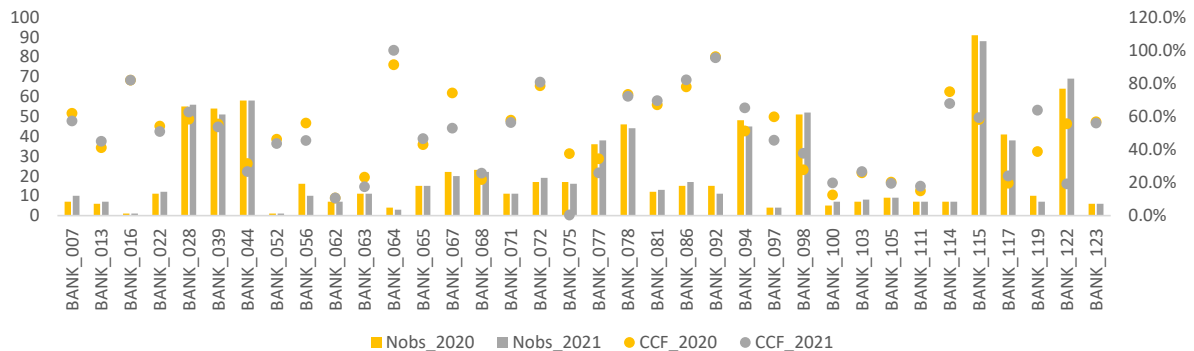
The PD of energy firms is remained stable between 31.12.2020 and 31.12.2021, there are no clear indications of an increase in the risk of default from one year to the next. The average delta PD (PD 2021-PD 2020) is equal to -0.11% with a standard deviation equal to 0.79%.

Figure 16: Comparison of LGD of Energy Firms between 31.12.2020 and 31.12.2021



The average delta LGD (LGD 2021-LGD 2020) is equal to 0.65% with a standard deviation equal to 4.41%. There are no clear indications of an overall increase or decrease in the LGD from 2020 to 2021.

**Figure 17: Comparison of CCF of Energy Firms between 31.12.2020 and 31.12.2021**



The CCF of energy firms is quite stable between 2020 and 2021. The average delta CCF (CCF 2021-CCF 2020) is equal to -1.79% with a standard deviation equal to 11.64%. It is important to highlight that a few outlier banks were not considered for the purpose of calculating the statistics for data quality issue.

The incidence of energy firms on the benchmarking sample of institutions is limited. About half of the institutions are exposed to companies in this industry, but the share of loans on average is equal to 5.10% of the total non financial loans portfolio. Nevertheless, the analysis has identified two institutions, with a loan exposure to energy firms of 19.5% and 23.5% (refer to Figure 10) out of total loans to non-financial corporations, which it is important to monitor overtime.

In the view of the above, the original idea it was also to verify how much exposure to energy firms is currently covered by SVB template 101, concerning exclusively large exposures. Unfortunately, given the available data it was not possible to assess the representativeness of the exposure to energy firms in the benchmarking sample compared to all exposure to energy firms.

From the analysis of the risk parameters, no significant differences emerge in statistical terms between the credit risk parameters of the energy firms compared to those of the other companies in the sample. Further, the credit risk parameters are stable overall between 31.12.2020 and 31.12.2021, not reflecting any expectation on the Energy Crisis. These results are consistent with the macroeconomic environment at the two reference dates and with the through the cycle (TTC) nature of the IRB parameters. Further, also elements such as re-rating processes, overrides, grade assignment dynamics, presence of calibration segments or model drivers depending on segments, play an important role in having more or less reactive PDs. In this regard, it is important to outline that the credit risk estimates analysed at the two reporting dates did not experience the Ukraine conflict, and that the IRB parameters are calibrated to the respective long run average outcome in order to ensure the appropriate stability of the estimates' quantification.

