



DRAFT SKELETON CHART PACK FOR THE 2023 BENCHMARKING – V3.0

Contents

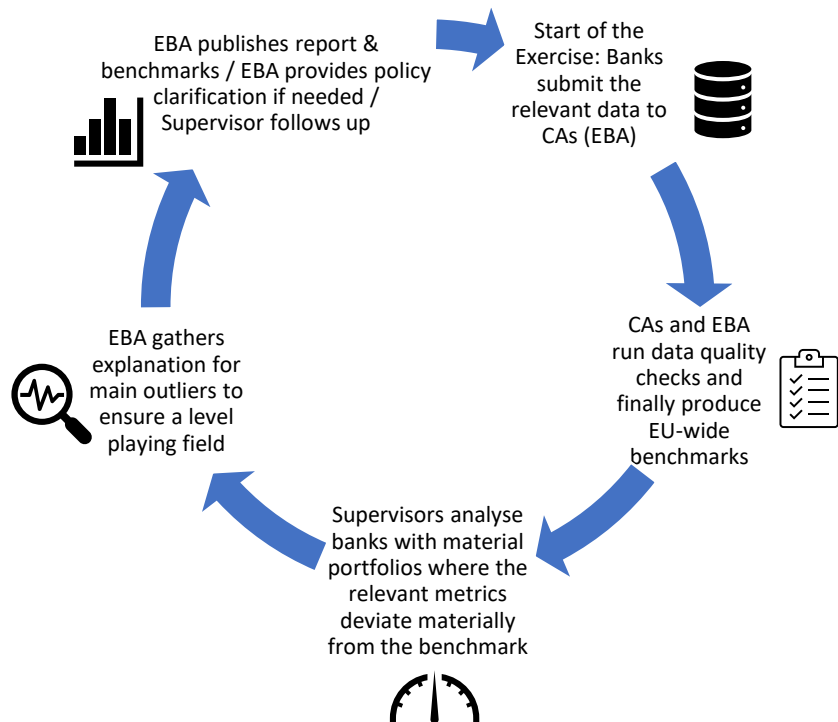
1	General remarks & Terminology	3
1.1	Abbreviations	5
2	Results of the 2023 benchmarking exercise	7
2.1	IRB exposure in the EU – as of 31.12.2022	7
2.1.1	Use of relevant different regulatory approaches (AIRB, FIRB, SLSC)	7
2.1.2	EAD breakdown by type of exposure by institution (LDP, HDP, other)	8
2.1.3	EAD and RWA breakdown by exposure classes over all IRB institutions	8
2.1.4	EAD breakdown by exposure classes (only LDP)	9
2.1.5	EAD breakdown by exposure class (only HDP)	9
2.1.6	EAD breakdown by country for each exposure class	10
2.1.7	EAD breakdown of secured exposure by collateral type	14
2.1.8	Representativeness of the single names	15
2.1.9	EAD development over time by exposure class & default status	16
2.2	IRB key metrics and benchmarks – as of 31.12.202	18
2.2.1	Summary statistics of IRB metrics (GC, RW, PD, LGD) by exposure class and approach	18
2.2.3	Benchmarks for IRB metrics by exposure class over time (for a sub-sample)	19
2.2.4	Average PD and default rates by exposure class and country over time (only HDP)	25
2.2.5	EAD breakdown by master rating grades by exposure class over time (only HDP)	32
2.2.6	Reporting of MoC and supervisory measures	37
2.3	Variability of capital requirements under the IRB – as of 31.12.2022	44
2.4	Variability of IRB key metrics in low default portfolios – as of 31.12.2022	49
2.5	Variability of IRB key metrics in high default portfolios – as of 31.12.2022	52
2.6	Results compared with previous exercise – PD & DR – By exposure class	53
2.7	Variability of capital requirements under the SA – as of 31.12.2022	57

1 General remarks & Terminology

This chart pack provides statistics and charts illustrating the results of the annual supervisory benchmarking (SVB) exercise for IRB models. The main objectives of this exercise are to:

- (i) provide an overview of RWA variability and the drivers thereof for own funds requirements that are calculated based on the IRB;
- (ii) conduct a supervisory assessments of IRB models based on the observation made for each institution in relation to the benchmarks calculated by the EBA and
- (iii) provide evidence to policymakers of the impact of recent policy changes.

The data collection is based on technical standards (ITS) specifically designed for the annual SVB exercises. These ITS specify the data that institutions have to submit for different breakdowns of their IRB portfolio. These breakdowns are specified by, for instance, country, type of collateral, loan-to-value ratio and sector and are provided via the ITS as well. This structure allows to understand the impact of these factors on the different IRB parameters such as PD, LGD and RW estimates. Competent authorities, together with the EBA, are monitoring the risk weighted exposure amounts resulting from the use of the IRB approach for credit risk on a yearly basis. More guidance on the data submission is provided on a [dedicated handbook page](#), which includes Q&As related to the supervisory benchmarking exercise.



The above chart illustrates the annual exercise, the results of which are published in this report. In the beginning of the exercise institutions are requested to submit the relevant data to its CAs (and the EBA). Based on this data submission the EBA calculates benchmarks which are then provided back to the CAs. The CAs use these benchmarks to monitor and assess the risk weighted exposure amounts resulting from the use of internal approaches.

The following table provides an exemplary timeline of the annual exercise (for the exercise in 2023).

Table 1: Timeline of Exercise in 2023

31 December 2022	Relevant reference date for the data
11th April 2023	Remittance date: Start of the Exercise: Banks submit the relevant data to CAs (EBA)
End April – End June	CAs and EBA run data quality checks and finally produce EU-wide benchmarks
July - September	Supervisors analyse banks with material portfolios where the relevant metrics deviate materially from the benchmark
October – December	EBA gathers explanation for main outliers to ensure a level playing field
January 2024 – March 2024	EBA publishes report & benchmarks / EBA provides policy clarification if needed / Supervisor follows up

1.1 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

2 Results of the 2023 benchmarking exercise

2.1 IRB exposure in the EU – as of 31.12.2022

2.1.1 Use of relevant different regulatory approaches (AIRB, FIRB, SLSC)

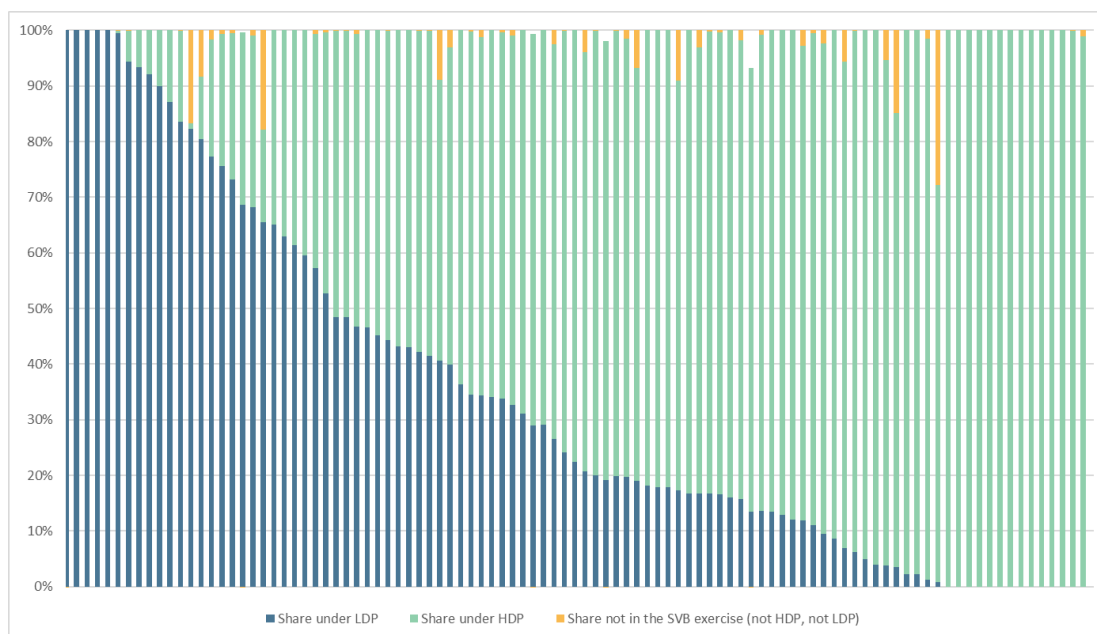
Table 2 describes the composition of the 2022 SVB sample across different dimensions (i.e. the use of regulatory approaches across SVB exposure classes).

TABLE 2: 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

2.1.2 EAD breakdown by type of exposure by institution (LDP, HDP, other)

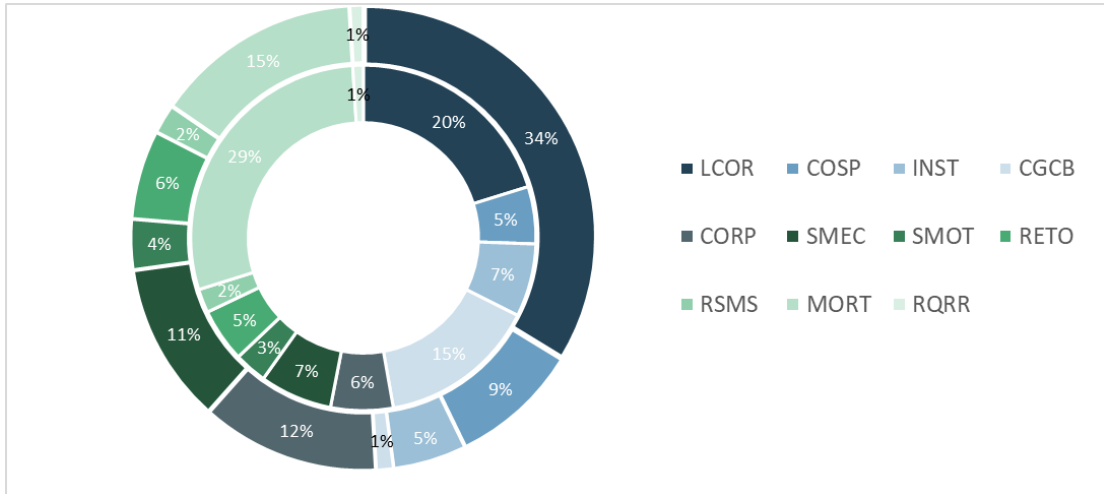
FIGURE 1: PROPORTION OF EXPOSURES UNDER LDP, HDP OR OUTSIDE THE SCOPE OF THE SVB EXERCISE BY IRB INSTITUTION (COMPARISON WITH TOTAL IRB PORTFOLIO FROM COREP DATA, SORTED BY PROPORTION UNDER LDP FROM LARGEST TO SMALLEST)



The differences in terms of exposure amounts reported under the IRB approach in COREP and in the benchmarking exercise may be due to the fact that equity exposure under the IRB approach is exempted from this exercise or it may be due to data quality issues including diverging approaches in reporting the exposure under the PPU. In particular, the reporting of RGLA/PSE may partially or fully be shifted to the SA in accordance with Article 115(2) and (4) and 116 (4) CRR, if these exposures are assimilated to sovereign ones. Otherwise, if there are differences in risk between RGLA/PSE exposures and exposures to the respective central governments, the RGLA/PSE may remain under the IRB approach and should be reported consistently between COREP and benchmarking.

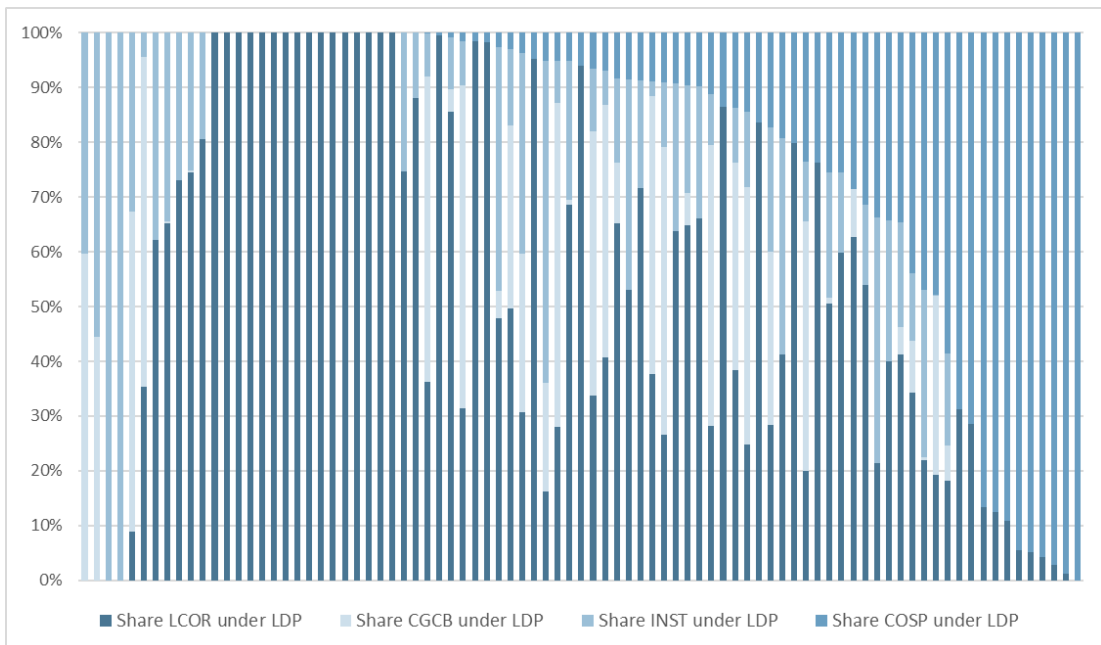
2.1.3 EAD and RWA breakdown by exposure classes over all IRB institutions

FIGURE 2: PORTFOLIO COMPOSITION OF RWAs (OUTER CIRCLE) AND EAD (INNER CIRCLE) FOR HDP AND LDP PORTFOLIOS (DEFAULTED AND NON-DEFAULTED)



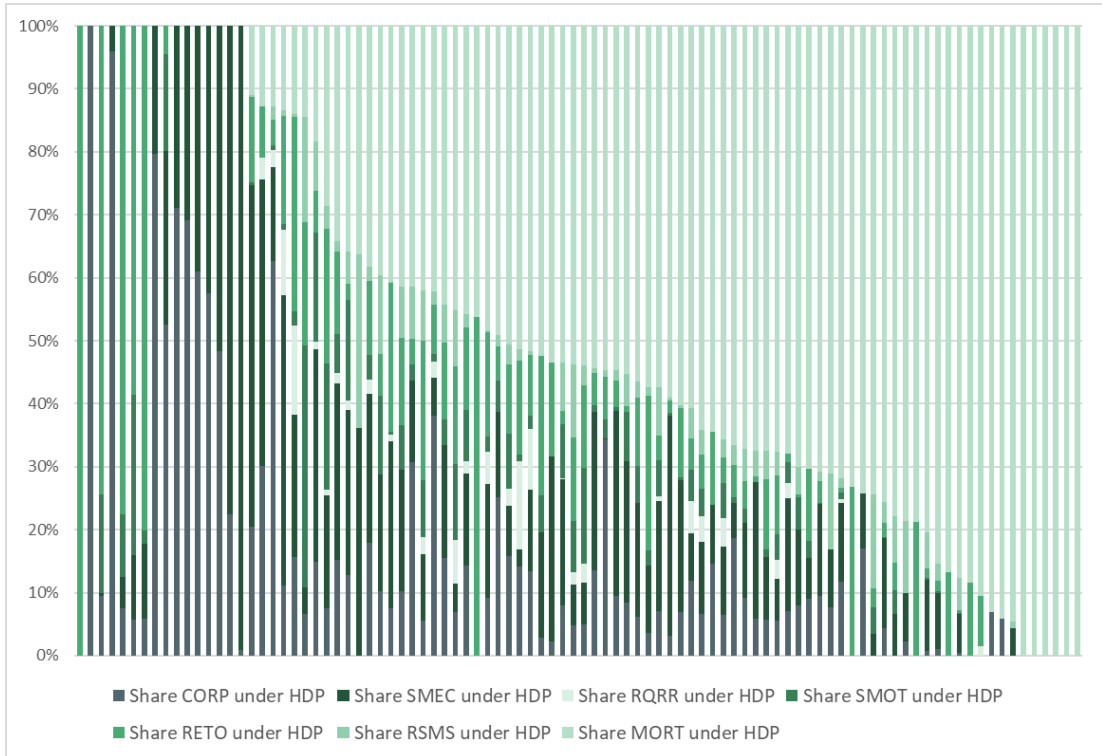
2.1.4 EAD breakdown by exposure classes (only LDP)

