European Banking Authority

EBA REPORT ON THE 2023 CREDIT RISK BENCHMARKING EXERCISE

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

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Contents

List of figures

Abbreviations

AIRB	advanced internal ratings-based
avg_ead	variable indicating ead on average
CA	competent authority
CCF	credit conversion factor
CfA	call for advice
CGCB	central governments and central banks
COREP	common supervisory reporting
CORP	exposures to corporates other
COSP	Exposures to specialised lending
CRD	Capital Requirements Directive
CRM	credit risk mitigation
CRR	Capital Requirements Regulation
cr_proxy	variable indicating a proxy of cure rate
DR	default rate
DR 1Y	default rate of last year
DR 5Y	Average default rate over the last five years
EAD	exposure at default
EBA	European Banking Authority
EL	expected loss
EU	European Union
FinGar	variable indicating the presence of financial guarantee
FIRB	foundation internal ratings-based
GC	global charge
GL	guidelines
GOVT	Exposures to central governments
HDP	high-default portfolio
INST	exposures to institutions
IRB	internal ratings-based
ITS	implementing technical standards
LCOR	exposures to large corporates
LDP	low default portfolio

LEI	Legal Entity Identifier
LGD	loss given default
LR	loss rate
LR 1Y	loss rate observed on the defaults of last year
LR 5Y	Average loss rate observed on the defaults over the last five year
MoC	margin of conservatism
MORT	exposures to residential mortgages
OthGar	variable indicating the presence of other guarantee
PD	probability of default
PPU	permanent partial use
QoQ	quarter on quarter
QRE	exposure class qualifying revolving
RealGar	variable indicating the presence of real estate collateral
RGLA/ PSE	regional governments and local authorities/public sector exposures
RETO	exposures to other retail non SME
RSMS	exposures to retail mortgages SME
RQRR	exposures to retail qualifying revolving
RW	risk weight
RWA	risk-weighted assets
SA	standardised approach
SLSC	specialised lending slotting criteria
SMEC	exposures to corporate small and medium-sized enterprises
SMER	exposures to retail small and medium-sized enterprises
SMEs	small and medium-sized enterprises
SMOT	Exposures to other retail SME
SVB	supervisory benchmarking
Time	variable indicating the time to recovery
UL	unexpected loss

Executive Summary

Legal Mandate

Article 78 of the CRD provides for the monitoring and assessment of risk-weighted exposure amounts (RWAs), which determine the own funds requirements for IRB banks. 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.

The EBA IRB roadmap is expected to reduce the undue variability of own fund requirements across institutions that apply the IRB approach.

In comparison with the previous year, the share of material model changes that have been approved has increased for all asset classes, indicating that the implementation of the IRB roadmap is progressing, although a remaining portion categorized as material model change is planned but not yet approved. In any case, supervisors should monitor the sensitivity of the risk metrics in relation to evolution of the risk observed figures.

Certain factors such as the prudential adjustments and the type and degree of collateralisation help to explain the credit risk parameters variability to some extent.

The report shows the evolution of the variability of the risk parameters over the period 2015-2023. A clear decreasing trend of variability can be observed in the Corporates class, whereas for the other asset classes the variability seems more stable. The report provides evidence that, besides risk factors able to capture the underlying portfolio characteristics, prudential adjustments could potentially explain part of the variability. A specific analysis regarding the portfolio Retail shows the role that the type and degree of collateralization can play in explaining the variability of the LGD.

1. Introduction

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

2. 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[1]. Since then, the 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 harmonizing 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 harmonized 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").

3. This report summarises the main results of the 2023 benchmarking exercise (based on data as of 31 December 2022 that has been collected between April 2023 and September 2023). One of the main focus of this year's analysis is the impact on IRB parameters stemming from the implementation of the IRB roadmap, in light of the entry into force of the Guide Lines on PD and LGD starting from 1 January 2022.

[1] EBA's report on comparability and procyclicality of own funds requirements under the IRB approach published in December 2013

2. General statistics on the materiality of the IRB approach

2.1 IRB Coverage Ratio

4. This section provides the evolution of the relative amount of exposure that is subject to the IRB method. To this end, the relative share of the EAD for which the AIRB method or the FIRB method is used, is represented. The analysis benefits from the data that the EBA receives on a regular basis thanks to the EUCLID project[2]. In turn, this enables to take in consideration also small and local institutions and to extend the analysis to institutions applying the Standardized Approach. The data is available since end 2020. To avoid variations depending on the possible entry or exit of some banks from the analysed sample, only the institutions that have been reporting for all reference dates in the period were taken into consideration. The level of consolidation considered is the highest at the EU level (subsidiaries of EU institutions are not considered).

5. The period considered is 31/Dec/2020 – 30/Jun/2023 on quarterly basis. The following table shows the number of institutions considered (stable sample[3]) and the number of institutions excluded. The table also shows the share of total assets covered by the stable sample. In June 2023, under the EUCLID project the EBA collected prudential information from about three thousand institutions, of which 2,174 reported the data for the entire period (11 quarters). These institutions represented about 95% of total assets[4] in June 2023.

Table 1: Nr of institutions reporting to the EBA

	Nr of institutions	Tot. Ass., 30/Jun/2023	Tot. Ead, 30/Jun/2023
Other	752	5.3%	4.9%
Stable Sample	2,174	94.7%	95.1%
All	**2,926**	**100%**	**100%**

Source: Corep templates C.02, C.47

6. Starting from this stable sample of institutions, it was considered the exposure value (Col 0110 of C.08.02) of the IRB asset classes and the exposure value (Col 0200 of C.07.00.a) of the SA asset classes[5]. For the SA, the provisions (Col 0030 of C.07.00.a) were added to the exposure value so to align the definition of the exposure with the IRB one. For both IRB and SA only

[2] EUCLID stands for European Centralised Infrastructure for Supervisory Data. It is the platform and data infrastructure developed and used by the EBA to gather and analyse regulatory data from a wide range of financial institutions. It covers supervisory, resolution, remuneration and payments data.

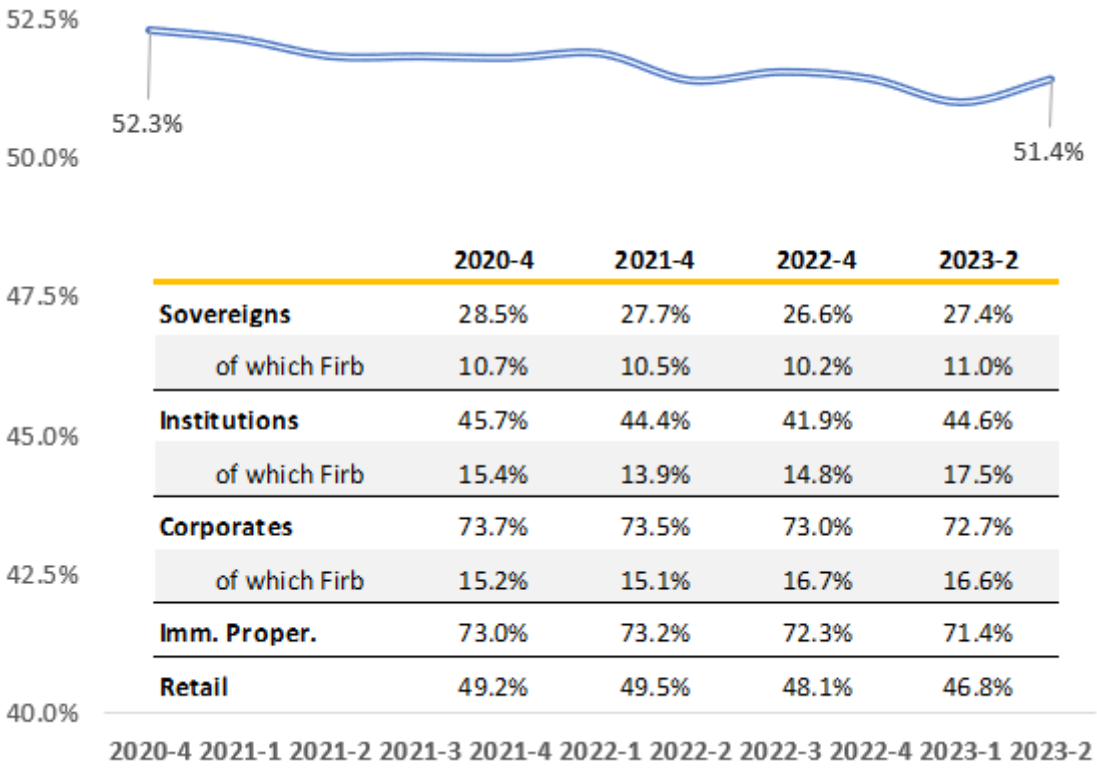
[3] Only banks having reported for all the quarters in the period are considered.

[4] The Total Assets is defined as the denominator of the Leverage Ratio, row 0290 of the Template C.47.00

[5] Also SA exposures reported by IRB banks are considered

performing exposures were considered. The figure below shows that the share of the IRB over the total EAD is about 50% (definitively higher for some asset classes like Corporates and loans secured by immovable properties). This share appears practically constant along the considered period.

Figure 1: Share of performing EAD under the IRB approach

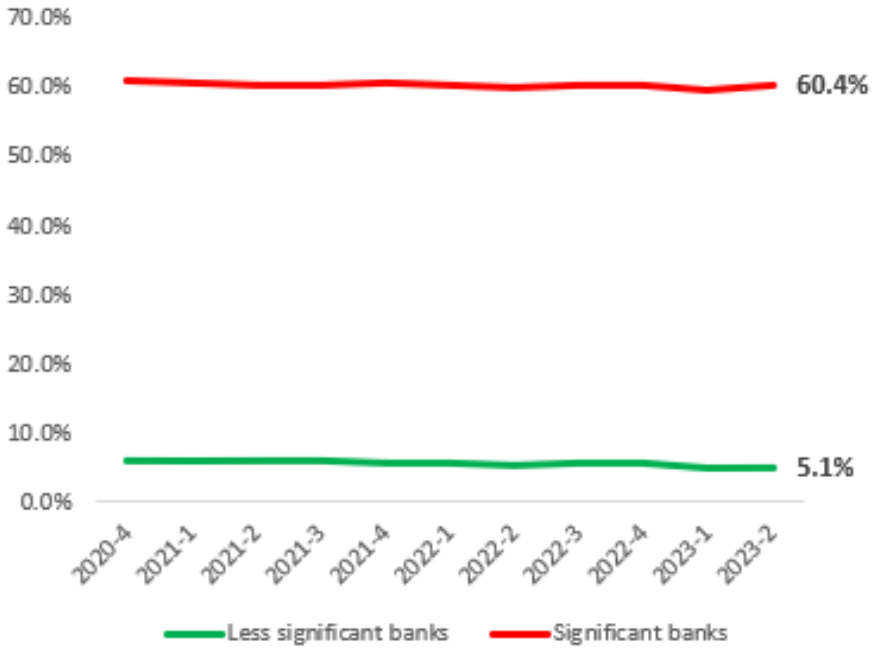


	2020-4	2021-4	2022-4	2023-2
Sovereigns	28.5%	27.7%	26.6%	27.4%
of which Firb	10.7%	10.5%	10.2%	11.0%
Institutions	45.7%	44.4%	41.9%	44.6%
of which Firb	15.4%	13.9%	14.8%	17.5%
Corporates	73.7%	73.5%	73.0%	72.7%
of which Firb	15.2%	15.1%	16.7%	16.6%
Imm. Proper.	73.0%	73.2%	72.3%	71.4%
Retail	49.2%	49.5%	48.1%	46.8%

Source: Corep templates C.08.02, C.07.00

The share of exposure under the IRB approach is clearly higher among the largest banks in comparison with smaller banks.