## 3.3 The 2022 underlying sample of institutions and portfolios

### 3.3.1 Dataset

The subset (sample) of European institutions which are considered for the analysis provided in this report is obtained from the list of institutions<sup>14</sup> which have a reporting obligation following Article 78 of the CRD. These are the institutions which had approval to calculate their own-funds requirements for their credit risk exposures by application of the internal ratings based (IRB) approach as of 31.12.2021 (the relevant reference date for this report). However, while the published list contains 111 institutions for which a data submission was expected in April 2022, the table below illustrates that only 101 were finally taken into account for this analysis. This is because the 8 Norwegian institutions, originally on the list, did not submit data as the relevant reporting regulation (DPM) was not adopted in time, one more institution was excluded due to unsatisfactory data and an additional institution has been removed since its IRB approval had actually been revoked.

However, given the individual business models not each participating institution provides data for each portfolio. Therefore, the number of institutions which are taken into account for the charts referring to specific exposure classes or more granular benchmarking portfolios, varies. As such for each chart and table the number of institutions actually considered in the analyses may be different (e.g. institutions not submitting a template due to specificities of their portfolio, like no LDP IRB models).

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<sup>14</sup> This list is published on the EBA website: [EBA updates list of institutions involved in the 2022 supervisory benchmarking exercise | European Banking Authority \(europa.eu\)](https://www.eba.europa.eu/en/press-and-news/press-releases/2022/04/2022-supervisory-benchmarking-exercise).

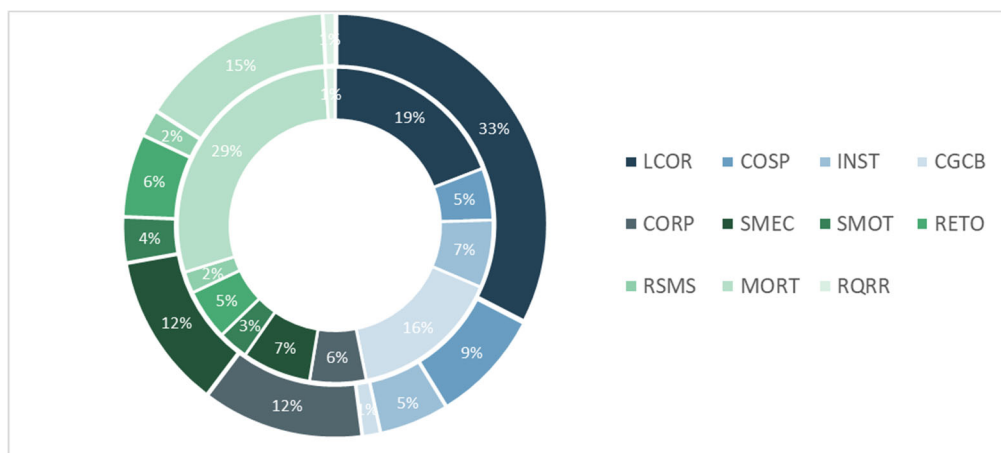
### 3.3.2 Portfolio composition and representativeness

This section provides an overview of key characteristics of the overall sample of institutions that is considered in this report. In particular, Table 2 describes the composition of the 2022 SVB sample across different dimensions (i.e. the use of regulatory approaches across SVB exposure classes). Figure 18 describes the portfolio composition in terms of RWA and EAD by exposure classes. The most relevant asset class in terms of capital absorption is the LCOR, with a share in terms of RWA of 33% against a share of exposure of 19%. It should be noted that around 80% of the LCOR EAD relate to obligors for which only FIRB or SA will be available following the full Basel III implementation. The exposure class MORT is still the most relevant in terms of exposure, representing 29% of the total, in line with the core business of most European institutions.

Table 2: Use of different regulatory approaches by SVB exposure class

	Exposure Class	AIRB	FIRB	SLSC	Number of participating institutions
LDP	LCOR	47	51	0	80
	COSP	22	17	33	56
	CGCB	17	28	0	38
	INST	25	47	0	60
HDP	CORP	47	50	0	79
	SMEC	45	51	0	79
	SMOT	64	0	0	64
	RETO	74	0	0	74
	RSMS	57	0	0	57
	MORT	80	0	0	80
	RQRR	34	0	0	34
<b>ALL</b>	<b>ALL</b>	<b>93</b>	<b>63</b>	<b>33</b>	<b>101</b>

Figure 18: Portfolio composition of RWAs (outer circle) and EAD (inner circle) for HDP and LDP portfolios (defaulted and non-defaulted)





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