FIGURE 3: PORTFOLIO COMPOSITION OF LDPs: PROPORTION OF LARGE CORPORATES, INSTITUTIONS AND SOVEREIGNS IN LDPs (SORTED BY PROPORTION OF SPECIALISED LENDING EXPOSURES IN LDPs FROM SMALLEST TO LARGEST)



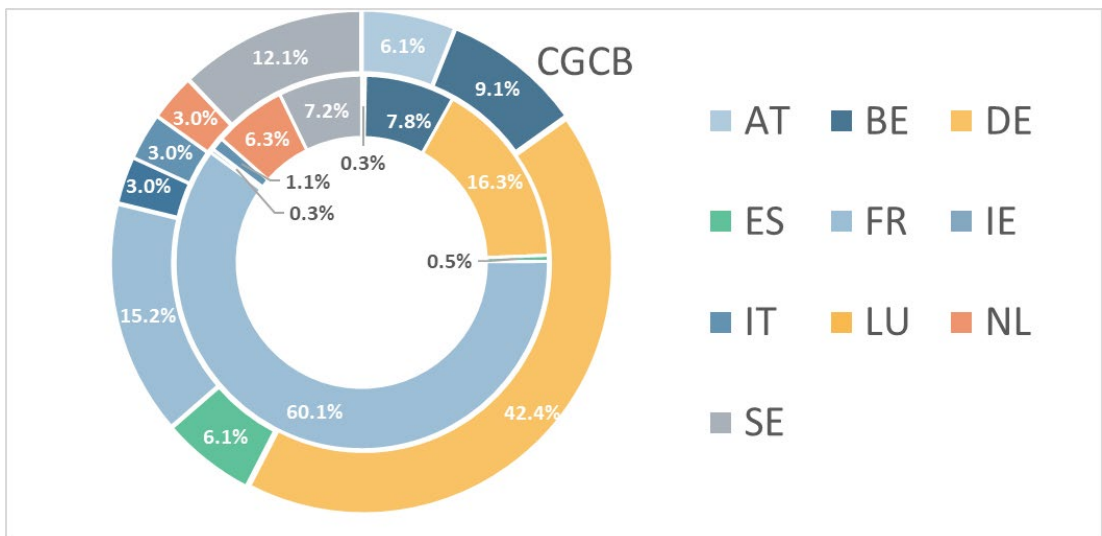
2.1.5 EAD breakdown by exposure class (only HDP)

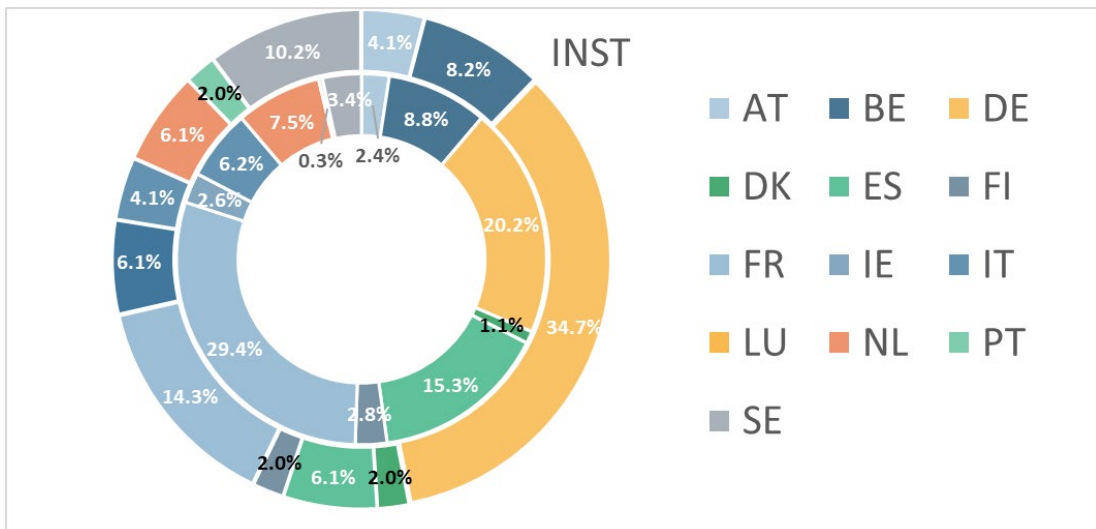
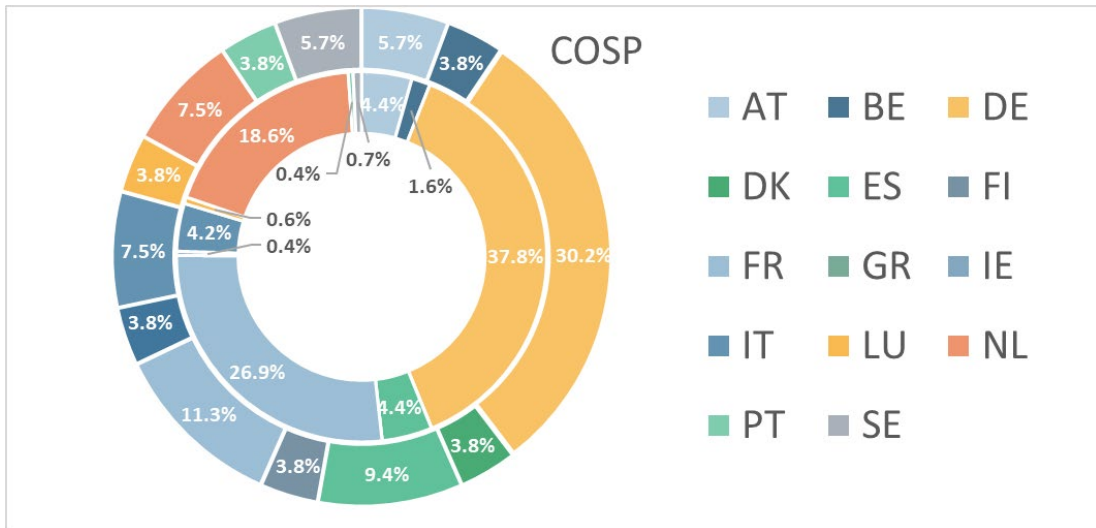
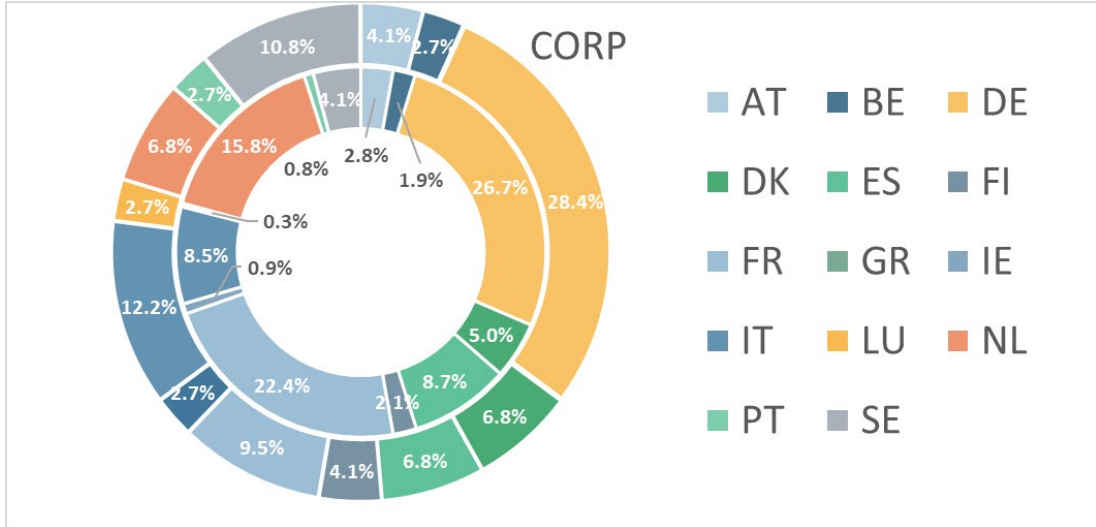
FIGURE 4: PORTFOLIO COMPOSITION OF HDPs: PROPORTION OF RESIDENTIAL MORTGAGES, SME RETAIL, SME CORPORATE AND CORPORATE-OTHER EXPOSURES IN HDPs (SORTED BY PROPORTION OF MORTGAGES IN HDPs FROM SMALLEST TO LARGEST)

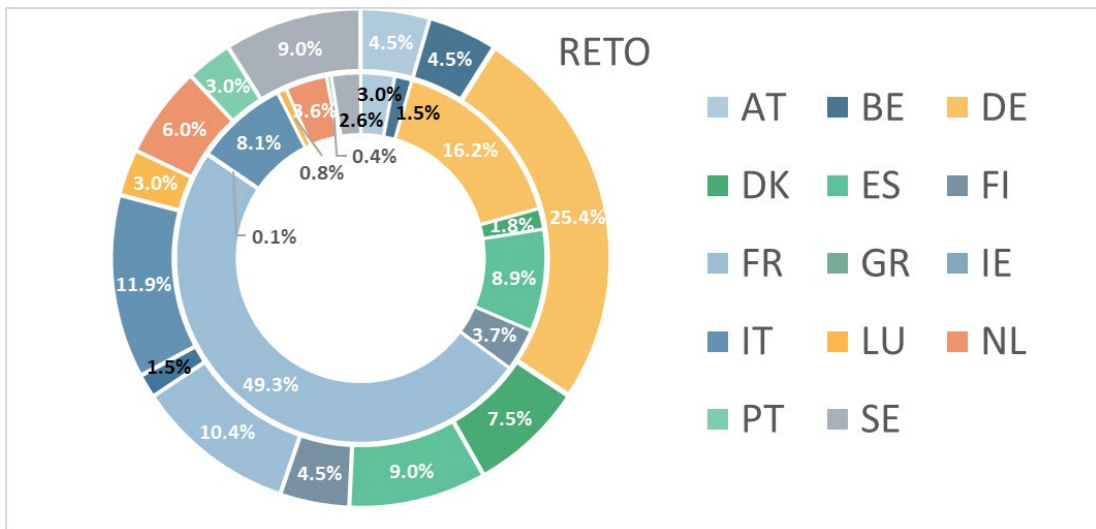
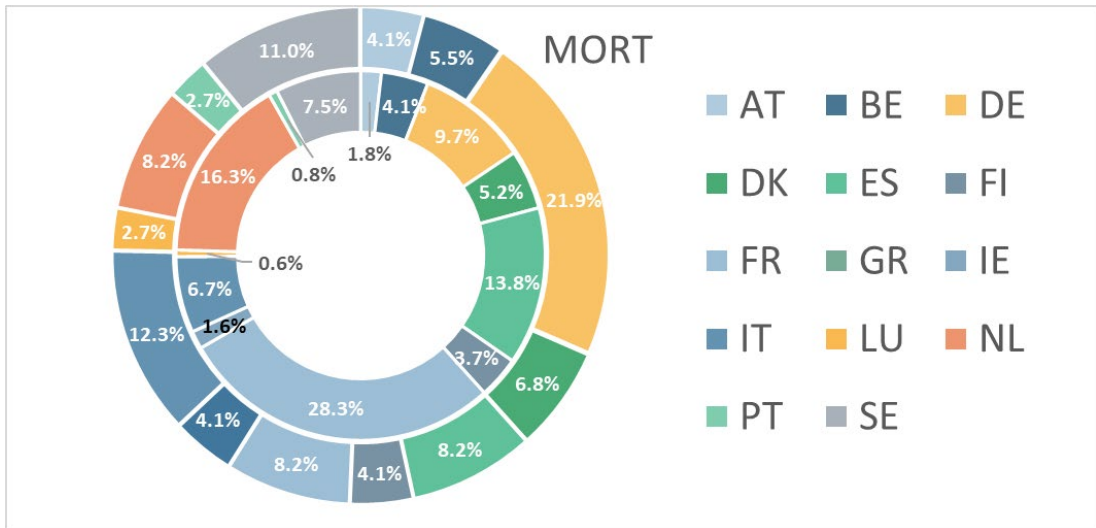
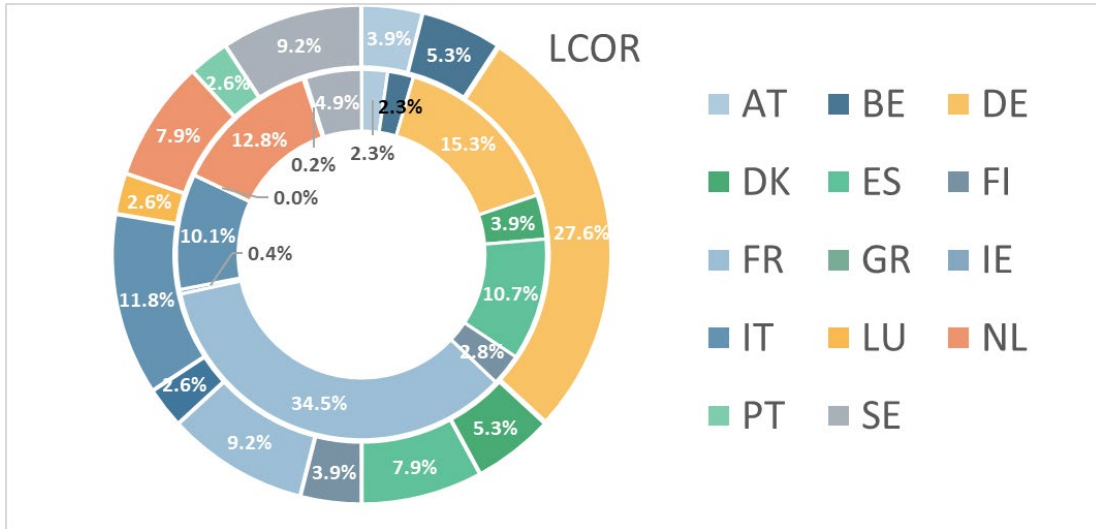