Figure 2: Share of performing EAD under the IRB approach by type of banks

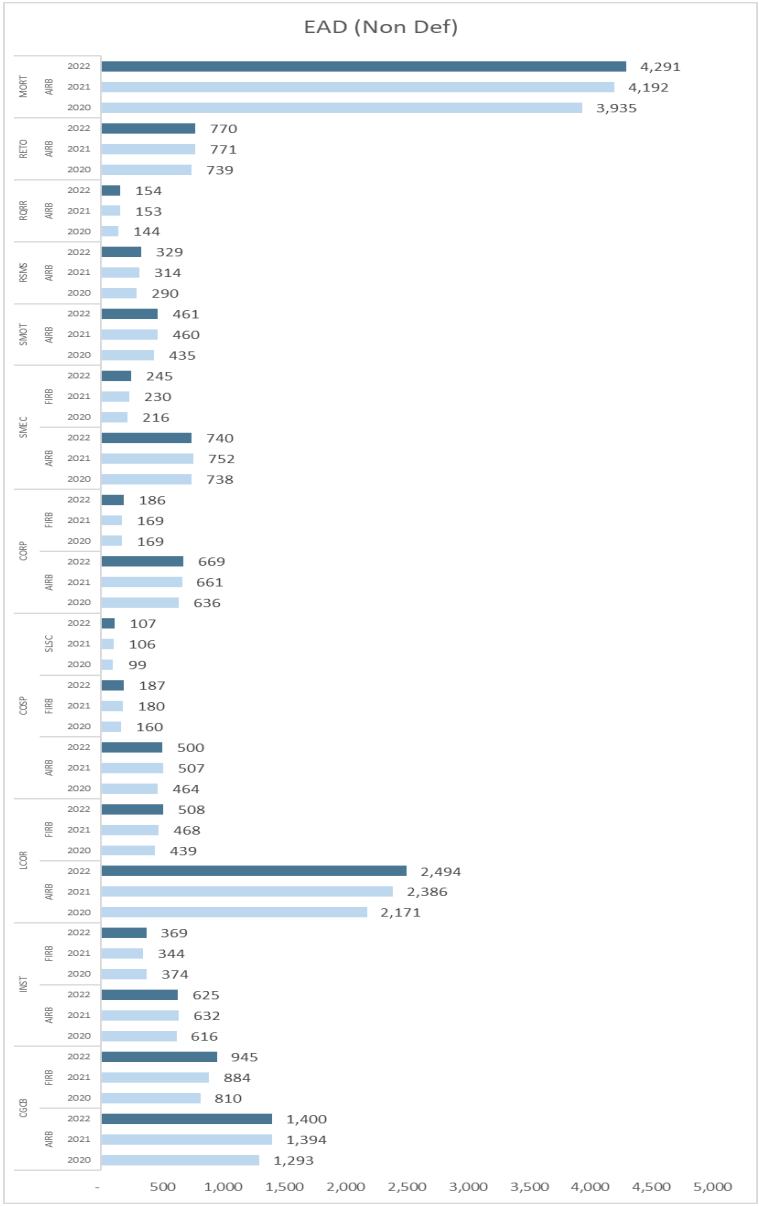


Source: Corep templates C.08.02, C.07.00

2.2 EAD and Risk parameters per asset classes

7. As shown in Figure 3, whereas the % of EAD in IRB slightly decreased, the EAD amount in IRB is slightly increasing for all asset classes and especially for mortgages (MORT) and large corporate (LCORP). We observed a very slight EAD decrease in other retail (RETO), credit card (RQRR), SME Corporate (SMEC) AIRB, and Corporate AIRB for Specialized Lending (COSP) AIRB, but only compared to the EAD increase during COVID by end 2021.

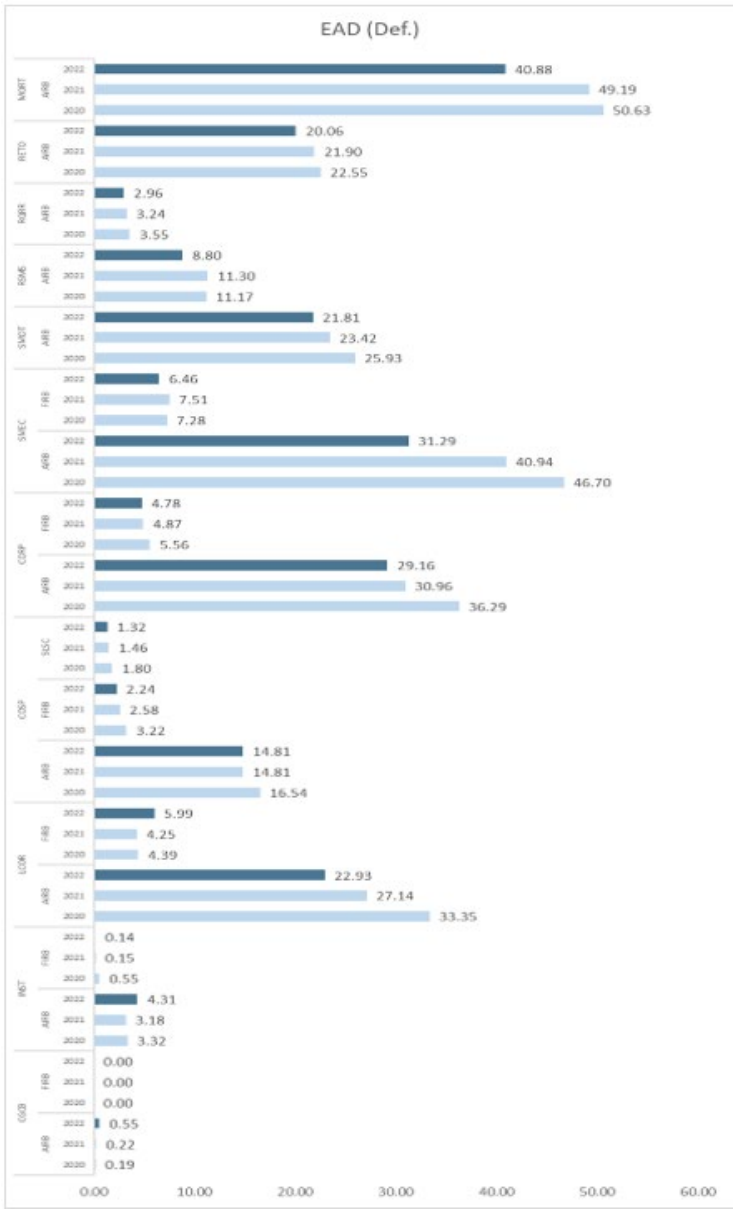
Figure 3: Change in EAD by regulatory approach (million EUR), non-defaulted exposures



Source: Benchmarking DB

8. Despite this general EAD increase, the chart below illustrates how the declining trend in Exposure at Default (EAD) amount in default continues for all asset classes this year, except for some approaches in LDP portfolios (Large Corporate (LCOR) FIRB only, Institutions (INST) AIRB only, and Central Governments and Central Banks (CGCB) AIRB only.

Figure 4: Change in EAD by regulatory approach (million EUR), defaulted exposures



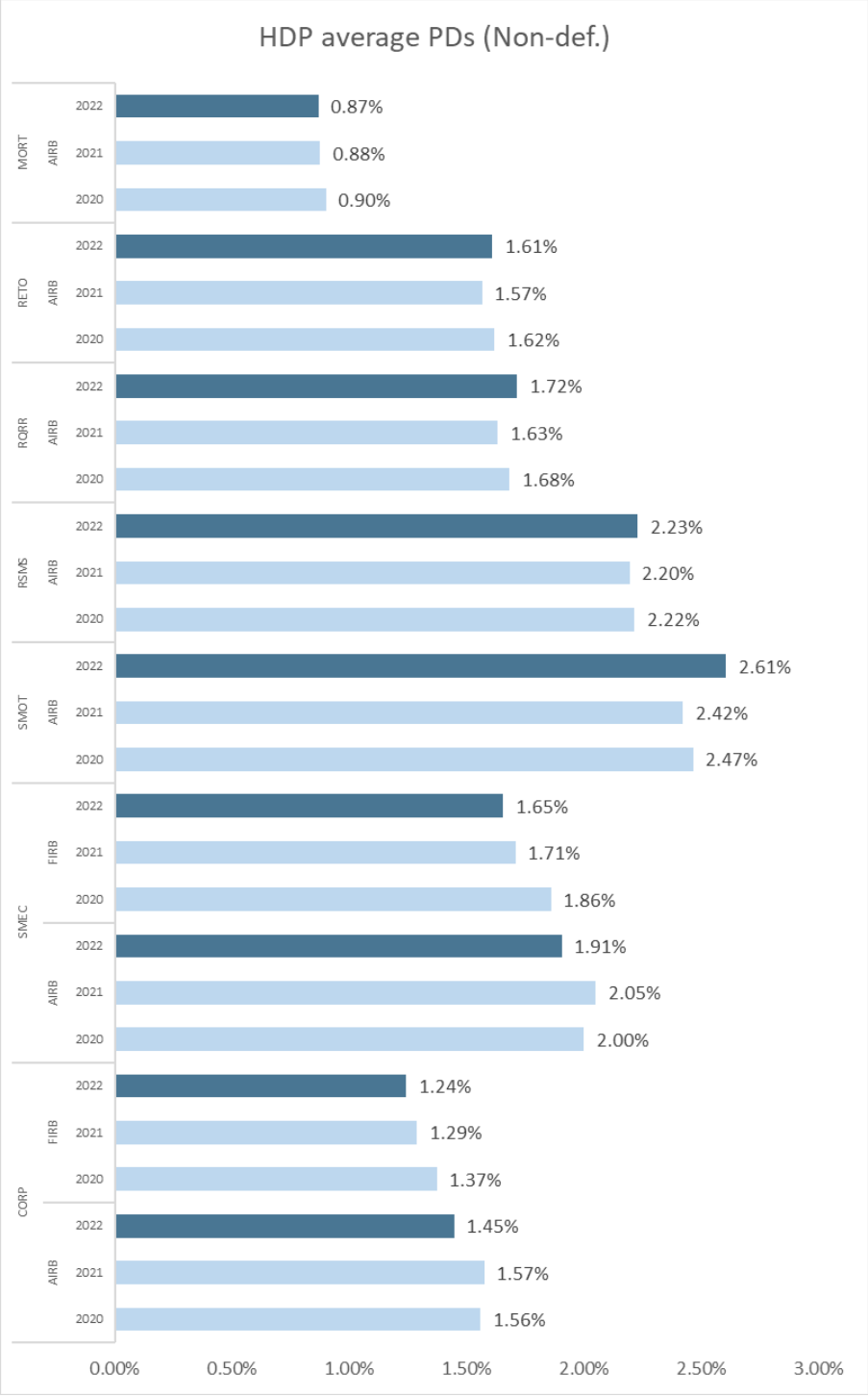
Source: Benchmarking DB

9. When analyzing the above charts, it should always be noted that they illustrate the EAD and not the Exposure. In fact, the EAD may be different than the original exposure for example in case of unfunded credit risk mitigation which might have an effect on the EAD (for example when the guarantor is in standardized approach or banks use the CRM substitution approach).