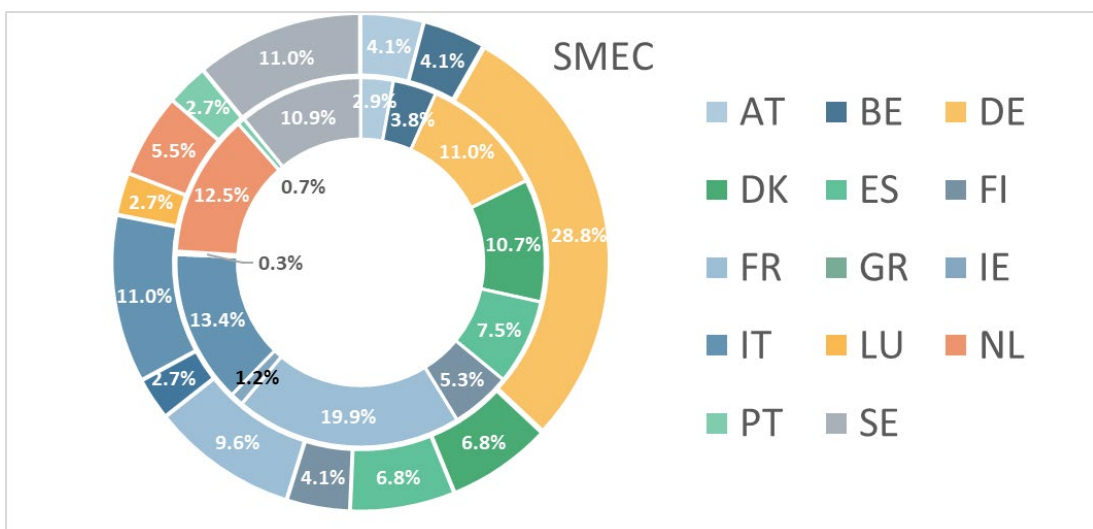
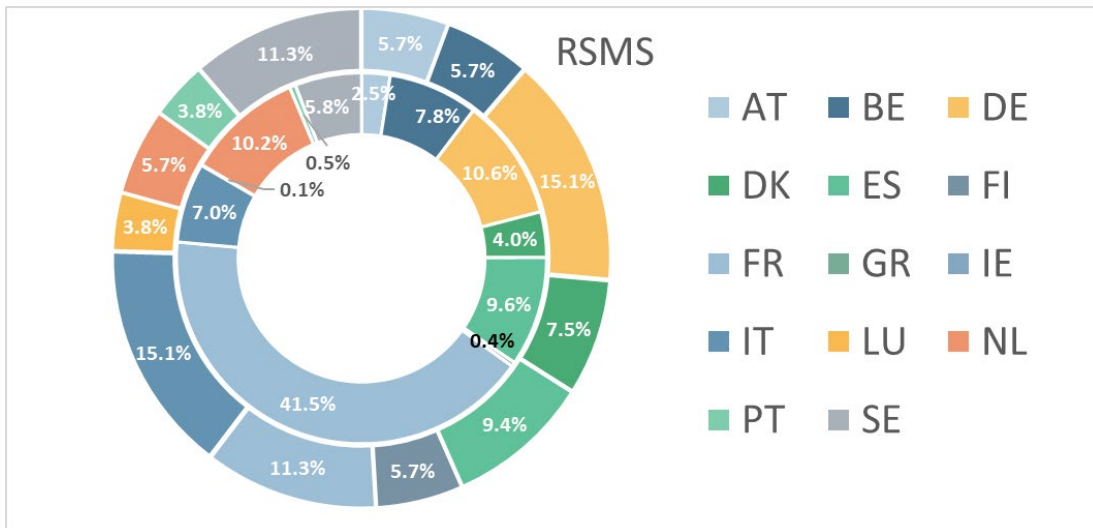
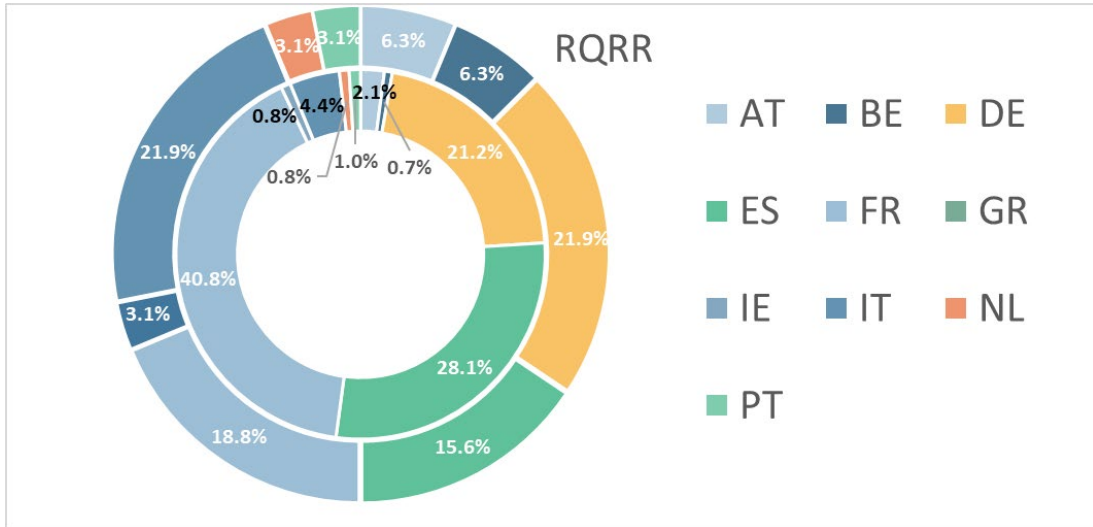
2.1.6 EAD breakdown by country for each exposure class

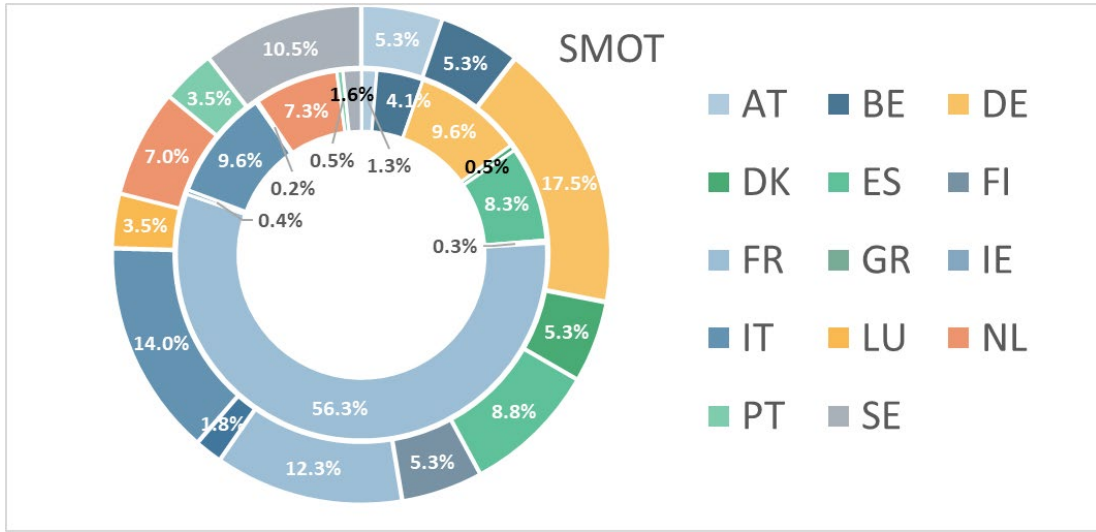
FIGURE 5: SAMPLE COVERAGE BY EXPOSURE CLASS AND COUNTRY (OUTSIDE # OF BANKS, INSIDE EAD)





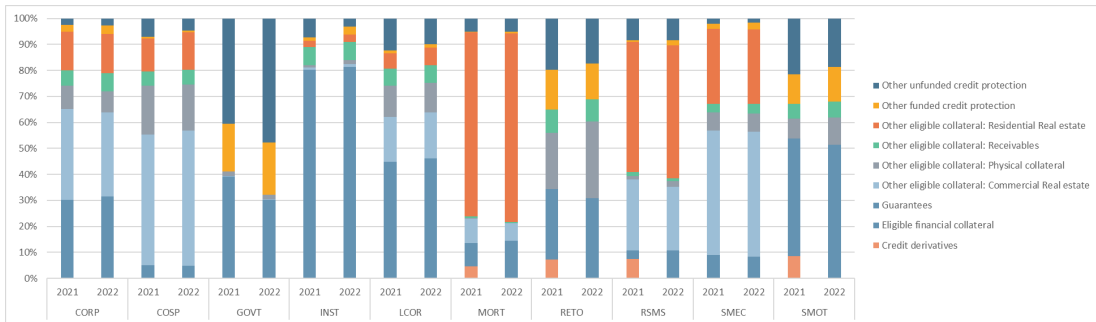






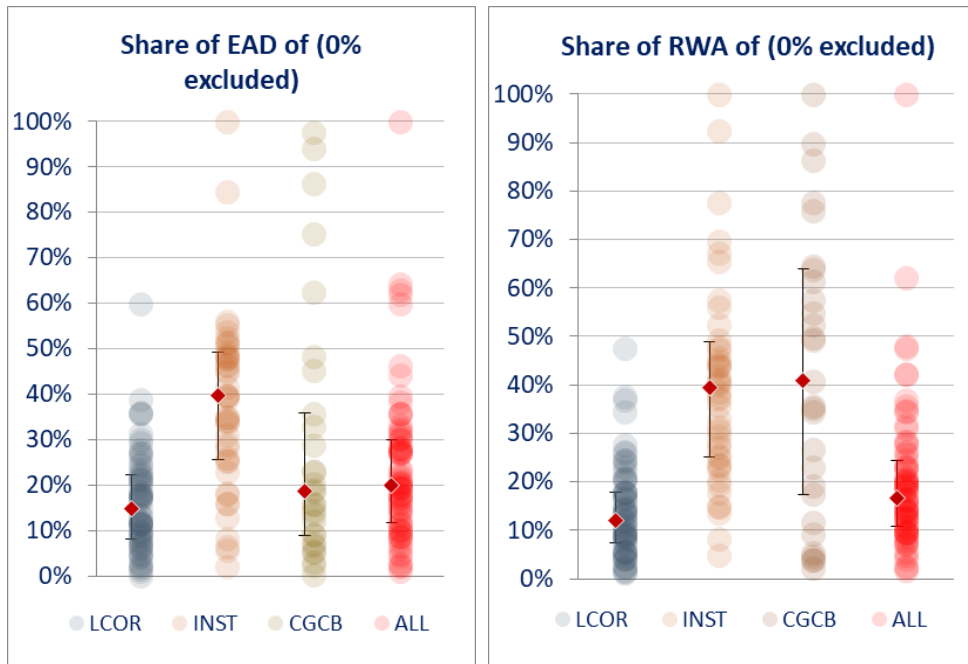
2.1.7 EAD breakdown of secured exposure by collateral type

FIGURE 6: BREAKDOWN OF SECURED EXPOSURE BY COLLATERAL TYPE



2.1.8 Representativeness of the single names

FIGURE 7: LDP COMMON COUNTERPARTIES EAD AND RWAs COMPARED WITH CORRESPONDING TOTAL IRB EAD AND RWAs



2.1.9 EAD development over time by exposure class & default status

FIGURE 8: CHANGE IN EAD BY REGULATORY APPROACH (MILLION EUR), NON-DEFAULTED EXPOSURES

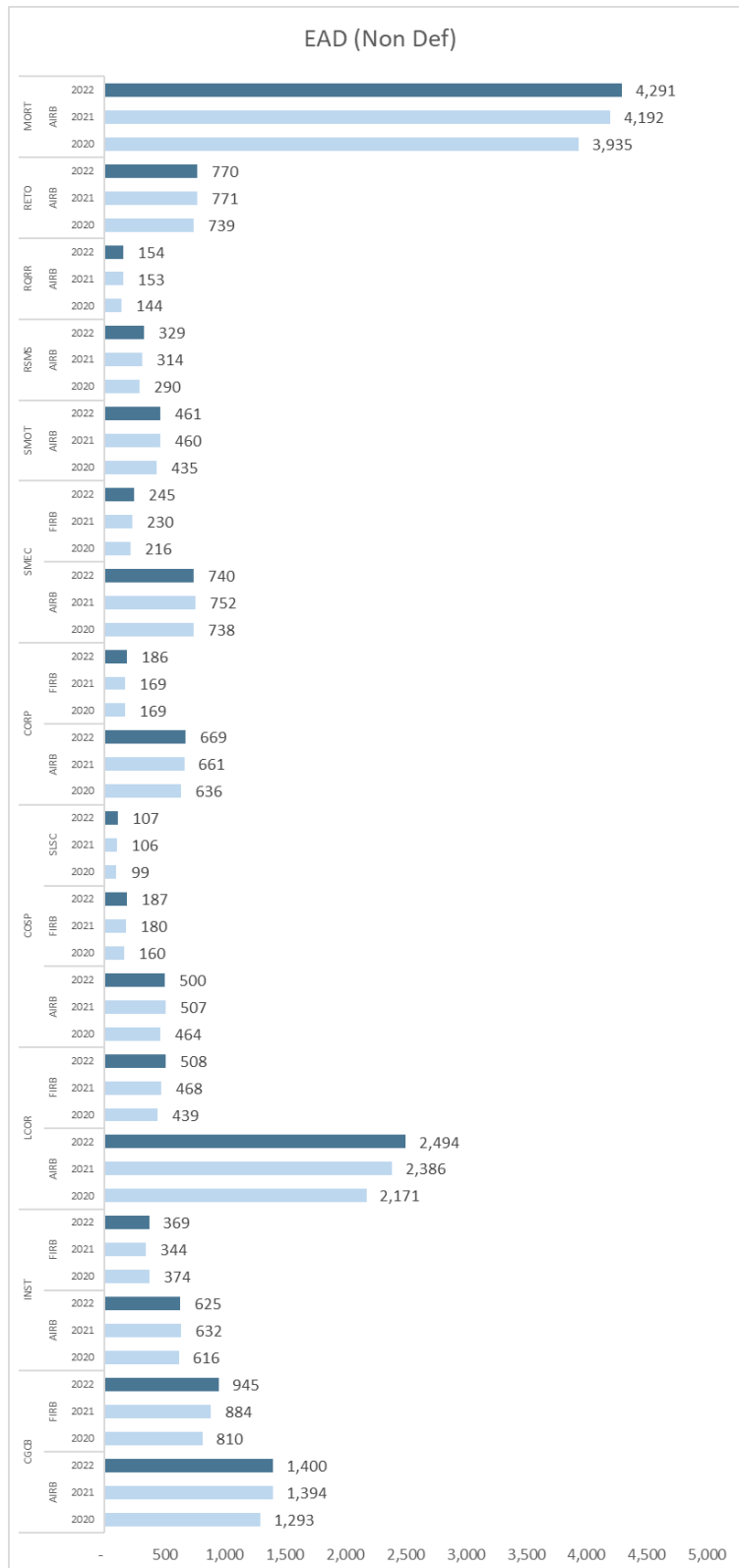
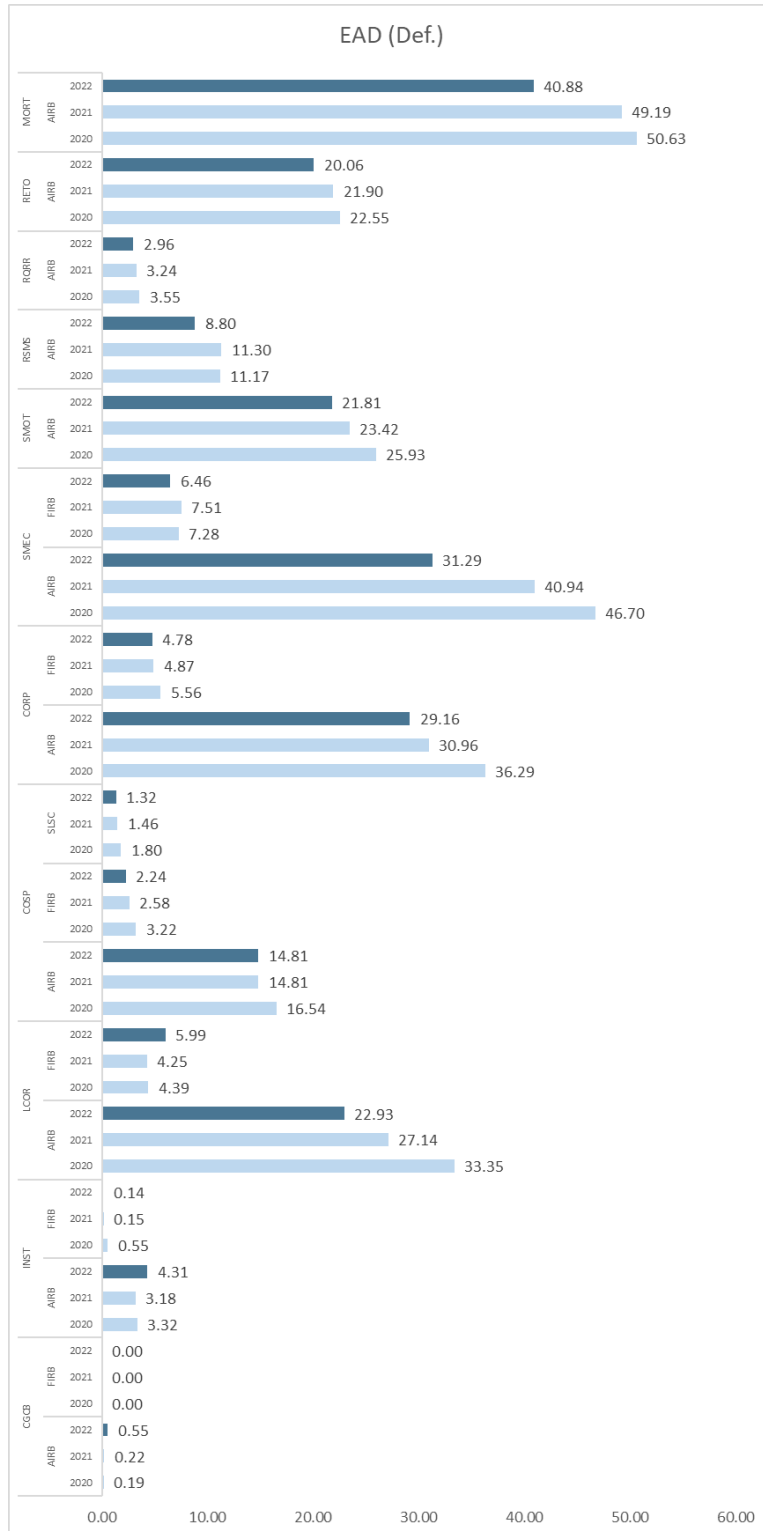


FIGURE 9: CHANGE IN EAD BY REGULATORY APPROACH (MILLION EUR), DEFAULTED EXPOSURES



2.2 IRB key metrics and benchmarks – as of 31.12.2022

2.2.1 Summary statistics of IRB metrics (GC, RW, PD, LGD) by exposure class and approach

TABLE 3: SUMMARY STATISTICS OF THE KEY METRICS OBSERVED FOR ALL EXPOSURES, BY SVB EXPOSURE CLASS AND REGULATORY APPROACH.

		LCOR		COSP			INST		CGCB		CORP		SMEC		SMOT	RETO	RSMS	MORT	QRRE
		AIRB	FIRB	AIRB	FIRB	SLSC	AIRB	FIRB	AIRB	FIRB	AIRB	FIRB	AIRB	FIRB	AIRB	AIRB	AIRB	AIRB	AIRB
Number of institutions		49	53	26	19	29	20	41	13	27	50	48	50	48	61	71	58	78	32
GC (%)	Q1	37%	42%	34%	41%	78%	16%	20%	2%	1%	41%	50%	34%	39%	32%	28%	15%	10%	15%
	Median	49%	62%	44%	55%	86%	23%	24%	5%	3%	60%	72%	46%	64%	38%	37%	27%	14%	26%
	Q3	64%	82%	53%	81%	96%	28%	30%	11%	14%	73%	91%	61%	86%	49%	53%	36%	19%	42%
	Q3-Q1	27%	39%	19%	40%	19%	12%	10%	10%	13%	32%	41%	27%	47%	17%	25%	20%	9%	27%
RW (%)	Q1	34%	41%	31%	40%	69%	16%	20%	1%	1%	37%	48%	30%	36%	23%	23%	13%	9%	10%
	Median	47%	59%	39%	51%	76%	22%	24%	5%	3%	54%	66%	40%	55%	31%	30%	22%	12%	17%
	Q3	59%	76%	48%	78%	84%	26%	29%	11%	13%	66%	83%	53%	70%	36%	43%	27%	16%	28%
	Q3-Q1	25%	35%	17%	38%	16%	11%	10%	10%	12%	29%	35%	22%	34%	13%	20%	16%	8%	18%
PD (%)	Q1	0.51%	0.33%	0.89%	0.34%	0.00%	0.13%	0.08%	0.02%	0.00%	0.84%	0.56%	1.19%	0.73%	1.95%	1.09%	1.09%	0.45%	0.65%
	Median	0.70%	0.61%	1.49%	0.60%	0.00%	0.19%	0.12%	0.06%	0.01%	1.50%	1.07%	2.06%	1.73%	2.61%	1.56%	1.74%	0.77%	1.56%
	Q3	1.25%	1.07%	2.25%	1.01%	0.43%	0.27%	0.22%	0.11%	0.05%	1.91%	1.76%	2.49%	2.72%	3.35%	2.18%	2.99%	1.04%	2.12%
	Q3-Q1	0.74%	0.74%	1.36%	0.67%	0.43%	0.14%	0.14%	0.09%	0.04%	1.07%	1.20%	1.30%	1.99%	1.40%	1.09%	1.90%	0.59%	1.47%
LGD (%)	Q1	27%	43%	13%	40%	0%	25%	26%	8%	45%	24%	40%	21%	38%	28%	26%	14%	11%	38%
	Median	33%	44%	21%	43%	4%	32%	38%	24%	45%	27%	43%	27%	42%	35%	39%	18%	16%	53%
	Q3	40%	45%	26%	44%	36%	39%	45%	39%	45%	36%	44%	32%	44%	47%	51%	21%	21%	66%
	Q3-Q1	12%	2%	12%	5%	36%	15%	19%	30%	0%	12%	4%	11%	6%	19%	25%	7%	10%	28%