10. The significant decline in Exposure at Default (EAD) in default, coupled with the slightly increasing trend in performing EAD, are elements that deserve ongoing monitoring and attention from supervisors. Specific attention should be paid for example to the fact that the decreasing trend of default rates since covid might reduce excessively the IRB parameters, overestimating the cyclical decrease of RWA.

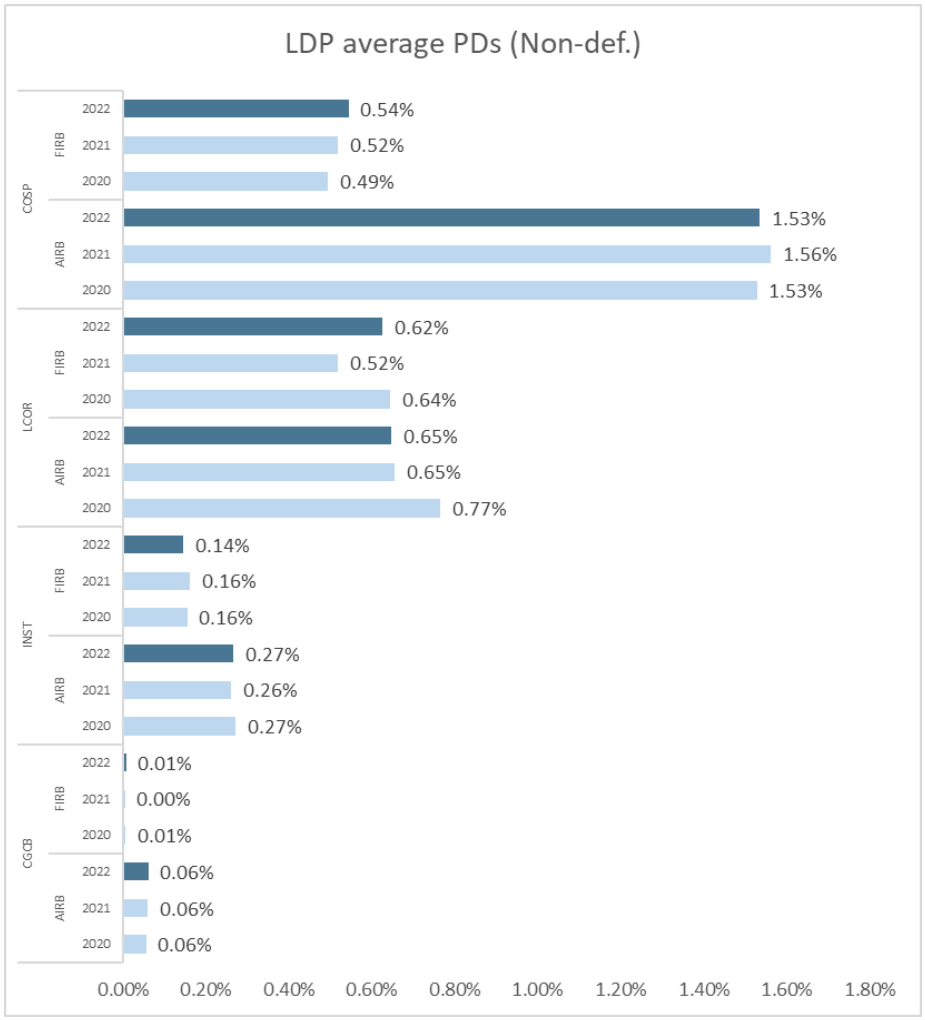
11. The following graphs show the trend of EAD weighted Probability of Default (PD) over the last 3 benchmarking exercises. We do not observe yet a significant increase in PD by end 2022, except a slight increase for revolving exposures (RQRR) and SME other retail (SMOT), despite the start of restrictive monetary policy and the continuation of geopolitical issues by end 2022 which, combined with the end of States' support measures related to the pandemic crisis, should have created an expectation of increasing default rates. We even notice a decrease in EAD weighted PD for mortgages (MORT), SME corporate (SMEC), corporate (CORP), large corporate (LCORP), whereas the slight increase for Other retail (RETO) and large corporate (LCORP) FIRB observed by end 2022 do not compensate yet the decrease occurred in 2021 during Covid. This might be consistent with the fact that this risk parameter reflects a long-run average of default rates and it is not point-in-time by nature, especially for LDP portfolios. However, supervisors should still 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. This is especially important in 2023 due to the material increase in interest rate.

Figure 5: CHANGE IN EAD-WEIGHTED PD BY REGULATORY APPROACH, NON-DEFAULTED EXPOSURES - HDP



Source: Benchmarking DB

Figure 6: CHANGE IN EAD-WEIGHTED PD BY REGULATORY APPROACH, NON-DEFAULTED EXPOSURES - LDP

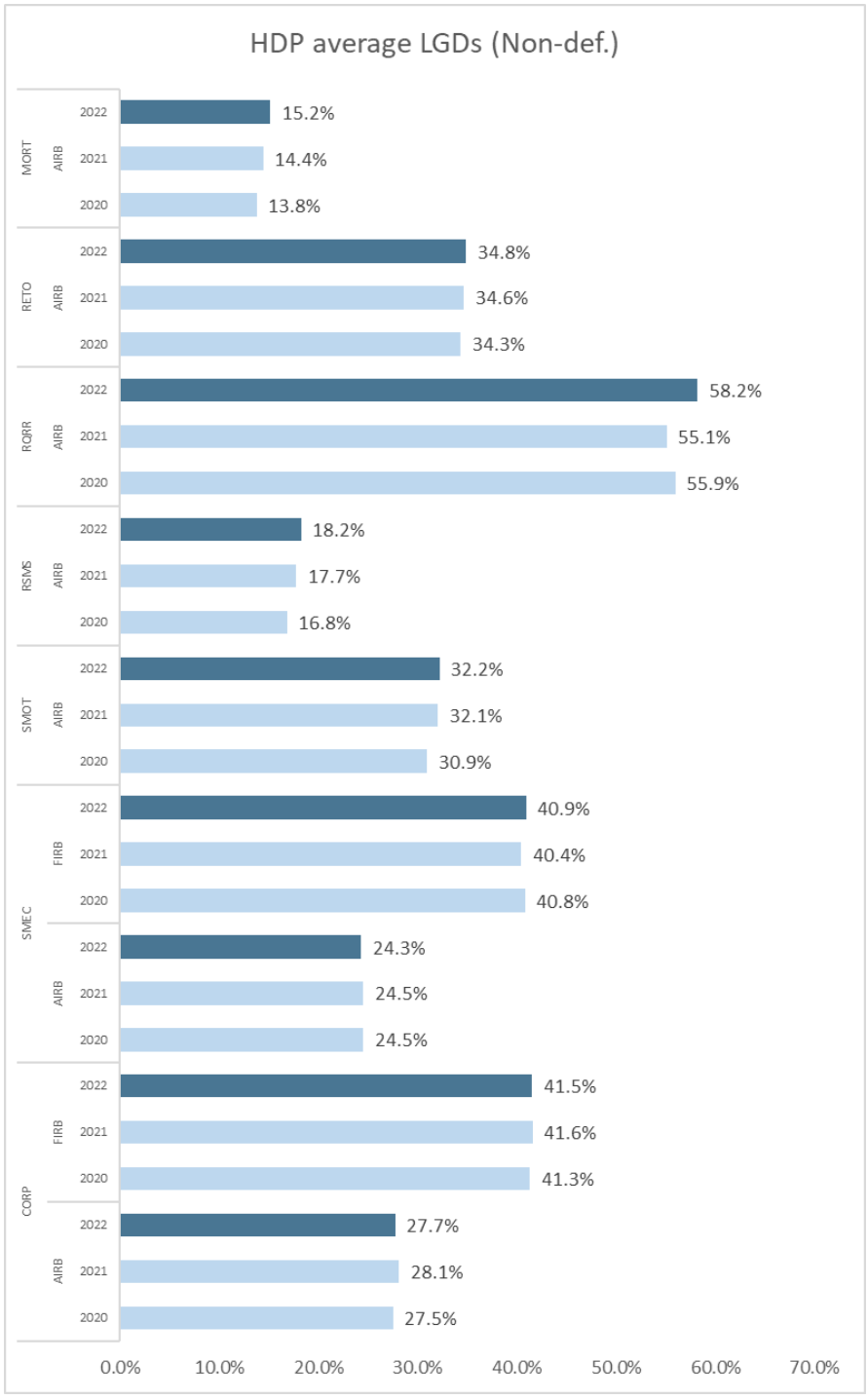


Source: Benchmarking DB

12. By end 2022 we actually still observe decreases in default rates (cfr. Section 2.2.4 "Average PD and default rates by exposure class and country over time (only HDP)" of the chartpack), especially for SME mortgages (RSMS), revolving exposures (RQRR) and SME corporate (SMEC). But we also already note some increases in default rates even if the trends seem to differ across asset class and countries. We note for example some increases for SME other retail (SMOT) but also in some countries for other retail (RETO), SME corporate (SMEC) and corporate (CORP), which are not always reflected yet in an increase in EAD weighted PD in the relevant countries, especially for corporate and SME corporate (SMEC).