2.2.3 Benchmarks for IRB metrics by exposure class over time (for a sub-sample)

FIGURE 10: CHANGE IN EAD-WEIGHTED RW BY REGULATORY APPROACH, NON-DEFAULTED EXPOSURES – HDP

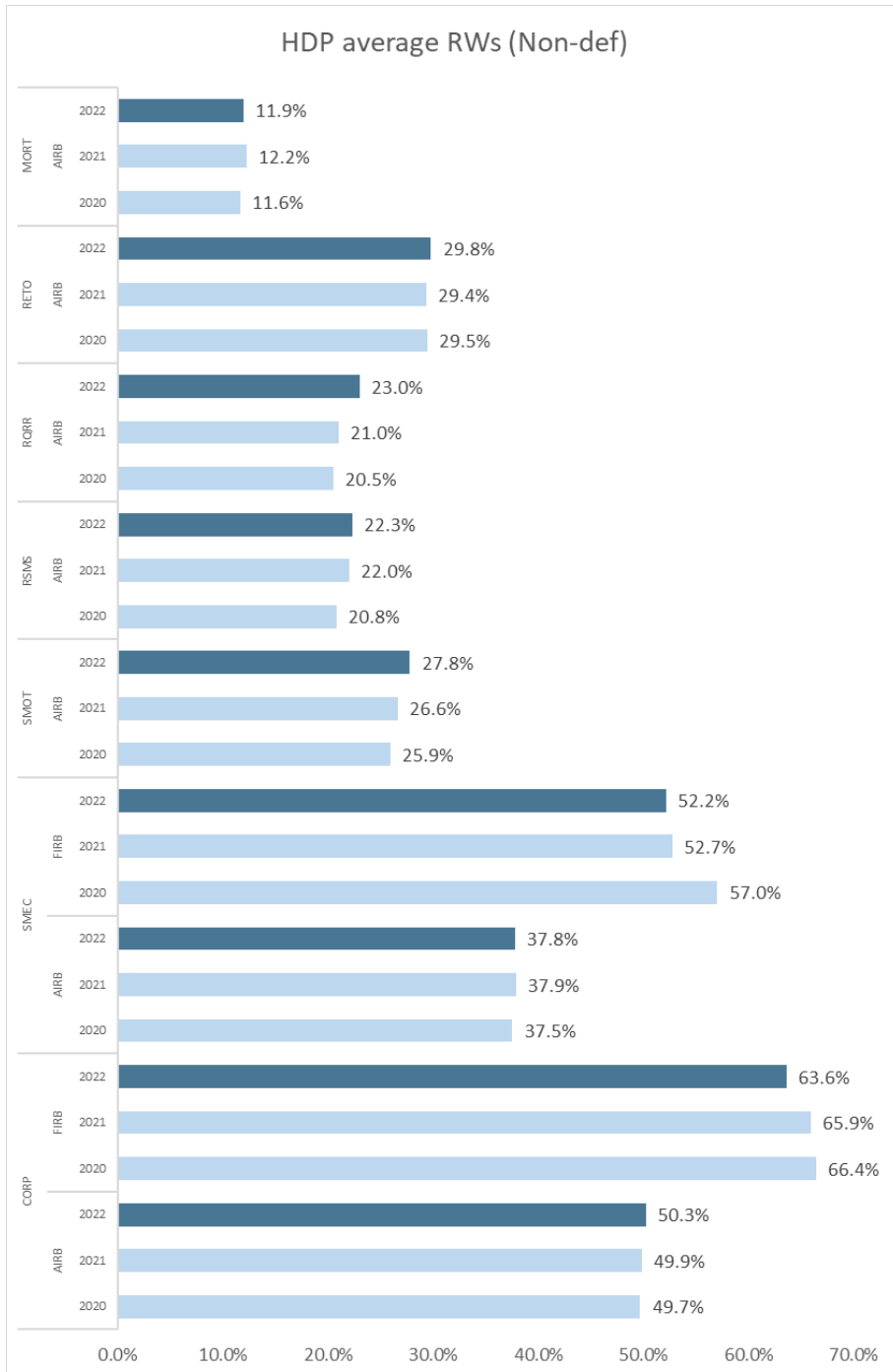


FIGURE 11: CHANGE IN EAD-WEIGHTED RW BY REGULATORY APPROACH, NON-DEFAULTED EXPOSURES – LDP

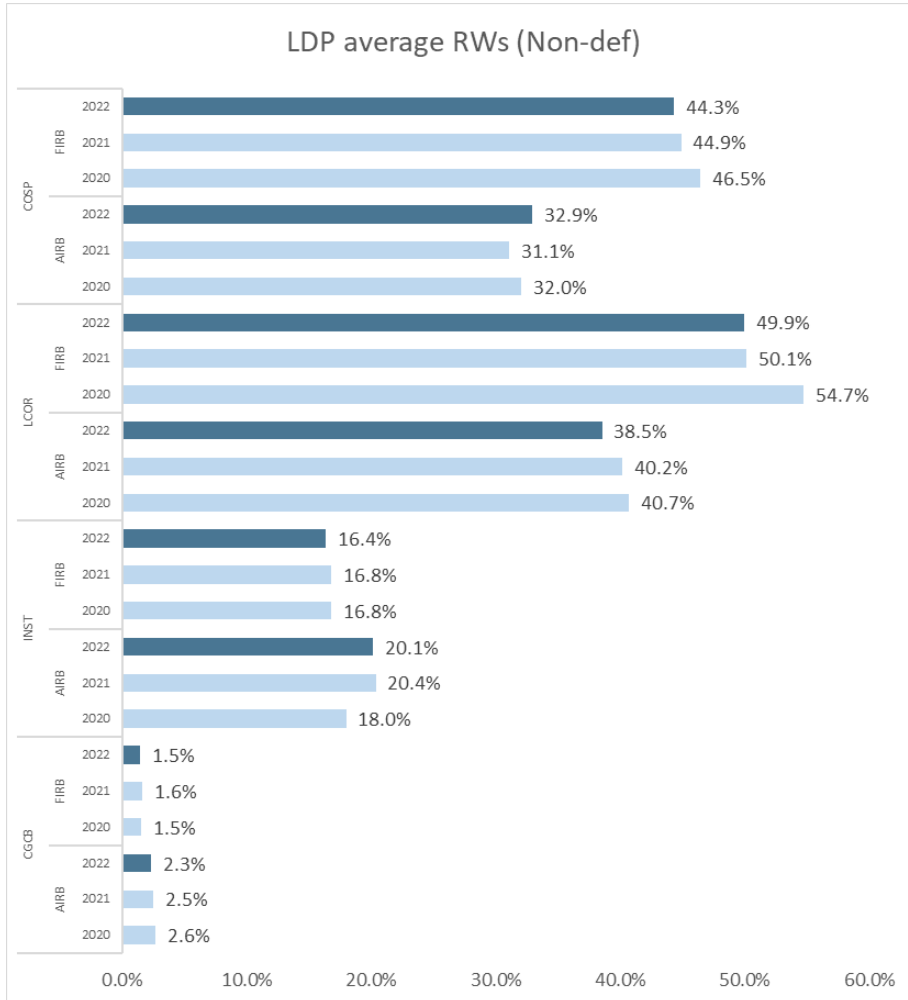


FIGURE 12: CHANGE IN EAD-WEIGHTED PD BY REGULATORY APPROACH, NON-DEFAULTED EXPOSURES – HDP

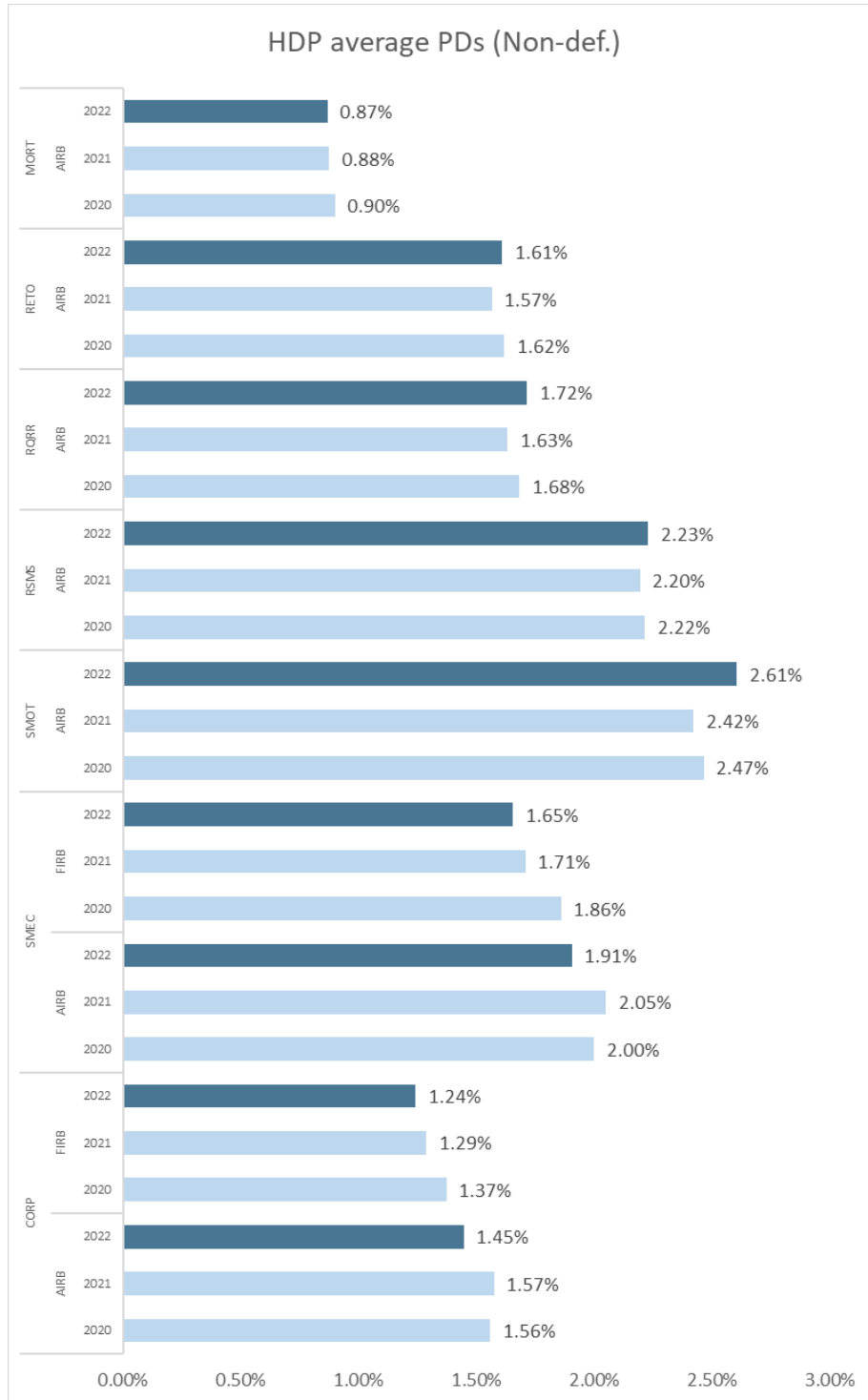


FIGURE 13: CHANGE IN EAD-WEIGHTED PD BY REGULATORY APPROACH, NON-DEFAULTED EXPOSURES - LDP

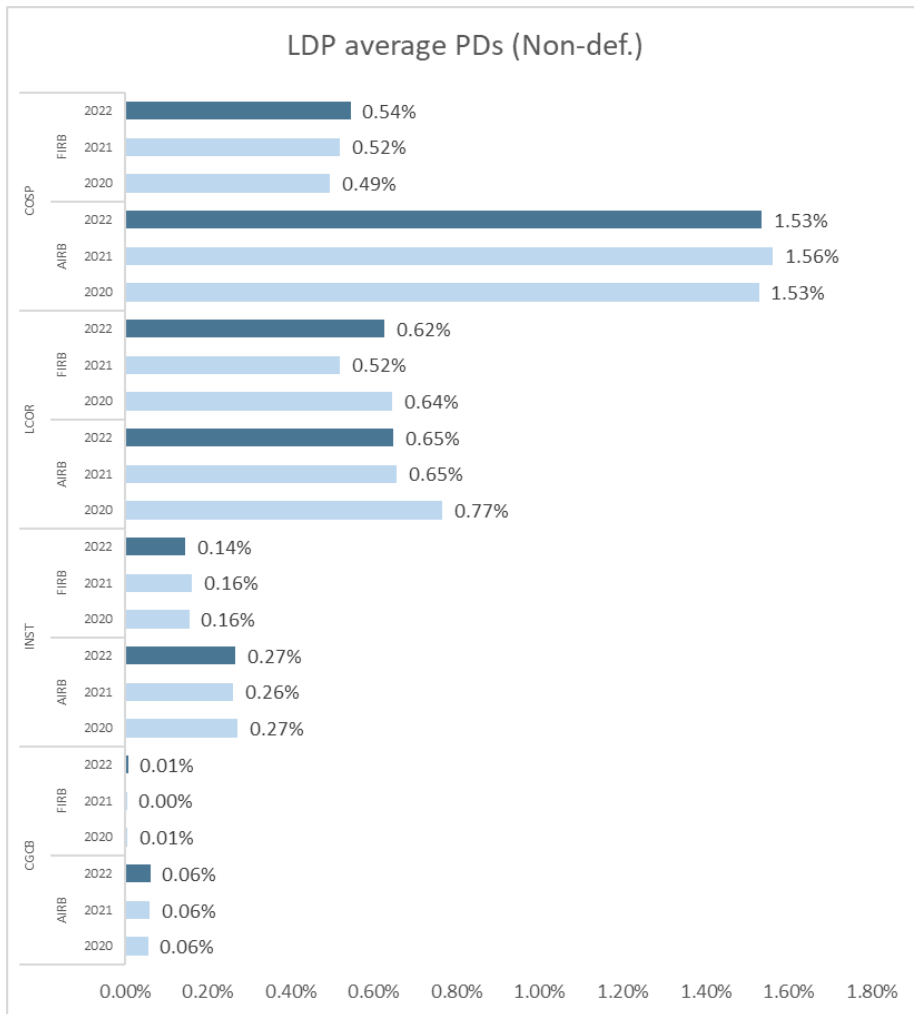


FIGURE 14: CHANGE IN EAD-WEIGHTED LGD BY REGULATORY APPROACH, NON-DEFAULTED EXPOSURES – HDP

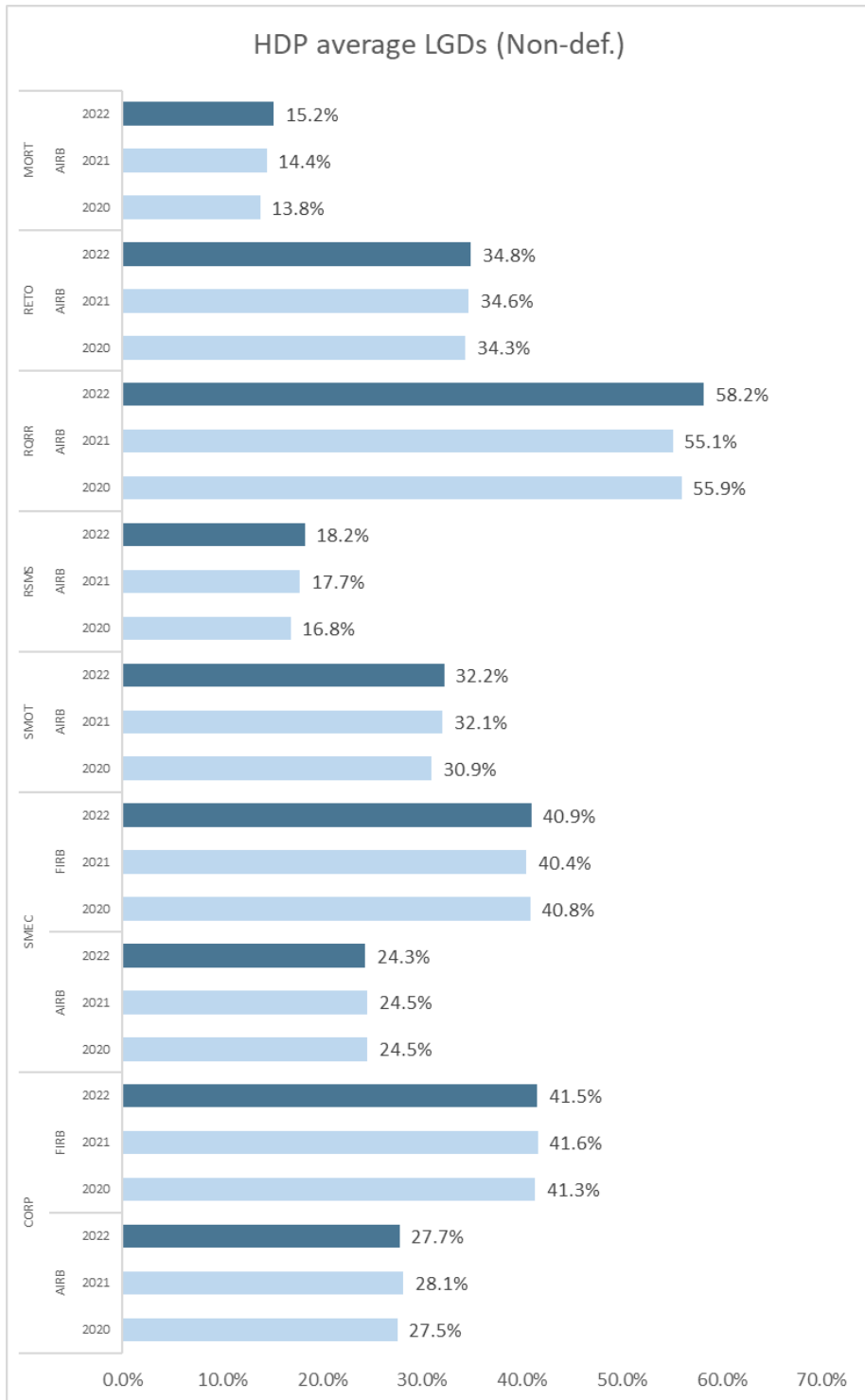
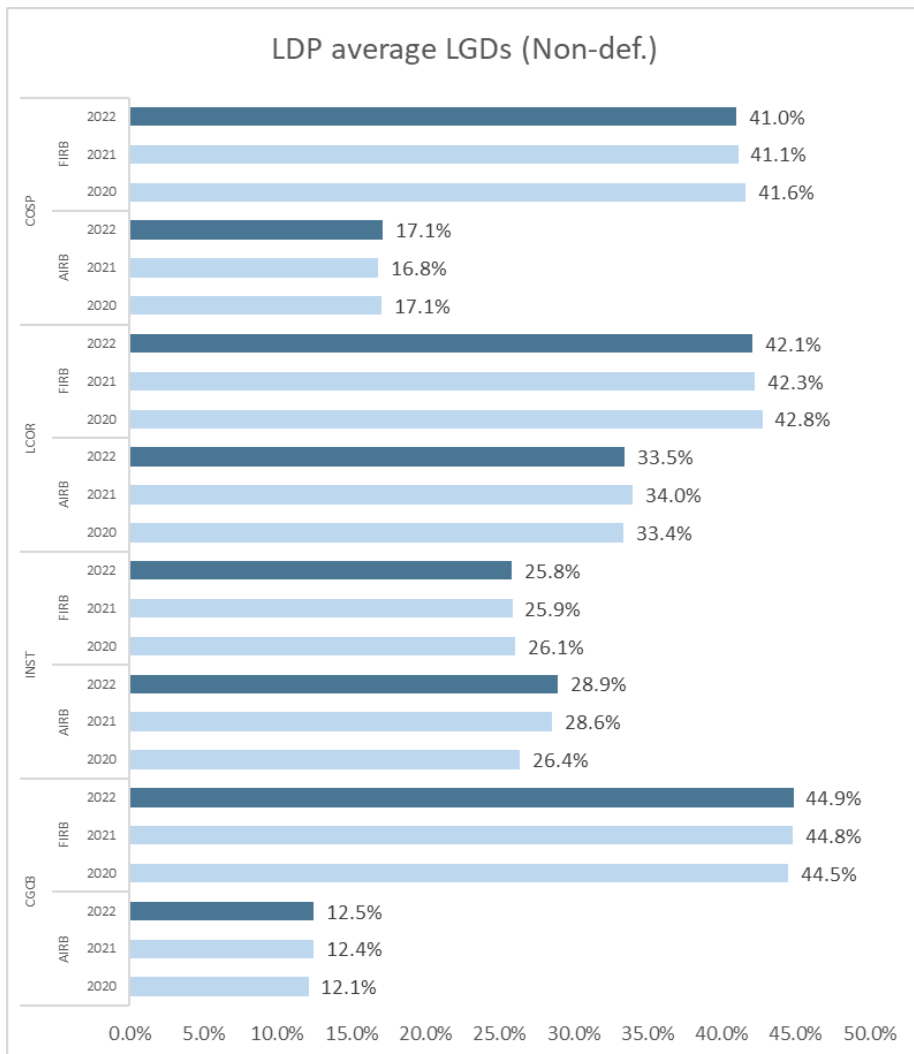
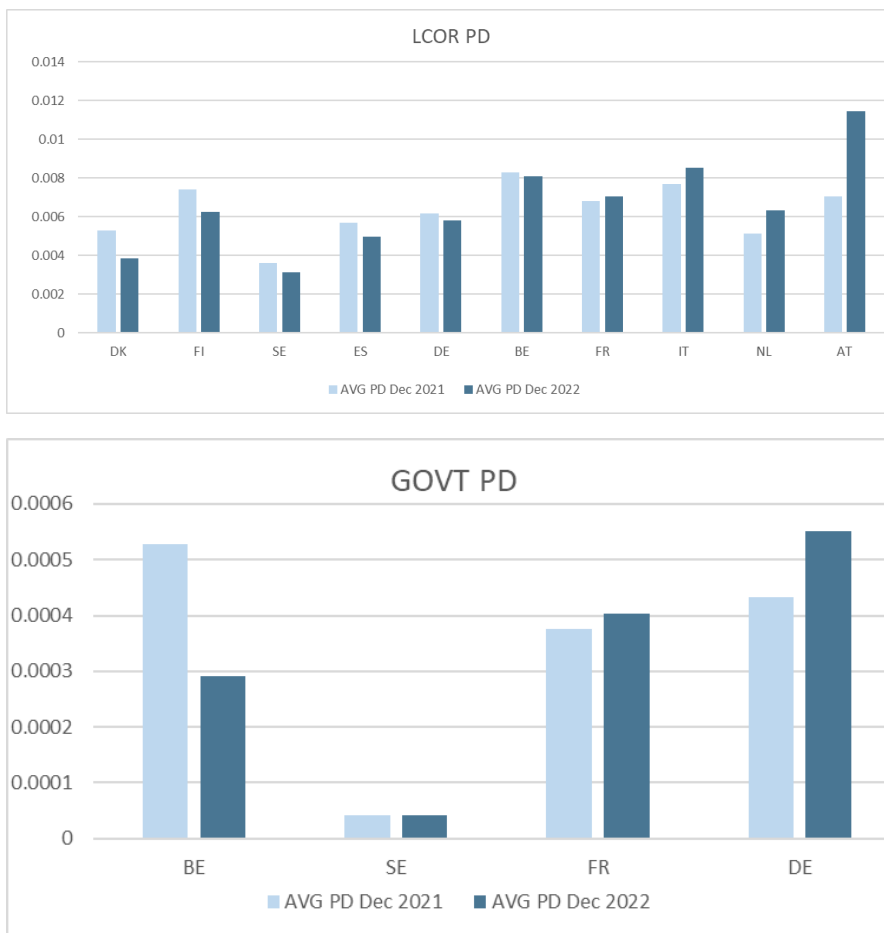


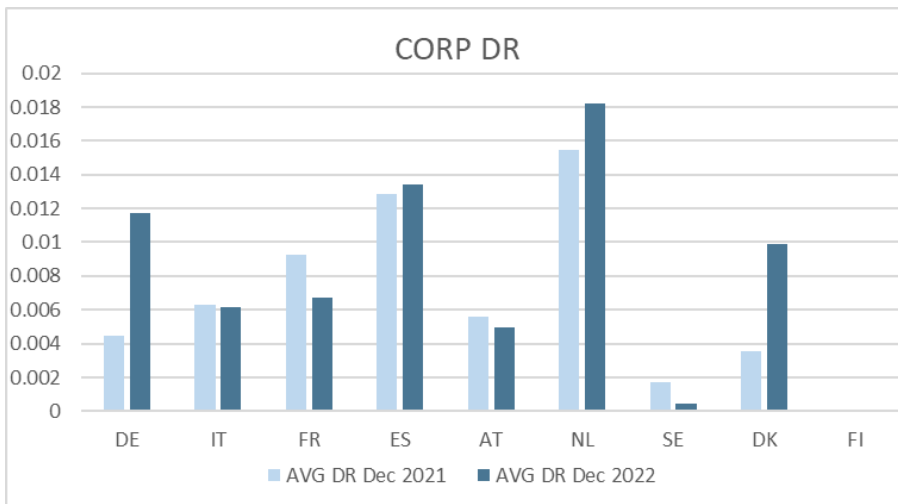
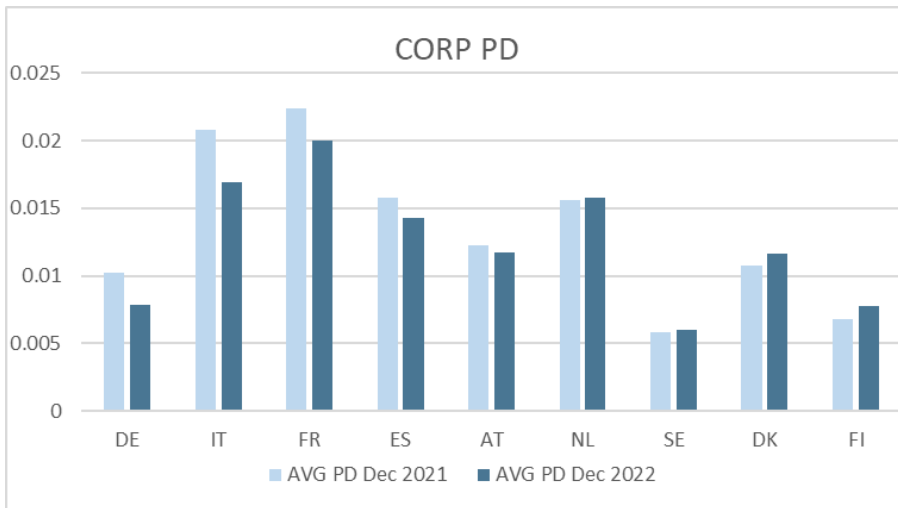
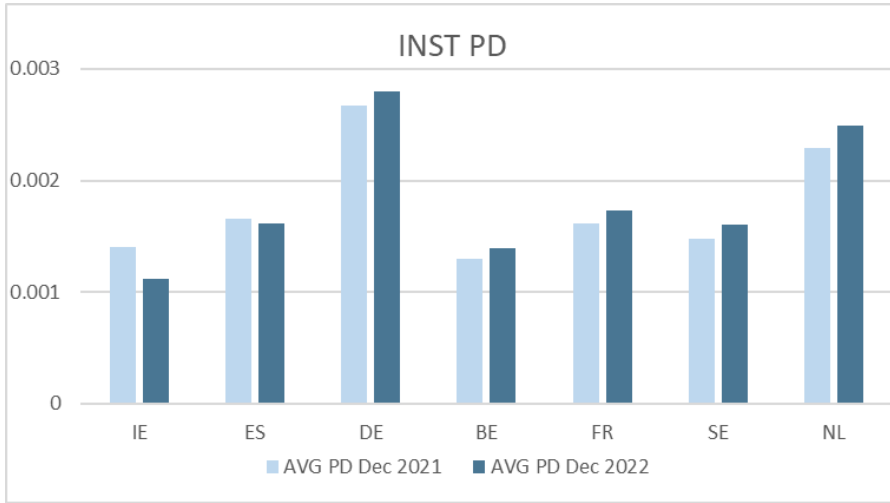
FIGURE 15: CHANGE IN EAD-WEIGHTED LGD BY REGULATORY APPROACH, NON-DEFAULTED EXPOSURES – LDP

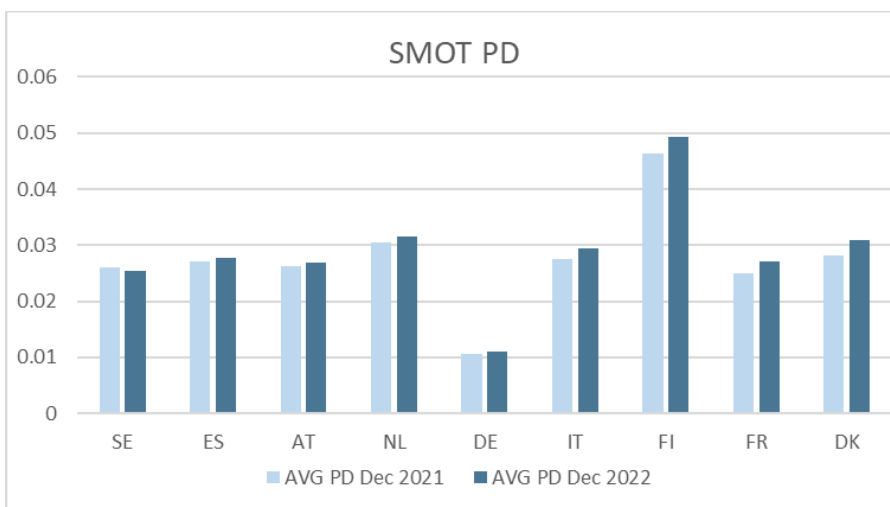
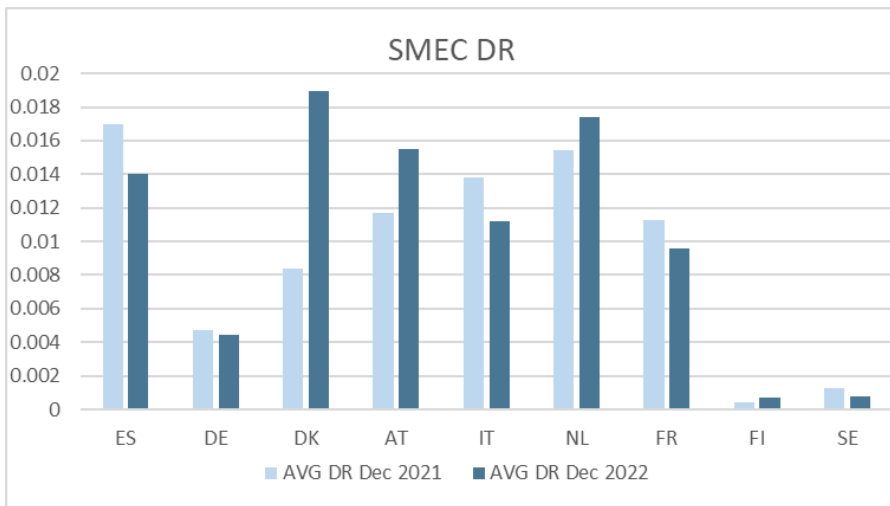
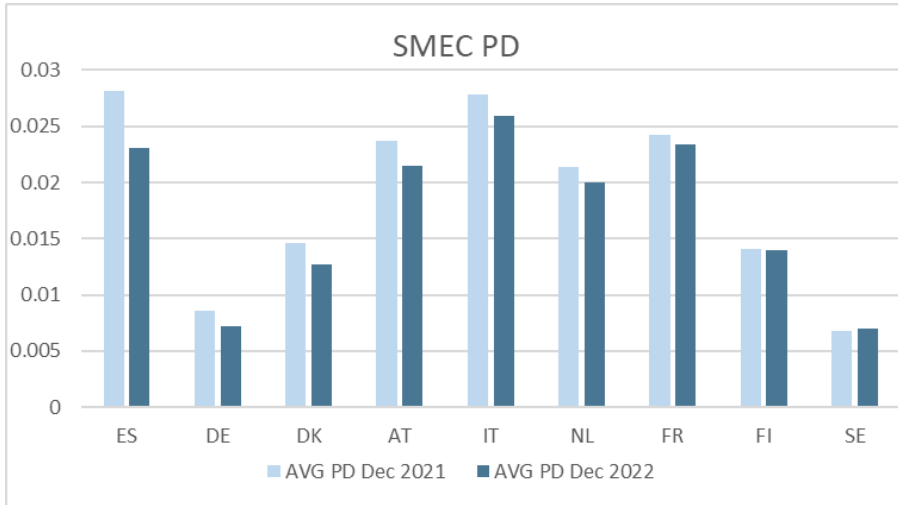


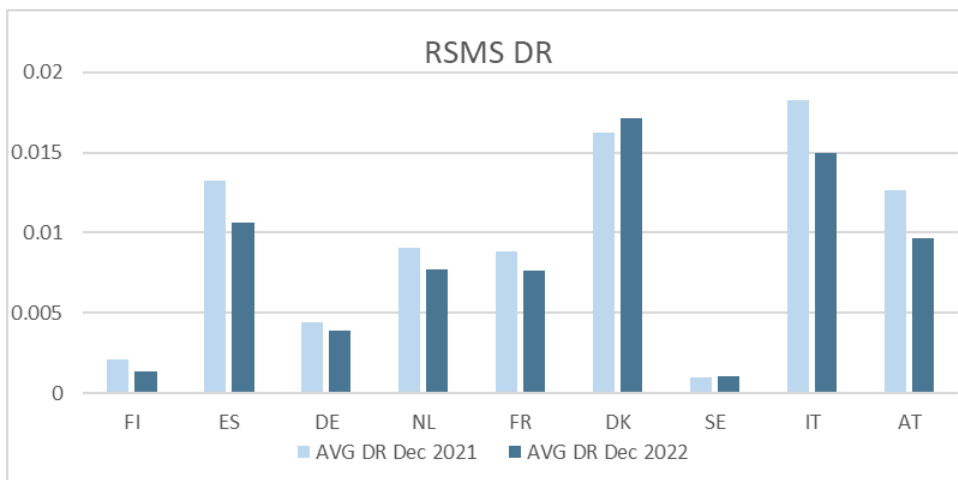
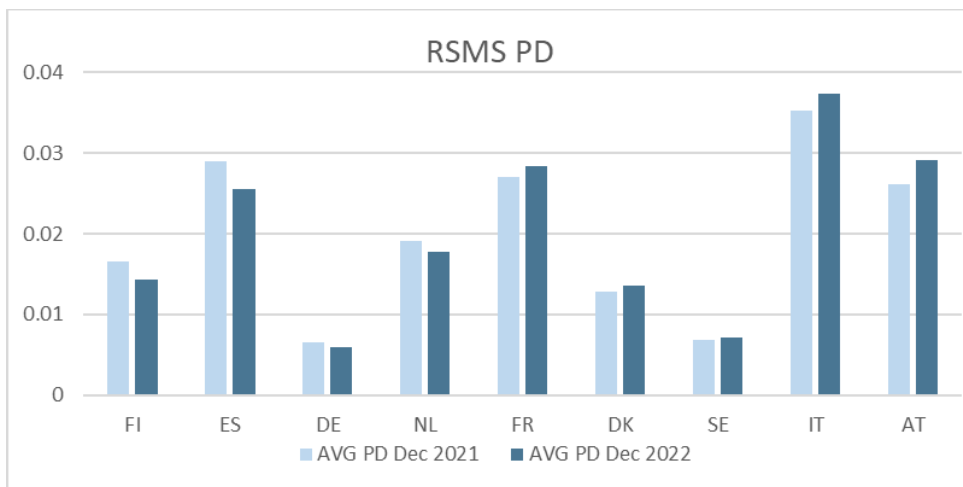
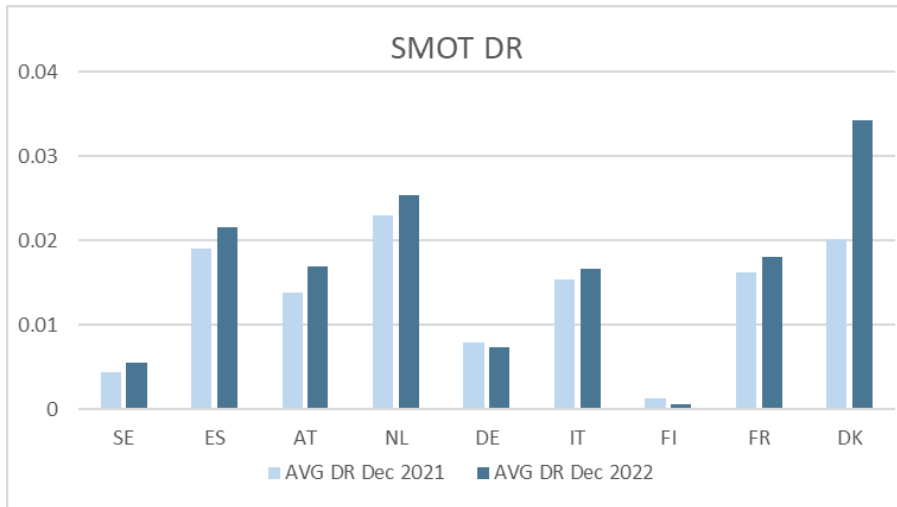
2.2.4 Average PD and default rates by exposure class and country over time (only HDP)

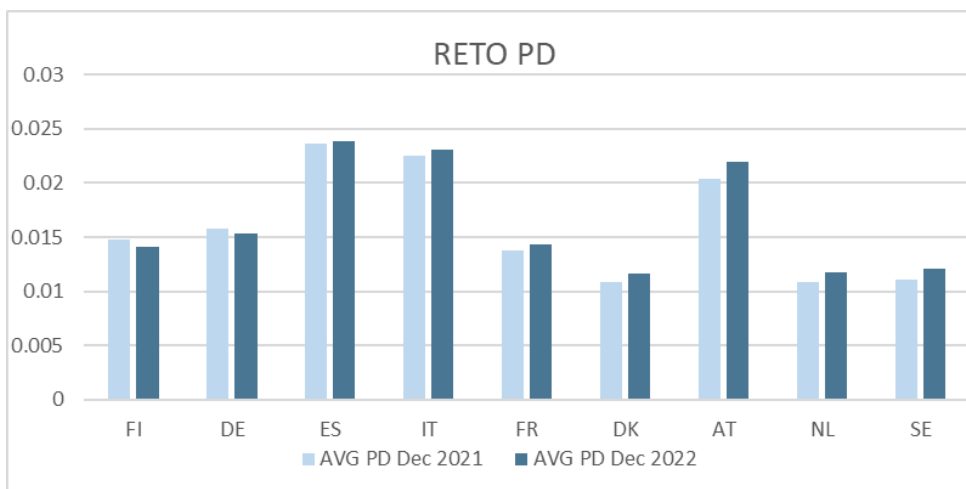
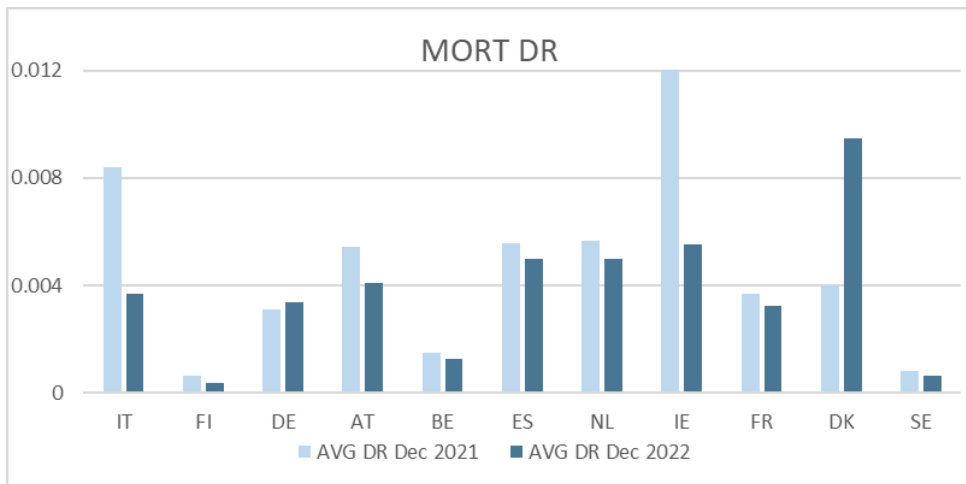
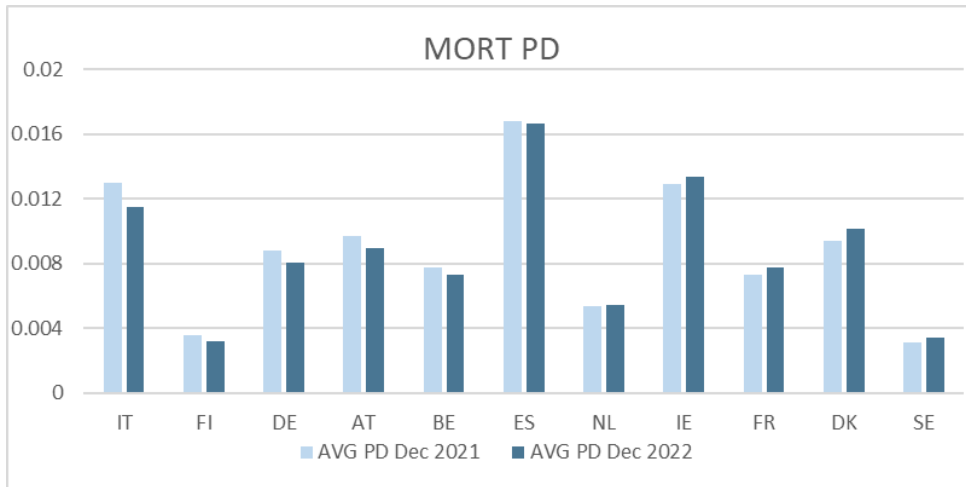
FIGURE 16: AVERAGE PD AND DR AS OF 31.12.2021 AND 31.12. 2022

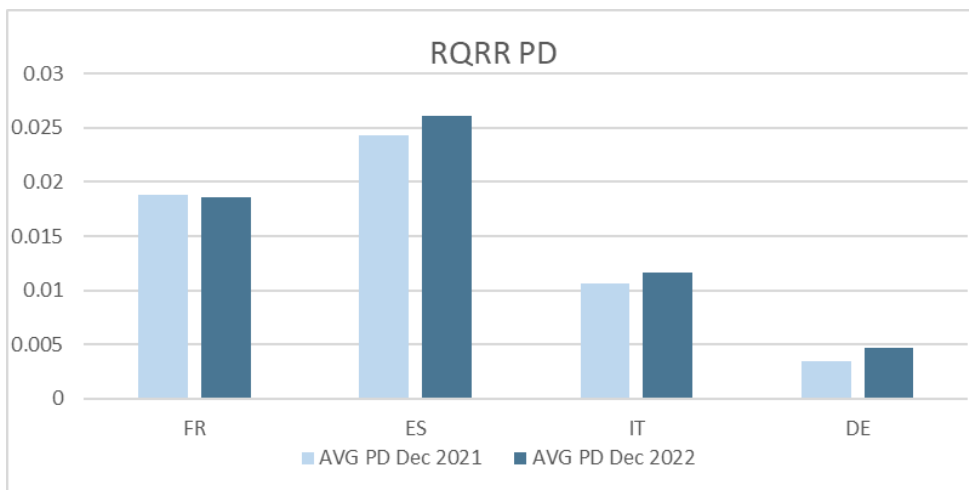
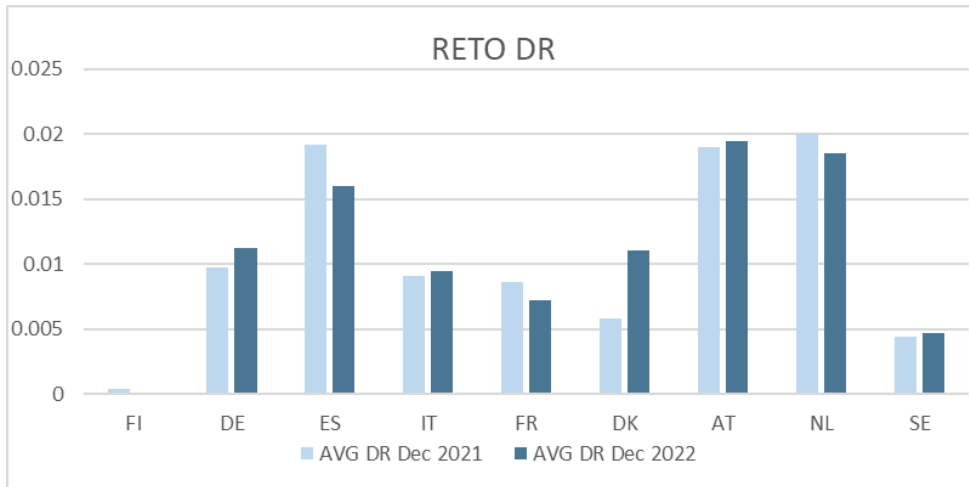