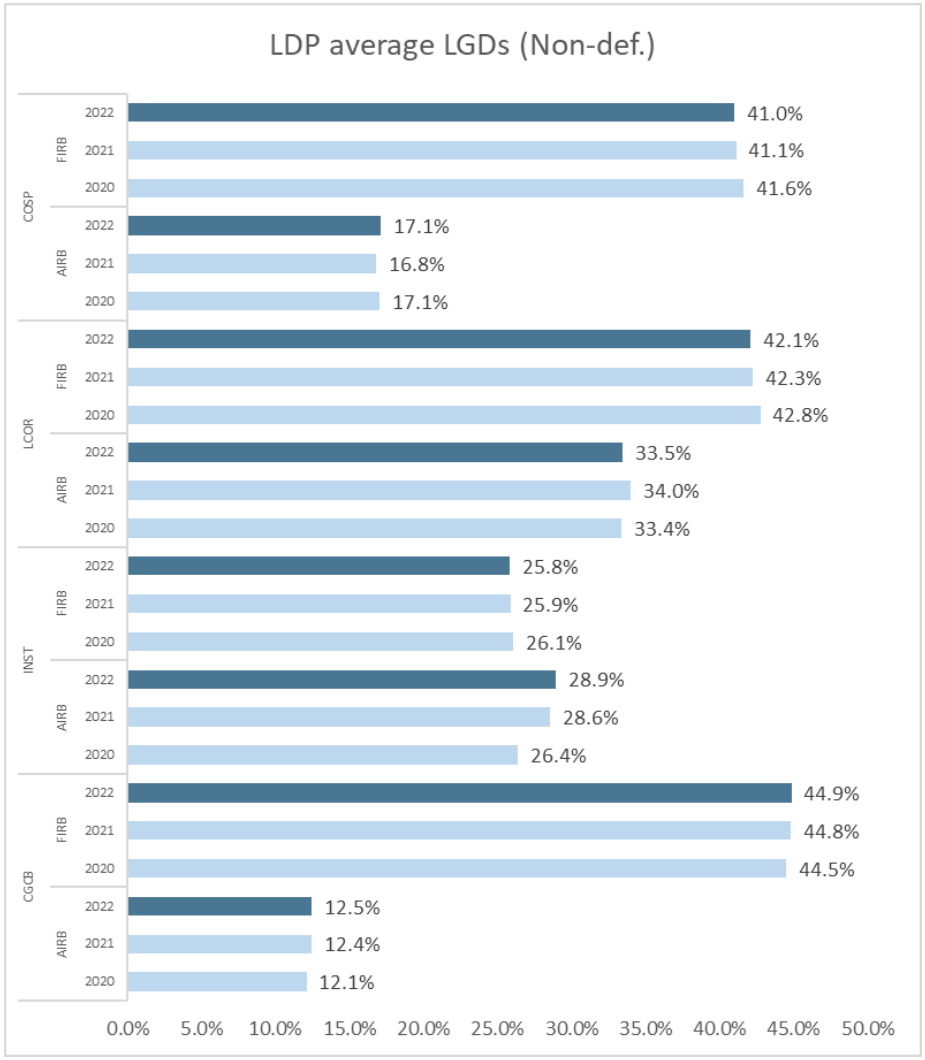
13. The following charts show the trend of LGD parameter for performing exposures both for HDP and LDP portfolios. The LGD is quite stable for all asset classes over the last 3-year horizon. However, we note a very slight increase of LGD for mortgages (MORT) and revolving exposures (RQRR) and SME other retail (SMOT)

Figure 7: CHANGE IN EAD-WEIGHTED LGD BY REGULATORY APPROACH, NON-DEFAULTED EXPOSURES – HDP



Source: Benchmarking DB

Figure 8: CHANGE IN EAD-WEIGHTED LGD BY REGULATORY APPROACH, NON-DEFAULTED EXPOSURES – LDP



Source: Benchmarking DB

3. The IRB Roadmap impact on IRB Risk Parameters

14. In February 2016, the EBA set out an IRB roadmap, which outlines the regulatory journey and strategic direction for implementing and enhancing IRB approaches in the banking sector. This roadmap encompasses a series of milestones and initiatives aimed at strengthening the risk sensitivity and comparability of IRB models across EU institutions. The IRB roadmap also emphasizes the importance of fostering consistency in supervisory practices and approaches, thereby promoting a level playing field among European financial institutions. The IRB roadmap has envisaged the development and publication of a series of regulatory products to achieve the predefined objectives. Below is the list with their respective implementation dates:

Table 2: Regulatory products of the EBAs IRB roadmap

Phase	Regulatory products (amendments)	Implementation date for institutions
Phase 1: IRB assessment methodology	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[6]
Phase 2: definition of default	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[7]
	GL under Article 178(7) on the application of the definition of default	
Phase 3: risk parameter estimation and treatment of defaulted assets	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 01/2022[8]
	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
		To be applied since 01/2022

[6] EUR-Lex - 32022R0439 - EN - EUR-Lex (europa.eu)

[7] EBA publishes report on progress made on its roadmap to repair IRB models | European Banking Authority (europa.eu)

[8] For most IRB models. Details published here EBA publishes report on progress made on its roadmap to repair IRB models | European Banking Authority (europa.eu)

Phase	Regulatory products (amendments)	Implementation date for institutions
	GL on downturn LGD estimation (an addendum to the GL on PD and LGD estimation)	
Phase 4: credit risk mitigation	Guidelines on credit risk mitigation for institutions applying the IRB approach with own estimates of LGDs	To be applied since 01/2022

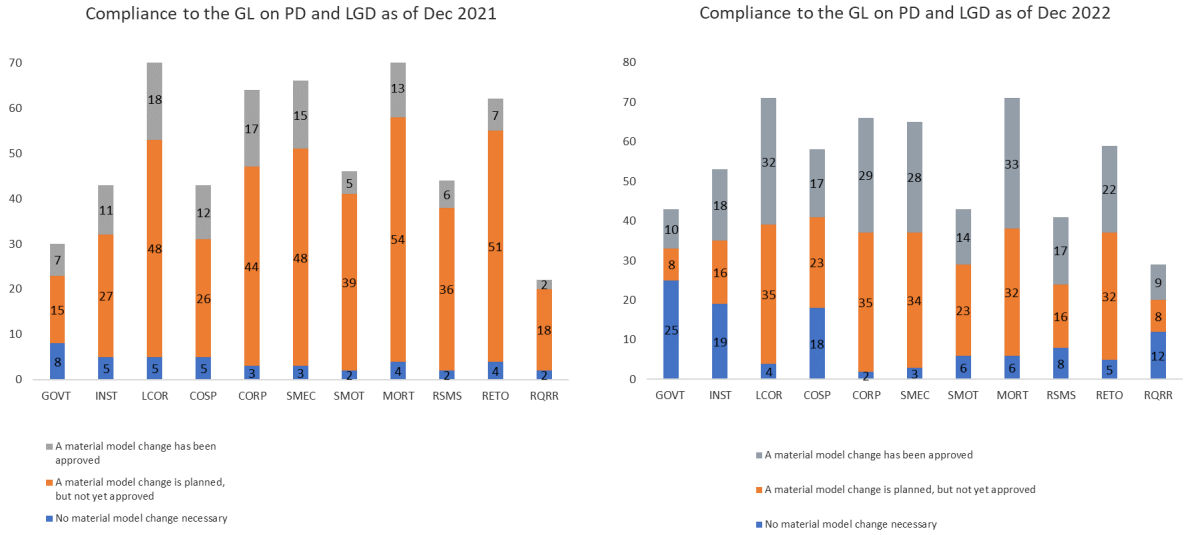
15. Against this backdrop, the EBA is committed to monitoring the implementation status of the IRB roadmap by financial institutions, providing an annual status update in this report.

3.1 Status Implementation of IRB Roadmap

16. Article 78(4) of the CRD requires CAs to make an assessment where institutions diverge significantly from the majority of their peers or where there is little commonality in approach, leading to a wide variance in results. In these cases, the CAs should investigate the reasons and take corrective action if the institution's approach leads to an underestimation of own funds requirements that is not attributable to differences in the underlying risks.

17. In order to facilitate the transfer of the information gathered in these assessments from the CAs to the EBA, the EBA issued a questionnaire to the CAs, which had to be completed for each institution participating in the SVB exercise. The EBA received the responses for 91 institutions. In this context, CA and supervisors have been requested to provide information on the state of implementation of model changes to achieve compliance with the Guidelines on Probability of Default (PD) and Loss Given Default (LGD), one of the key regulatory products of the IRB Roadmap. The following presents the comparison between the previous year and the current year:

Figure 9: Comparison of the state of compliance with the GL on PD and LGD for material models



source: Benchmarking DB

18. As evident from the chart, the share of 'material model changes that have been approved' has increased for all asset classes, indicating that the implementation of the IRB roadmap is progressing, although a remaining portion categorized as 'material model change is planned but not yet approved.' It is important to note that the category 'material model change is planned but not yet approved' also includes all completed inspections for which the final authorization to use the validated models for calculating the credit risk capital requirement has not yet been received by the institution.

19. During the 2023 benchmarking exercise several institutions explained that at the reference point in time (31.12.2022) for the data collection some of their models were still non-compliant. The different pace of reaching compliance with the IRB roadmap may limit the possibility to observe trends in the variability of own fund requirements.

20. In fact, the feedback received in the 2023 benchmarking exercise shows that the IRB repair program is still being implemented with supervisors even indicating in one case that final compliance will only be reached for a material retail portfolio in 2025. While the finalization of the implementation was expected by 01.01.2022 for most models by the regulator, supervisors and institutions seem to need significantly more time for the relevant adjustments.

3.2 Interaction between outlier values and model weaknesses

21. During the credit risk benchmarking exercise, supervisors are asked to assess in more detail significant deviations (so called outlier values) from the benchmarks provided by the EBA. Outlier values can often be justified by a different risk profile of the underlying portfolio. The 2023 exercise revealed a number of cases where the outlier values were produced by IRB models for which model weaknesses had already been identified via internal model investigations.

22. In this context, supervisors pointed out the supportive nature of the newly introduced benchmarks on conservatism incorporated in relevant risk metrics. Considering these benchmarks emphasized in at least one case the supervisor's concern of a potential underestimation of the impact of an economic downturn on LGD and of the adequacy of the quantification of a margin of conservatism (MoC).

23. In all cases it seems that add-ons have been imposed to account for the identified but not yet corrected weaknesses. EBA has no insight into the quantification methodologies of these add-ons nor on their comparability across IRB models and banks. It could however be observed that in most cases the add-ons are implemented via a multiplier to the IRB risk parameters, whereas in 2 cases the add-ons were reflected via the SREP process.

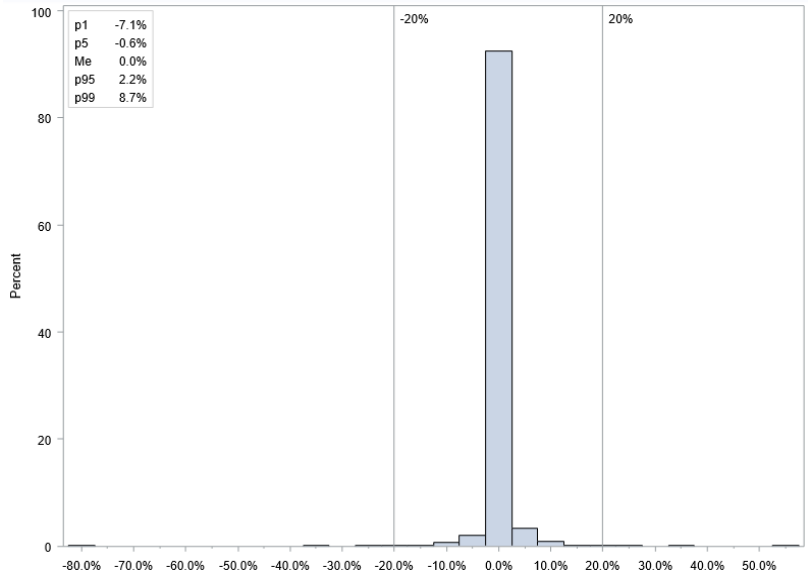
24. In conclusion, as there is no European guidance or policy for the quantification of such add-ons (except for the downturn LGD estimation), the MoC frameworks should be monitored by supervisors, and efforts should be made to ensure that they do not contribute to increasing the variability in own funds requirements. In this regard, the present report includes a comparative analysis in the section "Regulatory PD vs PD without MoC" between PD with and without margin of conservativism.

4. Chapter 3 – Variability over time

25. This section presents the time series of a measure of the variability of the estimated risk parameters. The aim is to verify the possible presence of trends in the variability. The period considered is 31/Dec/2015 – 30/Jun/2023 on quarterly basis[9]. The level of consolidation considered is the highest at the EU level (subsidiaries of EU banks are excluded). AIRB and FIRB institutions are considered. A consistent sample of reporting institutions for each asset class was considered. Banks reporting anomalous quarter on quarter (QoQ) variations of the average parameter at asset class level were excluded, the Table 3 below provides the details of the number of banks excluded It can be noticed that for each asset class the sample represents more than 90% of the total EAD.

26. The measure of the variability represented is the coefficient of variation (standard error over the simple average). The normalization of the standard error by the average permits to represent all the figures with the same scale, in turn this simplifies the comparisons between different asset classes and parameters. The asset class Sovereigns was excluded because of the limited number of banks. To reduce the effect of mergers & acquisitions operations the QoQ variation of the Total Assets at bank level were considered. The following chart shows the distribution of the QoQ variation of the Total Assets: 98% of the observations are in the range -7.1% - 8.7%. Institutions were excluded from the sample if a QoQ variation lower than -20% or higher than 20% was observed.

Figure 10: IRB banks, distribution of the QoQ variation of the Total Assets, 2015Q4 - 2023Q2



Source: Corep templates C.08.02

[9] In comparison with the Section 1, it is possible to extend to 2015 the analysis because only data stemming from IRB institutions is needed.

27. The following table shows the size of the sample for each asset class and the share of EAD covered by the sample with reference to end 2022.

Table 3: Composition of the sample used for the analysis of the risk parameters' variability over time

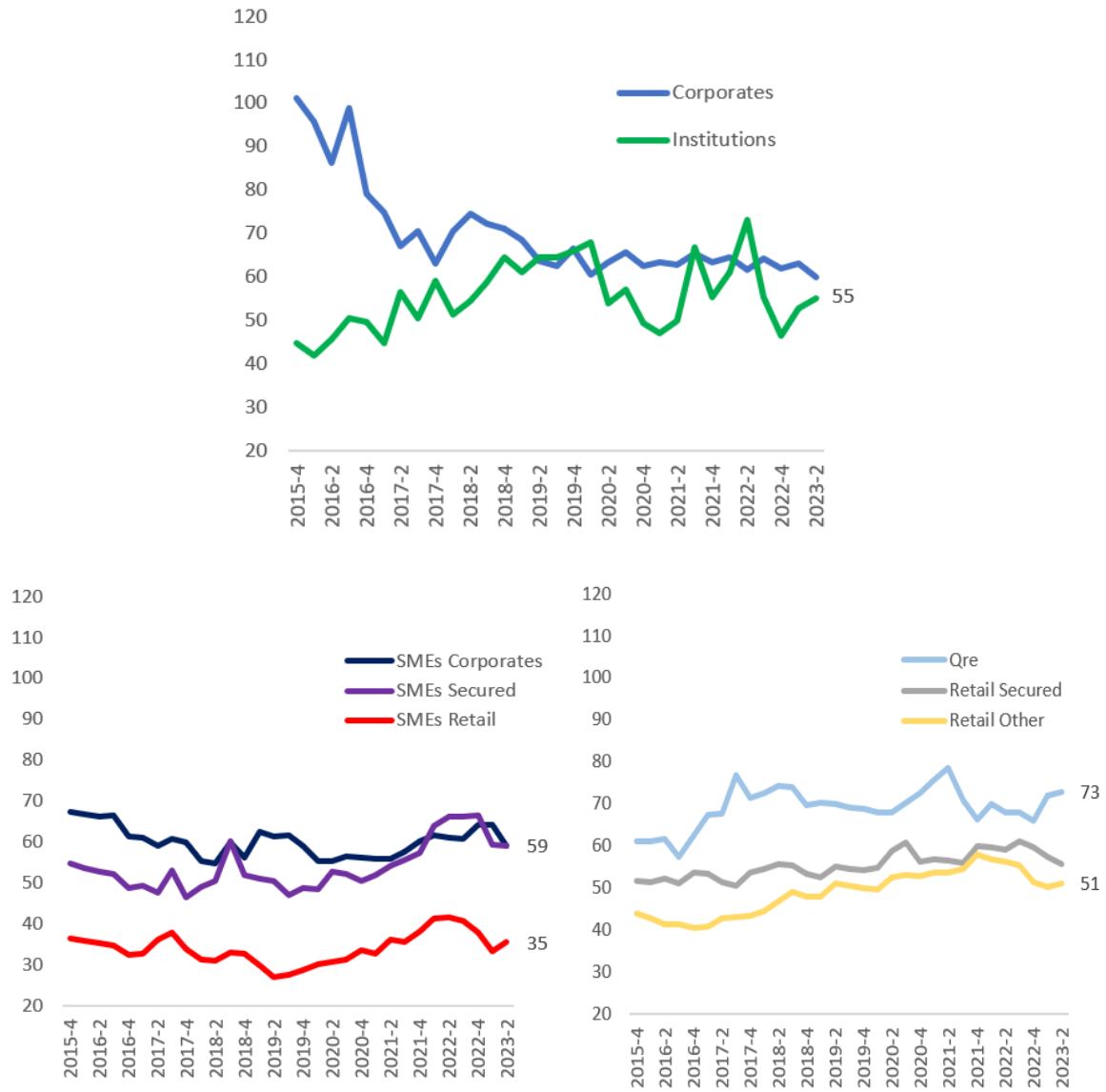
Asset Class	Sample size	%Ead at end 2022	Banks excluded
Institutions	23	90%	12
Corporates	40	94%	11
Sme Corporates	41	96%	8
Sme Retail	31	97%	9
Secured Sme Retail	31	97%	9
Secured Other retail	36	95%	10
Qre	21	96%	6
Other Retail	32	96%	10

Source: Corep templates C.08.02

4.1 The variability of the PD

28. In the following charts, the variability of the PDs reported by the institutions (EAD weighted average at asset class level) is represented in terms of coefficient of variation (standard deviation divided by the average). It can be noted that the coefficient of variation is between 50 and 75 for most asset classes. It is lower for the asset class SMEs treated as retails and higher for the asset class Sovereigns. For Corporates a reduction in variability is observed in the period considered while for the other asset classes the variability appears more stable.

Figure 11: Coefficient of variation of the estimated PD

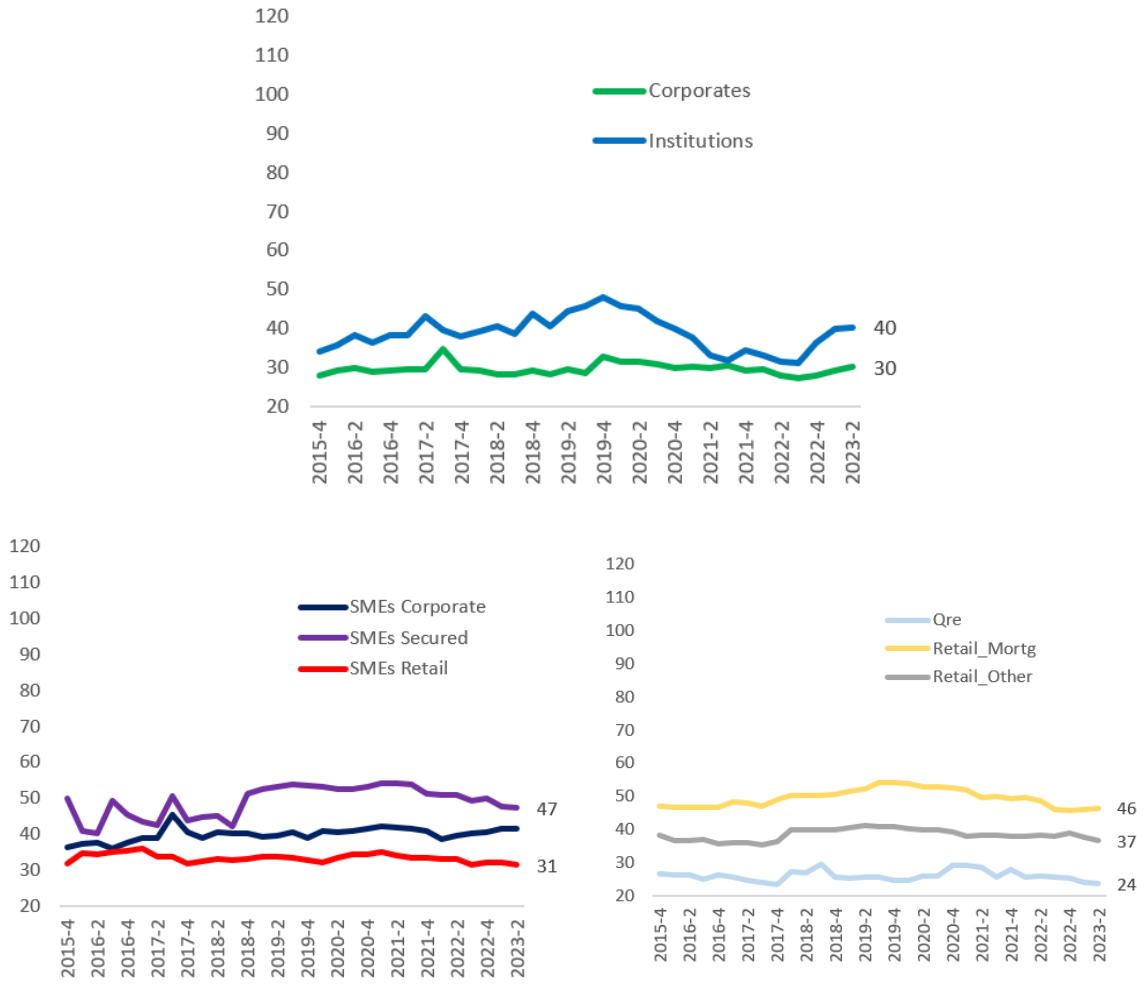


Source: Corep templates C.08.02

4.2 The variability of the LGD

29. Starting from the same sample defined for the PD analysis, FIRB banks were excluded for producing the figures of the next charts. The coefficient of variation is between 20 and 60 for most asset classes and appears quite stable.