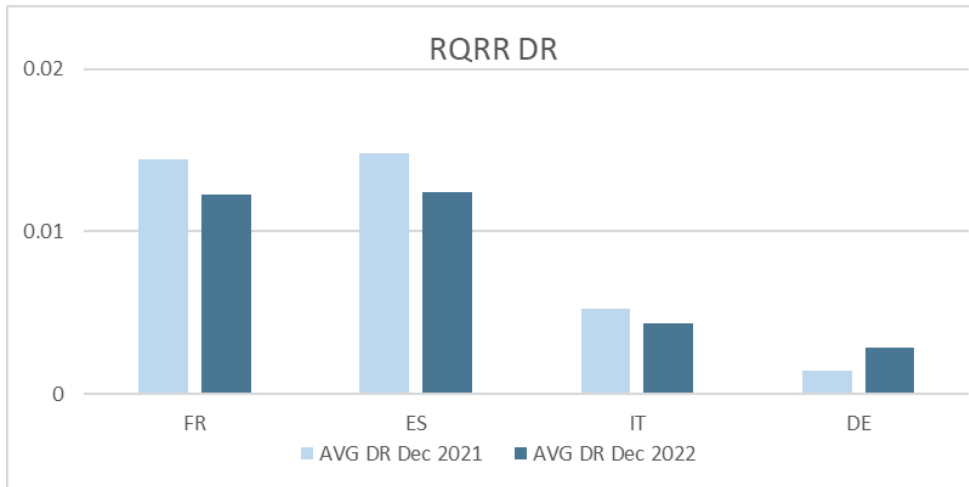






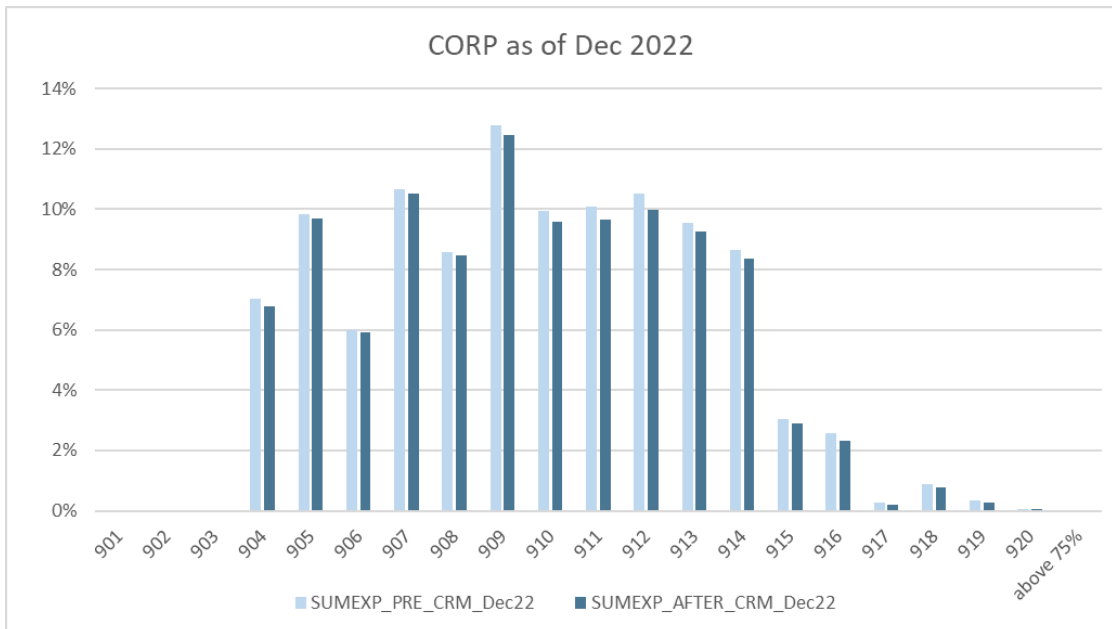
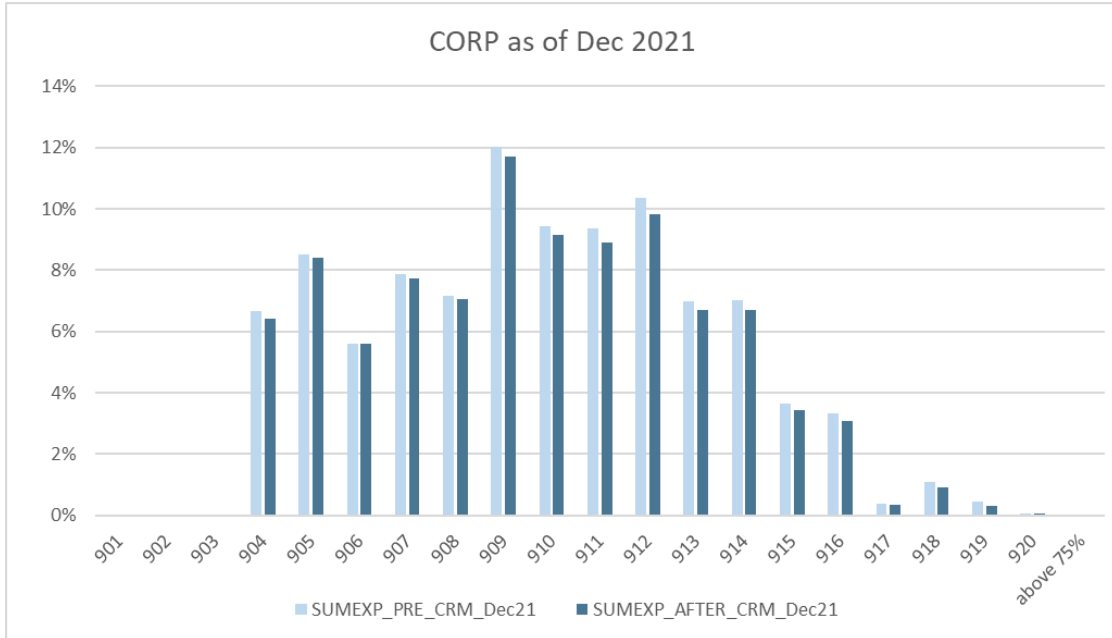


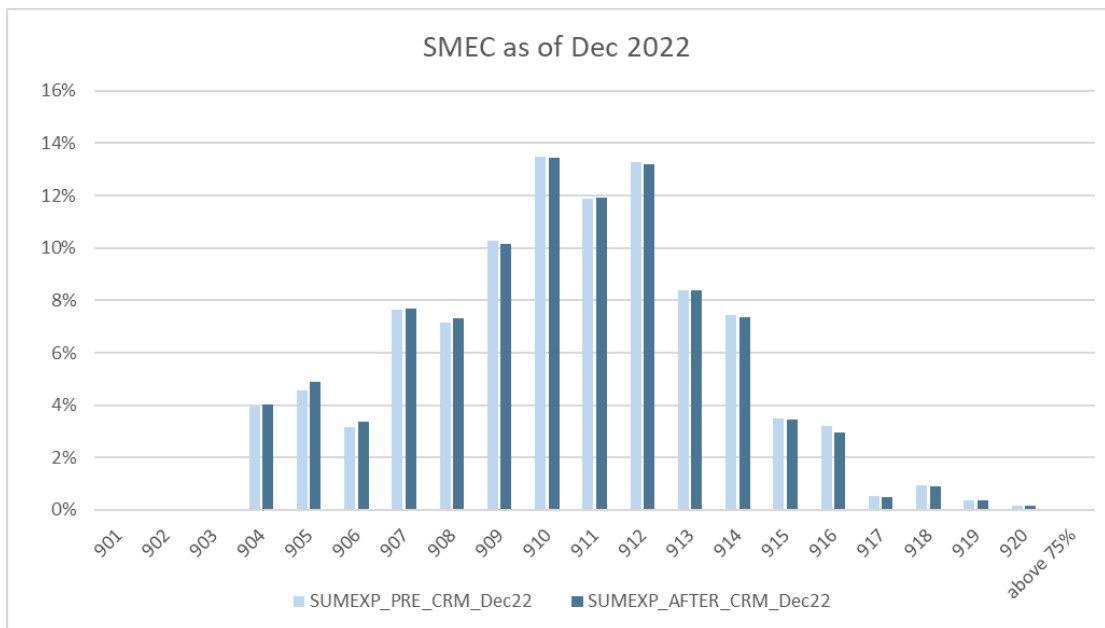
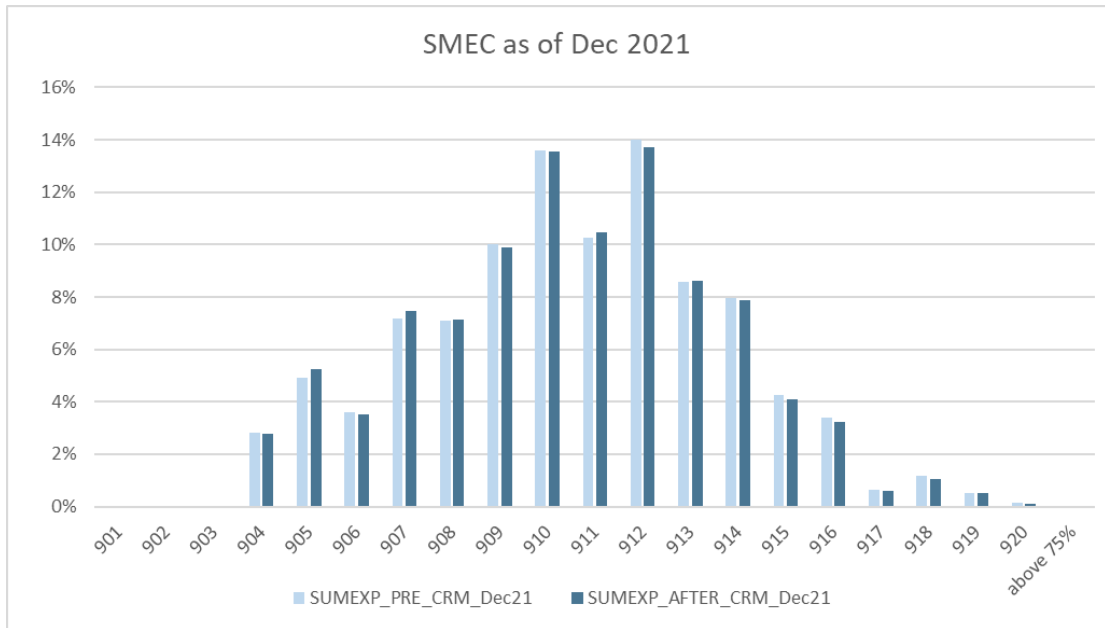


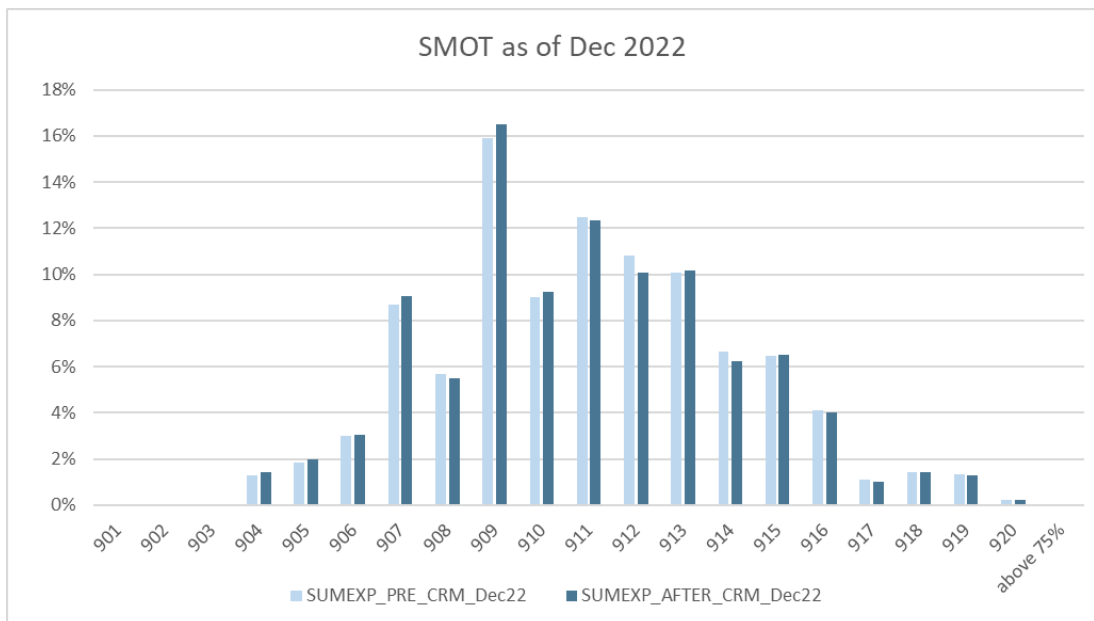
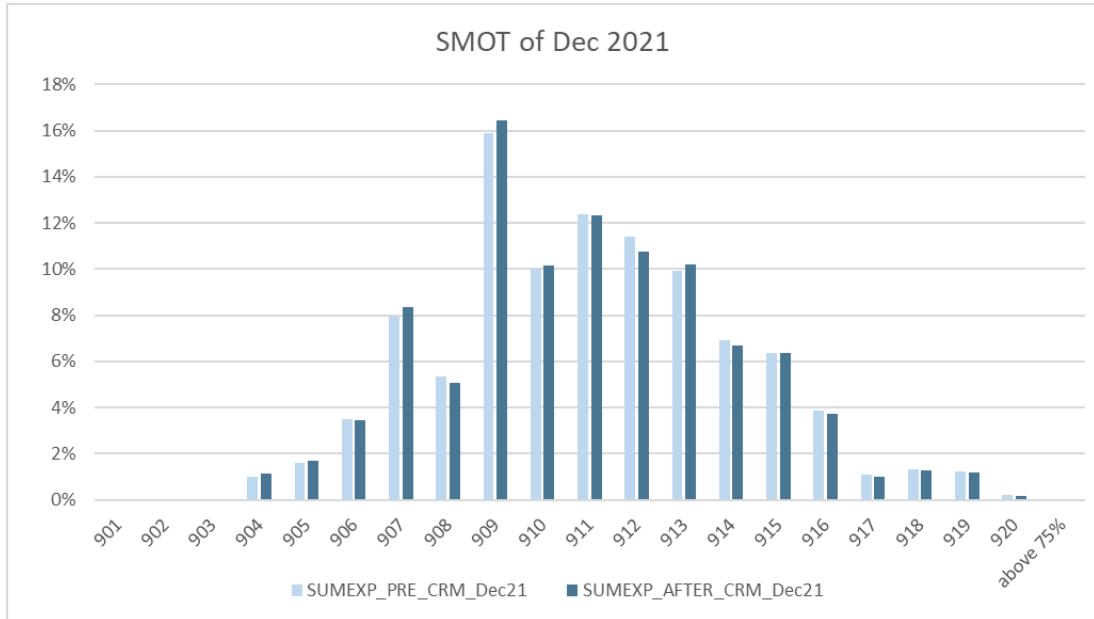