Figure 12: Coefficient of variation of the estimated LGD



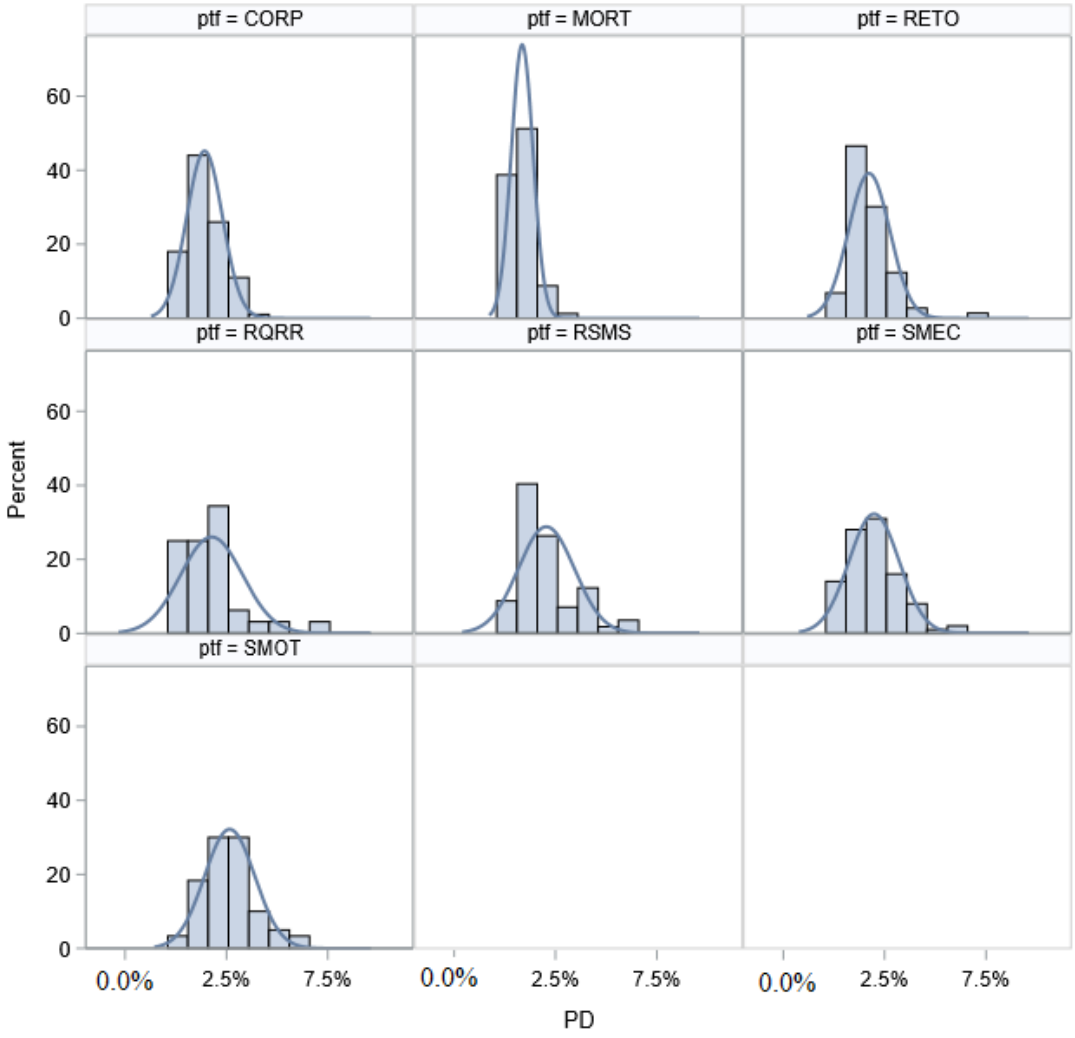
Source: Corep templates C.08.02

5. PD

5.1 Comparability of PD vs Default Rates

30. Given asset classes that are homogeneous in terms of technical facility types and borrowers, the observed variability of the average PDs reported by the IRB banks (see the Figure below) should be explained by the underlying risk level. To verify this hypothesis, we can use the average yearly default rate observed in a given period of time.

Figure 13: Distribution of the average estimated PD by asset class



Source: Benchmarking DB

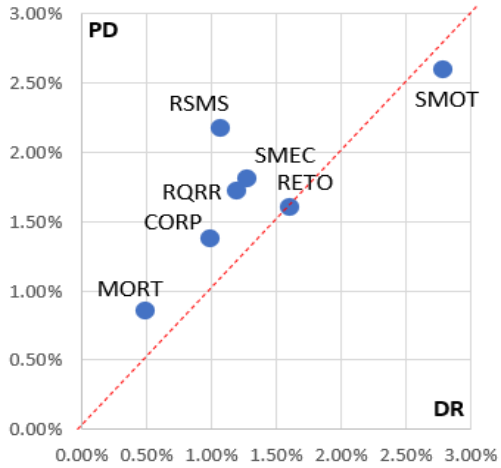
31. It must be remembered that the IRB risk parameters are meant to provide long run risk measures. For this reason, considering the default rate of a given year would not be appropriate, instead the PDs are compared with the average of the yearly default rates

observed over five years. It can be noticed from the figure below, that on average, the PDs are higher than the average default rates for most of the asset classes.

Table 4: Average PDs vs average Default rates

	Avg PD (wgt by Ead)	Avg 5-years DR (wgt by Ead)
CORP	1.38%	0.99%
MORT	0.86%	0.49%
RETO	1.61%	1.60%
RQRR	1.72%	1.19%
RSMS	2.18%	1.07%
SMEC	1.81%	1.27%
SMOT	2.60%	2.78%

Figure 14: Average PDs vs average Default rates



Source: Benchmarking DB

32. By sub-setting the institutions reporting the data for a given asset class on the ground of the reported average default rate, we would expect to observe a similar differentiation in terms of the reported PD. Indeed, an increasing trend can be noticed for some of the asset classes, however, it can also be noticed that the differentiation between the groups[10] is sometimes limited and in some cases is not coherent with the default rates: for example: the two central clusters for the Corporates asset classes differ by just 4 basis point (1.34% vs 1.38%), for retail other (RETO) the average PD of the first quartile DR cluster is higher than the average PD for the second quartile, whereas for SME mortgages (RSMS) and SME other retail (SMOT) the average PD of the last quartile DR cluster is lower than the average PD for the third quartile.

[10] The segmentation into groups enables to do the comparisons in terms of averages which reduces the impact of any outliers. Alternatively, a regression analysis could be done and indeed in Table 6 also the R-squared of such regression analysis is shown.

Table 5: Average PD by cluster of average Default rate

	Cluster	Nr of banks	Avg PD	Avg Dr5y
CORP	DR5y < Q1	24	0.97%	0.00%
	DR5y ϵ [Q1,Me)	25	1.38%	0.22%
	DR5y ϵ [Me,Q3)	24	1.34%	0.75%
	DR5y ≥ Q3	25	1.91%	2.33%
MORT	DR5y < Q1	19	0.64%	0.09%
	DR5y ϵ [Q1,Me)	20	0.69%	0.30%
	DR5y ϵ [Me,Q3)	19	0.83%	0.51%
	DR5y ≥ Q3	20	1.24%	0.89%
RETO	DR5y < Q1	15	1.72%	0.12%
	DR5y ϵ [Q1,Me)	20	1.47%	0.55%
	DR5y ϵ [Me,Q3)	18	1.80%	1.13%
	DR5y ≥ Q3	18	1.95%	2.94%
RQRR	DR5y < Q1	8	1.59%	0.06%
	DR5y ϵ [Q1,Me)	8	1.08%	0.02%
	DR5y ϵ [Me,Q3)	8	1.78%	0.00%
	DR5y ≥ Q3	8	2.60%	0.01%
RSMS	DR5y < Q1	14	1.50%	0.20%
	DR5y ϵ [Q1,Me)	15	2.90%	0.62%
	DR5y ϵ [Me,Q3)	14	3.87%	1.17%
	DR5y ≥ Q3	15	2.84%	1.93%
SMEC	DR5y < Q1	24	1.73%	0.01%
	DR5y ϵ [Q1,Me)	25	1.45%	0.39%
	DR5y ϵ [Me,Q3)	24	2.03%	1.24%
	DR5y ≥ Q3	25	2.69%	2.70%
SMOT	DR5y < Q1	15	2.58%	0.23%
	DR5y ϵ [Q1,Me)	15	2.37%	1.01%
	DR5y ϵ [Me,Q3)	15	3.87%	1.72%
	DR5y ≥ Q3	16	3.30%	4.12%

Source: Benchmarking DB

33. It is possible to obtain a decomposition of the total variance of the PD in two components: The “between variance” reflects the distance between the clusters in terms of PD. The higher this distance is , the greater is the contribution of the average default rate to explain the variability of the PDs. The “within variance” is the average of the variances observed in each cluster. This is the component of the variance that is not explained by the average default rate.

34. The following table shows the share of variance that is explained by the average default rate. The null hypothesis is also tested that all the clusters’ averages are equal against the alternative hypothesis that at least one average is statistically different from the others. The share of variance explained is lower than 20% for all the asset classes. The table reports also the explained variance (the R-squared coefficient) of a regression between the banks estimated PDs and the average default rates. The evidence that most of the variance remains within the clusters seems to confirm that there are factors other than the average default rate explaining the variability of PDs. Some of them might be partially due, for example when banks use a longer time series of default rates to calibrate their PD. But others might less reflect difference in the underlying risk profile of banks’ portfolio. The next section investigates for example the dispersion of the margin of conservatism applied by banks and Supervisors and which might partially imply undue variation of RW across EU banks.

Table 6: Share of variance of the PD explained by the average default rate

	F Value	Pr > F	Explained Variance	R^2 (1)
CORP	5.4	0.2%	14.7%	20.3%
MORT	5.87	0.1%	19.2%	24.6%
RETO	0.73	54.1%	3.1%	0.0%
RQRR	1.43	25.4%	13.3%	13.0%
RSMS	0.78	51.1%	4.1%	1.4%
SMEC	5.22	0.2%	14.3%	2.9%
SMOT	1.22	31.2%	6.0%	0.2%

(1) R^2 of a regression of the PD against the average default rate over 5 years

Exec

Source: Benchmarking DB

5.2 Regulatory PD vs PD without MoC

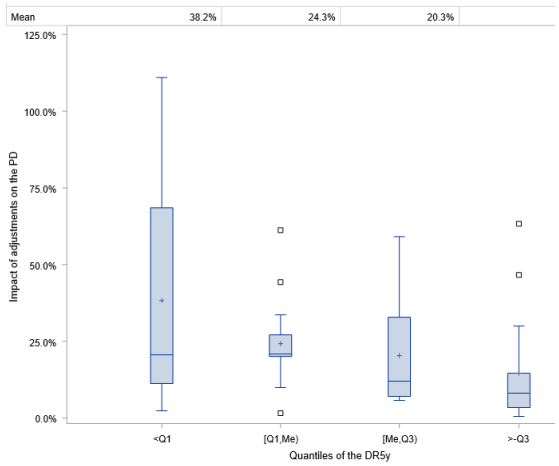
35. The available data includes a measure of the PD net of prudential adjustments. Unfortunately, this information was available only for half of the banks.

36. The figure below shows the impact (in terms of relative difference) of such adjustments that clearly can be material. It is also worth noticing that the impact appears on average higher and more disperse in conjunction with lower default rates (except for revolving exposures and SME other retail). This may indicate that in the presence of evidence of low risks, banks tend to increase the level of corrections[11]. This tendency, expected from a prudential point of view, can however contribute to loosening the relationship between PD and default rates and to increasing the overall variability.

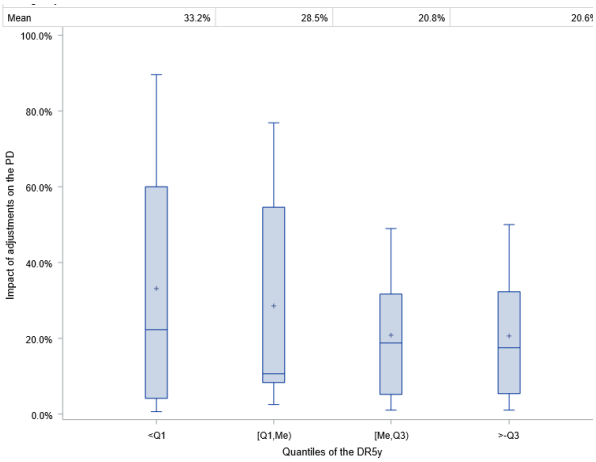
[11] According to the EBA Guidelines on PD and LGD estimation, the fewer the data the greater the MoC should be.

Figure 15: Impact of the prudential adjustments over the estimated PD

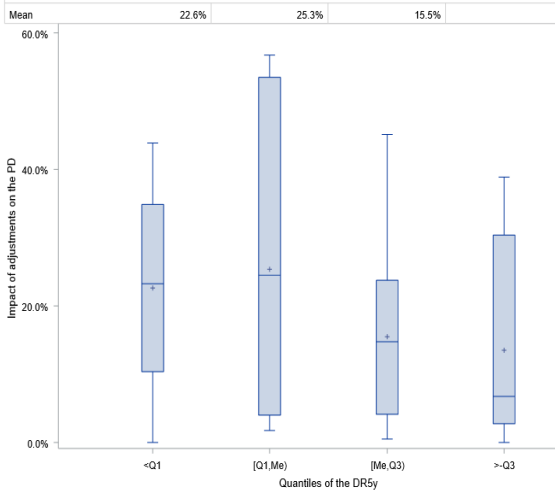
CORP



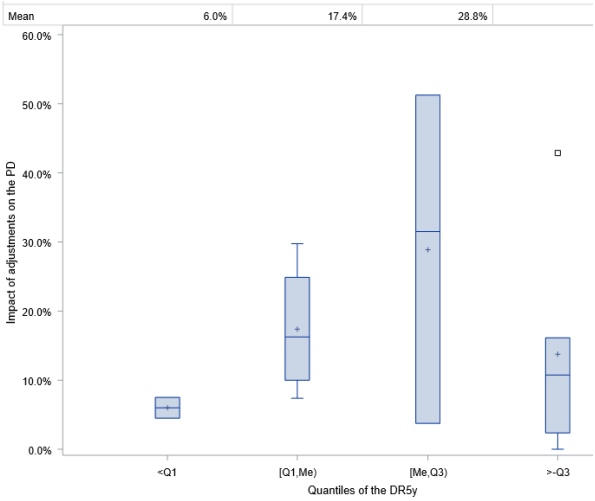
MORT



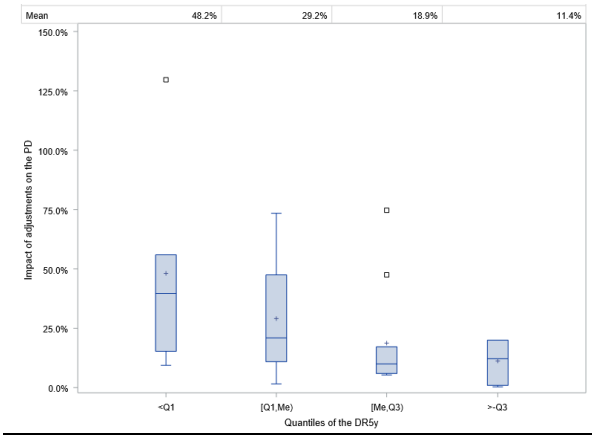
RETO



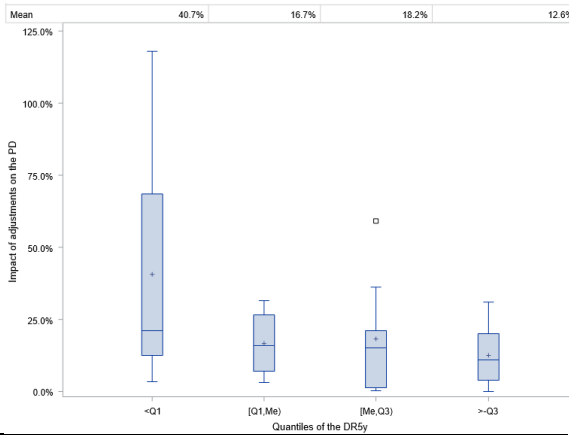
RQRR



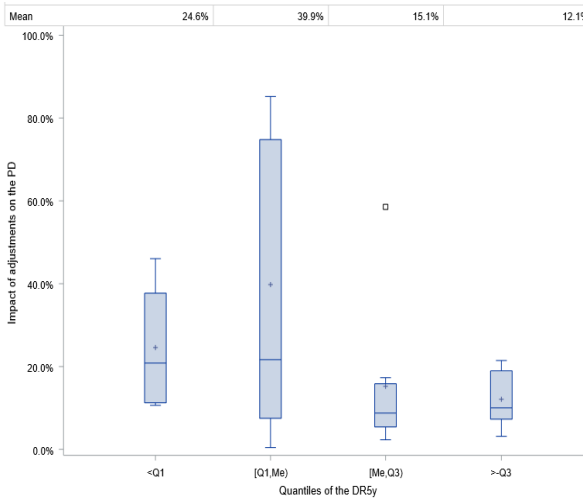
RSMS



SMEC



SMOT



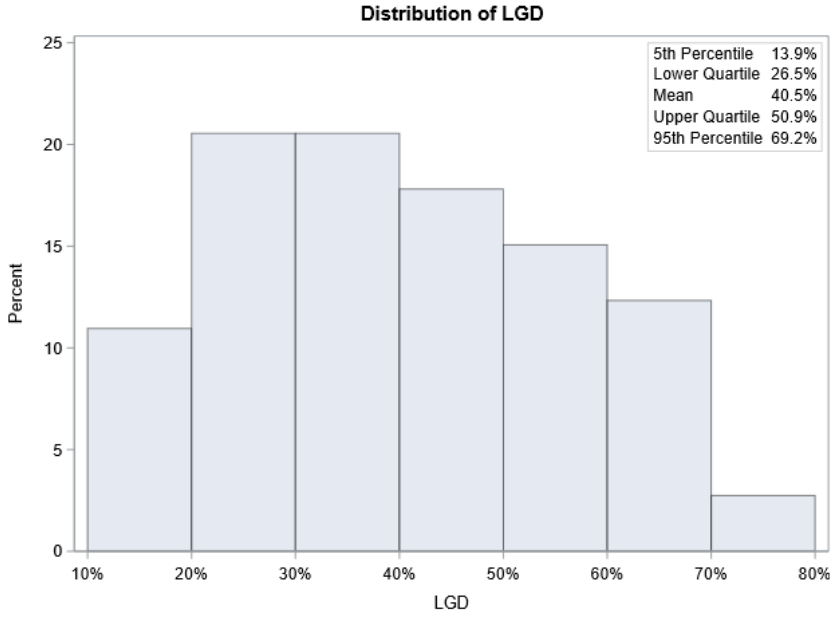
Source: Benchmarking DB

6. The LGD of the Other Retail portfolio

6.1 Drivers of the variability in LGD

37. The other retail asset class includes a wide variety of technical forms of consumer credit. Furthermore, the collateralisation can be very different in terms of type and degree of coverage. For these reasons it is reasonable to expect a certain variability in the LGD estimated by the banks. Indeed, the figure below shows that the average LGD for this asset class is quite dispersed: 90% of the average LGDs are included in a range that spans from 70% and 14%.

Figure 16: Distribution of the average LGD for the asset class other retail



Source: Benchmarking DB

38. Possible drivers of the variability of the estimated LGDs can be the followings.

39. The presence and type of guarantees and the level of collateralization. The information about the guarantees and collateralisation were retrieved from the Corep template C.08.02. The amount of the guarantees and collateralisation is divided by the amount of the Ead.

40. Another driver can be the cure rate, as regards consider the following simplified model where $\mathcal{L}_C$, $\mathcal{L}_{NC}$, CR are the loss in case of a cured default, the loss in case of a not-cured default and the cure rate respectively:

$$LGD_{PE} = CR * \mathcal{L}_C + (1 - CR) * \mathcal{L}_{NC}$$
$$LGD_{NPL} = \mathcal{L}_{NC}$$

Under this model the LGD for performing exposures (LGD_{PE}) depends on the cure rate and the loss in case of a cured default that is not zero (due indirect costs and discounting effect) but it is close to zero, and on the danger rate (the complement to one of the cure rate) and the loss in

case of a not-cured default. The LGD for non-performing exposures (LGD_{NPL}) depends only on the loss in case of a not-cured default. This is an approximation, considering that defaults can still be cured. However, as we are dealing with the stock of non-performing exposures, it is reasonable to assume that long-lasting defaults carry a higher relative significance. By computing the ratio: LGD_{PE}/LGD_{NPL} it is easy to see that we obtain:

$$LGD_{PE}/LGD_{NPL} = CR * \mathcal{L}_C/\mathcal{L}_{NC} + (1 - CR) * \mathcal{L}_{NC}/\mathcal{L}_{NC} = \\ = CR * \mathcal{L}_C/\mathcal{L}_{NC} + (1 - CR)$$

Now, by assuming that $\mathcal{L}_C$ is practically zero, it is easy to obtain:

$$1 - \frac{LGD_{PE}}{LGD_{NPL}} = 1 - (1 - CR) = CR$$

41. Another possible driver is the average size of the exposures because fixed recovery costs have higher impacts on the LGD when the size of the exposure is limited. The average size of the exposure can be computed by dividing the Ead by the number of borrowers.

42. A further driver is the average time needed for the recovery process due to the discounting effects. The average time to recovery is available in the Finrep template F.47.

43. Below it is possible to see the results of a linear regression (parameters estimated by OLS) between the LGD and the selected risk drivers. First of all, it can be noticed that all the estimated parameters are negative as it could be expected. Second, some of them are significantly different from zero (the cure rate, the share of financial and other collateral). For example, an increase in the cure rate of 10 percentage points is expected to shape a reduction of the LGD by 5 percentage points. The explained variance is higher than 30%. Notice that the residuals appear approximately normal which reinforces the reliability of the inference about the parameters.

Table 7: Regression analysis of the LGD

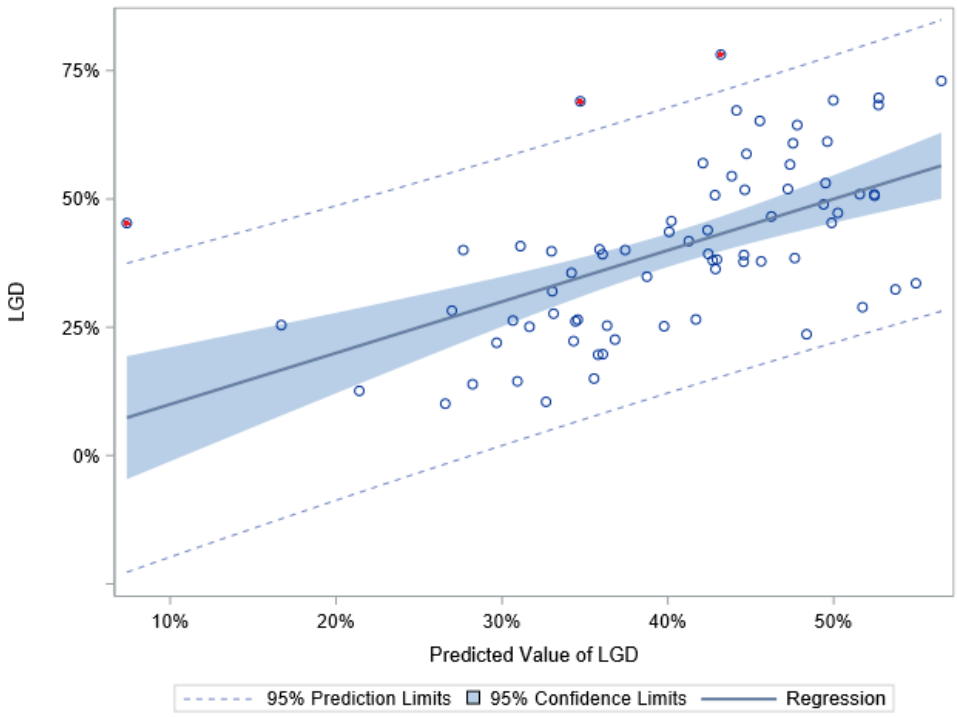
Root MSE	0.14362	**R-Square**	0.3153
Dependent Mean	0.40457	**Adj R-Sq**	0.2531
Coeff Var	35.50015		

Parameter Estimates				
Variable	**Parameter Estimate**	**Standard Error**	**t Value**	**Pr > |t|**
Intercept	0.60237	0.05088	11.84	<.0001
RealGar	-0.08237	0.10174	-0.81	0.4211
FinGar	-0.43172	0.15180	-2.84	0.0059
OthGar	-0.10470	0.03910	-2.68	0.0093
time	-0.00310	0.00607	-0.51	0.6114
cr_proxy	-0.47666	0.11723	-4.07	0.0001
avg_ead	-0.00000126	0.00000109	-1.15	0.2530

Source: Benchmarking DB and Corep

44. Another important, residual driver of the observed variability could be the presence of reporting errors. The last chart shows the comparison between the reported values and the values predicted by the model together in a 95% confidence level bounds. Observations outside such bound could be investigated as possible outliers due to misreporting.

Figure 17: Regression analysis of the LGD: actual vs predicted values



Source: Benchmarking DB and Corep

6.2 Heterogeneity in Retail Exposure class

45. As anticipated in the previous section, the 2023 benchmarking exercise revealed some possible inconsistencies in the assignment to the retail sub exposure classes. Depending on their nature as an exposure secured by immovable property, a qualified revolving exposure or any other retail exposure, the own funds requirements for retail exposures are calculated with different correlation factors.

46. This year's analysis revealed that the criteria how to assign retail exposures to the above-mentioned sub-exposure classes may not be fully consistent across institutions. Generally, the rules for assignment to retail sub exposure classes are set out in Article 154 of the CRR and more guidance is laid down in in the RTS on Assessment Methodology in Article 65. Specifically, Article 65(4)(b) provides guidance for the assignment of exposures to the exposure class "Retail - secured by immovable property". This Article requires competent authorities to verify the correct assignment to the exposure class "Retail - secured by immovable property" by verifying that all exposures where the immovable property collateral is used in the own-LGD estimates in accordance with 181(1)(f) of Regulation (EU) No 575/2013, a coefficient of correlation as referred to in Article 154(3) of Regulation (EU) No 575/2013 is assigned.

47. In addition, for the reporting the COREP instructions in paragraph 76 of Annex II to Commission Implementing Regulation (EU) 451/2021 (COREP ITS), clarify that retail exposures secured by immovable property shall be considered any retail exposures secured by immovable property recognised as collateral, regardless of the ratio of the value of collateral to the exposure or of the purpose of the loan.

6.2.1 Real estate collateral reported for RETO portfolios

48. Several institutions reported real estate collateral under *"Credit risk mitigation techniques taken into account in LGD estimates excluding double default treatment"* in column 0190 of C08.01a(0016) for exposures reported in C08.01a(0017) of the COREP framework, i.e. they report Retail - Other SME/non-SME exposure where real estate collateral is taken into account in the LGD. This is inconsistent to the above outlined guidance that requires the assignment to the exposure class "Retail - secured by immovable property" in this case.

49. Therefore, the nature of the exposure reported as Retail - Other SME/non-SME and collateralised by real estate and the LGD variability of this exposure class has been analysed in more depth in the previous section 6.1 and certainly, this phenomenon will be monitored in the future to ensure the comparability of these LGD estimates.

50. In conclusion, more clear guidance on this aspect may be needed. First, to ensure that any retail exposure secured by immovable property recognized as collateral is assigned to the exposure class "Retail- secured by immovable property". And second, for the assignment to either MORT, RETO or RQRR, to ensure a consistent interpretation of the nature of unsecured exposure. In other words, if an institution decides, e.g. for prudential reasons, not to recognise

immovable property in its LGD estimation for consumer credits or credit lines, should such exposure then be understood/reported as unsecured.

Annex I – Data sample

52. The subset (sample) of European institutions which are considered for the analysis provided in this report is obtained from the list of institutions[12] 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 31.12.2022 (the relevant reference date for this report). However, while the published list contains 108 institutions for which a data submission was expected in April 2023, the table below illustrates that only 99 were finally taken into account for this analysis. Of the 108 banks on the list, 4 institutions have been excluded because as of March 31, 2023, they revert back to standard before the remittance date. The other 5 banks were excluded for the following reasons:

- 1 bank for which we didn't receive data due to issues with master data properties;
- 3 banks which have been excluded due to missing information on highest portfolio level, preventing many comparison;
- 1 additional bank excluded because of significant gaps between Corep and Benchmarking.

53. 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).

54. The following table, as previously mentioned, provides an overview of the overall number of participating institutions and how they are distributed across asset classes and approaches (AIRB, FIRB or SLSC).

[12] This list is published on the EBA website: EBA updates list of institutions involved in the 2023 supervisory benchmarking exercise | European Banking Authority (europa.eu)

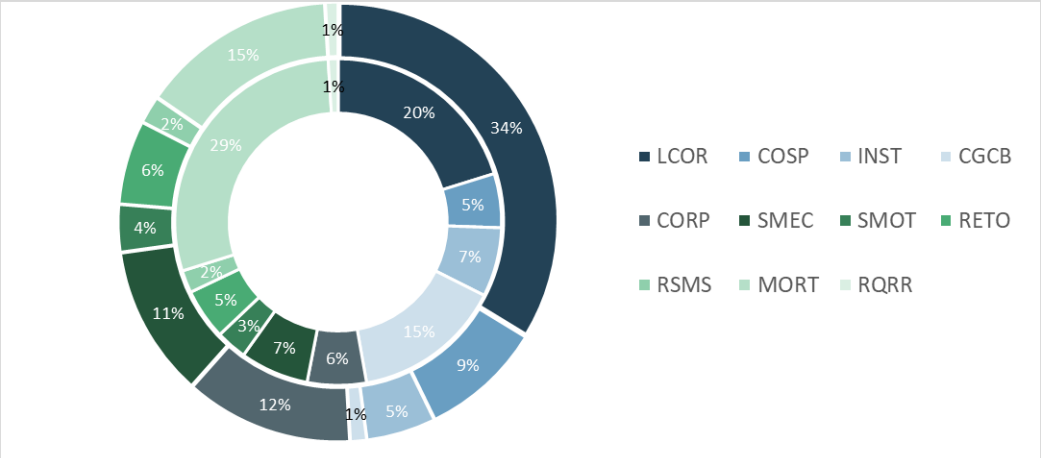
Table 8: USE OF DIFFERENT REGULATORY APPROACHES BY SVB EXPOSURE CLASS

	Exposure Class	AIRB	FIRB	SLSC	Number of participating institutions
LDP	LCOR	49	53	0	80
	COSP	25	19	29	58
	CGCB	13	27	0	33
	INST	20	41	0	49
HDP	CORP	50	48	0	78
	SMEC	50	48	0	78
	SMOT	61	0	0	61
	RETO	71	0	0	71
	RSMS	58	0	0	58
	MORT	78	0	0	78
	RQRR	32	0	0	32
ALL	**ALL**	**90**	**60**	**29**	**99**

55. Figure 17 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 34% against a share of exposure of 20%. 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.

Figure 18: PORTFOLIO COMPOSITION OF RWAS

(OUTER CIRCLE) AND EAD (INNER CIRCLE) FOR HDP AND LDP PORTFOLIOS (DEFAULTED AND NON-DEFAULTED)



Annex II – EAD Misalignment between COREP and Benchmarking

56. Significant deviations have been observed between the exposure at default (EAD) resp. the average IRB parameters (PD, LGD) reported via the COREP reporting framework and those metrics reported via the benchmarking framework (BM). These deviations are concerning as it is a priori unclear which of the reporting's (COREP or BM) contains a reliable value and for many fields the instructions in BM refer to the instructions in COREP which contradicts differences in the values reported in these fields.

57. Concretely such significant deviations of values reported on comparable data fields in the COREP and in the BM data submission were observed for at least 10 institutions in 6 jurisdictions in the data quality assessment. Ideally the reporting and the benchmarking BTS are developed with a common and single data dictionary in the future. Q&As regarding data fields used in both data collections should be revised to ensure their consistency between the frameworks.

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