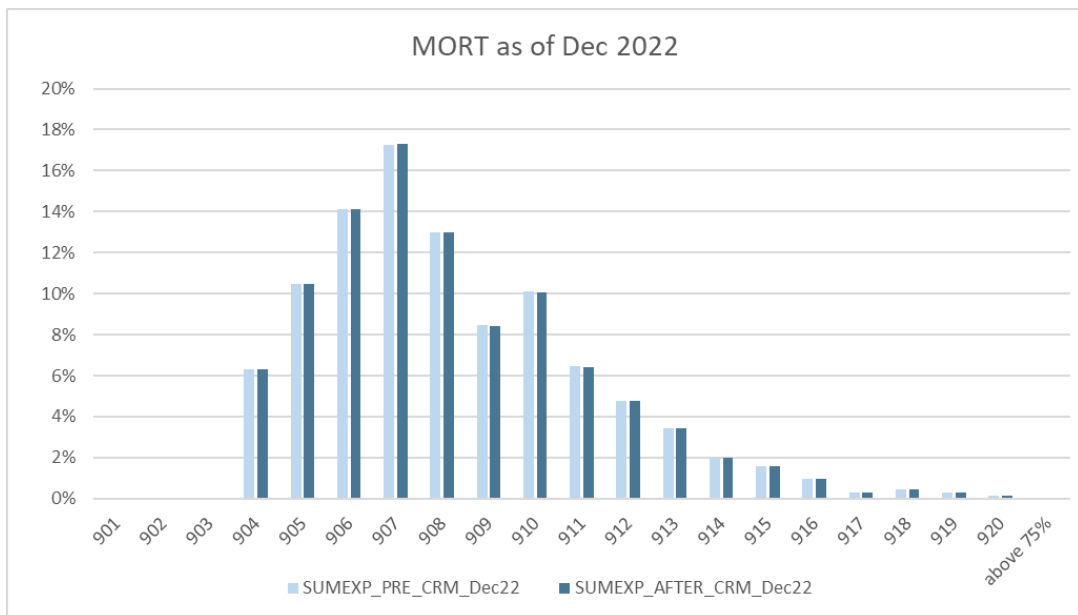
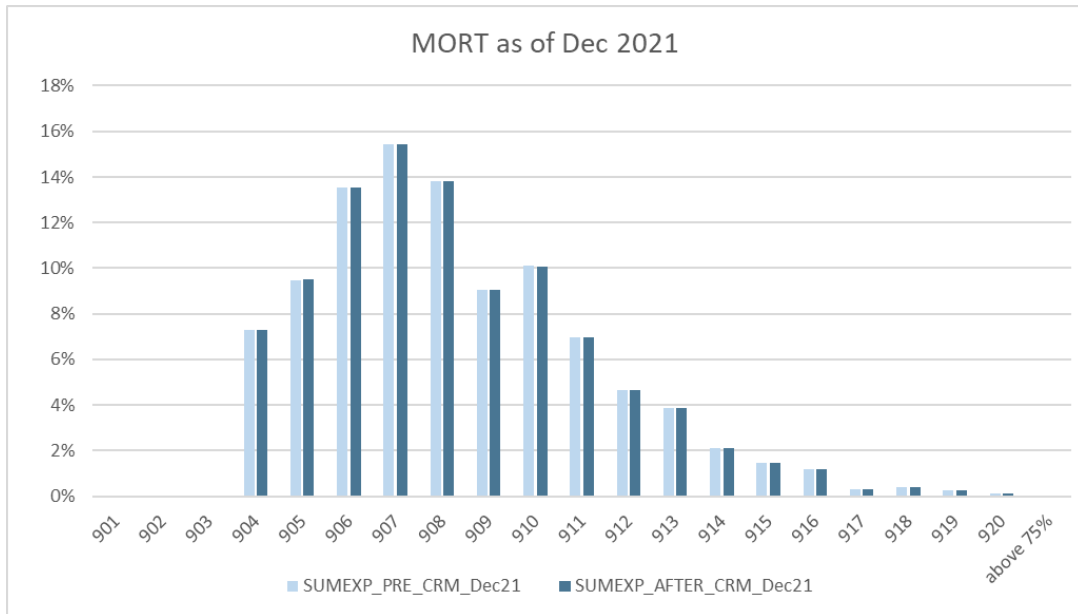
2.2.5 EAD breakdown by master rating grades by exposure class over time (only HDP)

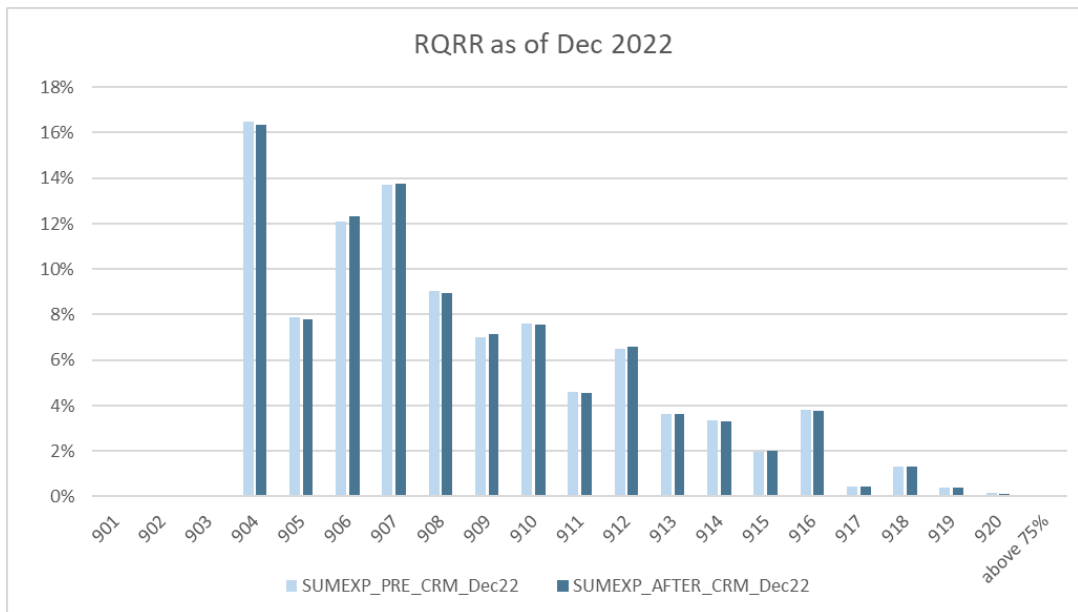
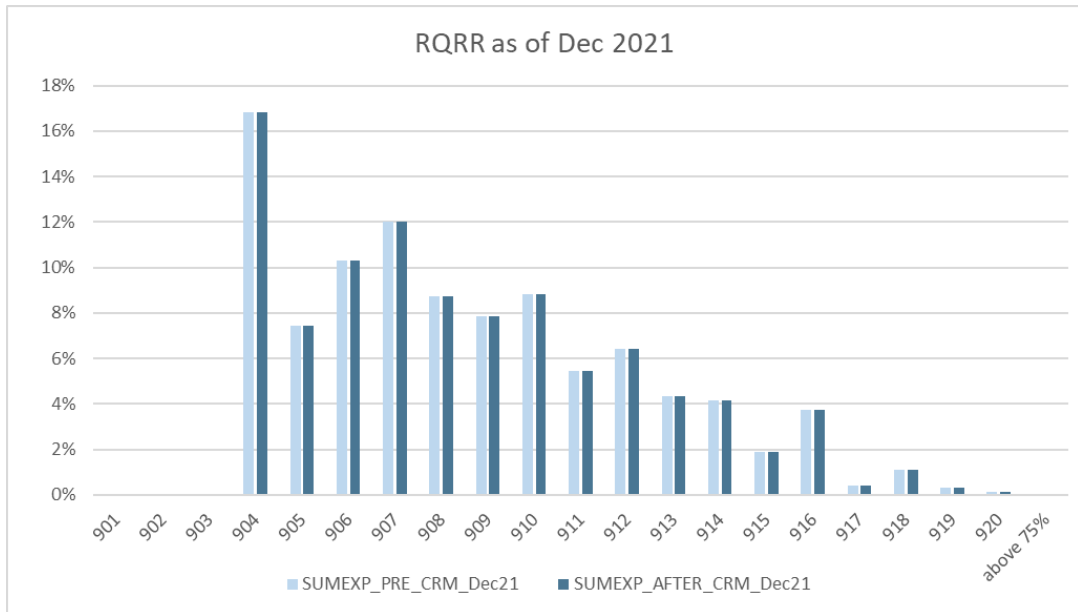
FIGURE 17: EAD BREAKDOWN BY MASTER RATING GRADES BY EXPOSURE CLASS OVER TIME (ONLY HDP)











2.2.6 Reporting of MoC and supervisory measures

TABLE 4: RANGES OF SUPERVISORY ADD-ONS TO PDs BY EXPOSURE CLASS – PERFORMING AIRB

Exposure class	% PD submission	Median Supervisory Add-on to PDs	Median MoCs to PDs	Median full conservatism	Median PDs
CORP	62.7%	1.1%	4.2%	10.2%	1.5%
COSP	63.0%	0.0%	0.1%	7.4%	1.3%
GOVT	69.2%	0.0%	0.9%	18.2%	0.1%
INST	75.0%	3.4%	0.3%	8.0%	0.2%
LCOR	66.0%	3.3%	2.0%	10.7%	0.7%
MORT	70.0%	0.0%	4.0%	9.5%	0.8%
RETO	65.8%	0.0%	2.5%	5.6%	1.6%
RQRR	71.9%	0.0%	0.2%	6.9%	1.6%
RSMS	62.7%	0.0%	4.9%	10.2%	1.7%
SMEC	58.8%	0.0%	4.5%	10.8%	2.1%
SMOT	59.7%	0.0%	4.7%	9.2%	2.6%

TABLE 5: RANGES OF SUPERVISORY ADD-ONS TO LGDs BY EXPOSURE CLASS – PERFORMING AIRB

Exposure class	% LGD submission	Median Supervisory Add-on to LGDs	Median MoCs to LGDs	Median full conservatism	Median downturn component	Median LGDs
CORP	62.7%	3.0%	1.7%	10.5%	8.9%	27.3%
COSP	66.7%	0.8%	7.1%	18.5%	11.0%	22.1%
GOVT	76.9%	0.4%	0.0%	20.3%	0.0%	24.1%
INST	80.0%	2.6%	0.0%	8.3%	0.1%	31.9%
LCOR	66.0%	2.4%	1.5%	11.6%	3.3%	32.0%
MORT	70.0%	3.6%	3.5%	13.5%	15.1%	15.8%
RETO	67.1%	0.0%	1.3%	9.1%	7.8%	39.3%
RQRR	68.8%	0.0%	0.0%	7.5%	5.7%	53.4%
RSMS	64.4%	2.8%	3.6%	13.3%	7.5%	17.8%
SMEC	58.8%	2.5%	2.9%	8.8%	12.4%	26.7%
SMOT	61.3%	0.1%	1.6%	6.1%	6.1%	36.8%

Performing AIRB --- Summary statistics for each add on

TABLE 6: RANGES OF MOC RELATIVE TO PD BY EXPOSURE CLASS – PERFORMING AIRB

pd_Moc							
Macro_exposure	Min_EU_pd_Moc	Max_EU_pd_Moc	P50_EU_pd_Moc	Mean_EU_pd_Moc	N_EU_pd_Moc	NMISS_EU_pd_Moc	Mean_EU_PD
CORP	0.0%	38.0%	4.2%	9.6%	30	21	1.5%
COSP	0.0%	25.0%	0.1%	6.9%	15	12	1.8%
GOVT	0.0%	28.6%	0.9%	7.8%	9	4	0.3%
INST	0.0%	35.7%	0.3%	5.1%	14	6	0.3%
LCOR	0.0%	41.4%	2.0%	9.0%	31	19	1.3%
MORT	0.0%	100.0%	4.0%	11.1%	53	27	0.9%
RETO	0.0%	36.2%	2.5%	7.5%	47	26	1.7%
RQRR	0.0%	30.0%	0.2%	5.9%	23	9	1.8%
RSMS	0.0%	42.7%	4.9%	9.0%	36	23	2.8%
SMEC	0.0%	96.6%	4.5%	12.0%	28	23	2.0%
SMOT	0.0%	46.0%	4.7%	8.8%	37	25	3.0%

TABLE 7: RANGES OF SUP RELATIVE TO PD BY EXPOSURE CLASS – PERFORMING AIRB

pd_Sup							
Macro_exposure	Min_EU_pd_Sup	Max_EU_pd_Sup	P50_EU_pd_Sup	Mean_EU_pd_Sup	N_EU_pd_Sup	NMISS_EU_pd_Sup	Mean_EU_PD
CORP	0.0%	100.0%	1.1%	10.4%	32	19	1.5%
COSP	0.0%	100.0%	0.0%	19.8%	17	10	1.8%
GOVT	0.0%	100.0%	0.0%	22.2%	9	4	0.3%
INST	-4.5%	100.0%	3.4%	17.1%	15	5	0.3%
LCOR	0.0%	100.0%	3.3%	11.9%	33	17	1.3%
MORT	-23.1%	100.0%	0.0%	8.6%	56	24	0.9%
RETO	-19.2%	100.0%	0.0%	6.3%	48	25	1.7%
RQRR	0.0%	100.0%	0.0%	7.1%	23	9	1.8%
RSMS	-3.0%	100.0%	0.0%	9.8%	37	22	2.8%
SMEC	-1.1%	100.0%	0.0%	9.3%	30	21	2.0%
SMOT	-0.8%	100.0%	0.0%	8.3%	37	25	3.0%

TABLE 8: RANGES OF MOC SUP RELATIVE TO PD BY EXPOSURE CLASS – PERFORMING AIRB

pd_MocSup							
Macro_exposure	Min_EU_pd_MocSup	Max_EU_pd_MocSup	P50_EU_pd_MocSup	Mean_EU_pd_MocSup	N_EU_pd_MocSup	NMISS_EU_pd_MocSup	Mean_EU_PD
CORP	0.0%	100.0%	10.2%	20.0%	30	21	1.5%
COSP	0.0%	100.0%	7.4%	26.3%	15	12	1.8%
GOVT	0.0%	100.0%	18.2%	30.0%	9	4	0.3%
INST	-4.1%	100.0%	8.0%	21.6%	14	6	0.3%
LCOR	0.0%	100.0%	10.7%	20.4%	31	19	1.3%
MORT	0.0%	100.0%	9.5%	19.1%	53	27	0.9%
RETO	-10.8%	100.0%	5.6%	13.8%	47	26	1.7%
RQRR	0.0%	100.0%	6.9%	12.9%	23	9	1.8%
RSMS	0.0%	100.0%	10.2%	18.5%	36	23	2.8%
SMEC	0.0%	100.0%	10.8%	21.4%	28	23	2.0%
SMOT	0.0%	100.0%	9.2%	16.8%	37	25	3.0%

TABLE 9: RANGES OF MOC RELATIVE TO LGD BY EXPOSURE CLASS – PERFORMING AIRB

LGD_Moc							
Macro_exposure	Min_EU_LGD_Moc	Max_EU_LGD_Moc	P50_EU_LGD_Moc	Mean_EU_LGD_Moc	N_EU_LGD_Moc	NMISS_EU_LGD_Moc	Mean_EU_LGD
CORP	-3.8%	29.0%	1.7%	6.2%	32	19	29.2%
COSP	0.0%	47.0%	7.1%	11.5%	18	9	22.7%
GOVT	0.0%	50.0%	0.0%	9.1%	10	3	28.2%
INST	0.0%	19.6%	0.0%	3.8%	15	5	30.3%
LCOR	-3.6%	43.4%	1.5%	5.7%	33	17	32.1%
MORT	-7.6%	76.1%	3.5%	9.8%	53	27	17.2%
RETO	-7.2%	48.1%	1.3%	6.2%	47	26	40.5%
RQRR	-5.8%	22.4%	0.0%	3.3%	22	10	52.7%
RSMS	-4.5%	94.3%	3.6%	8.7%	37	22	18.9%
SMEC	-4.0%	31.9%	2.9%	6.0%	30	21	26.7%
SMOT	-3.8%	36.3%	1.6%	4.5%	37	25	37.8%

TABLE 10: RANGES OF SUP RELATIVE TO LGD BY EXPOSURE CLASS – PERFORMING AIRB

LGD_Sup							
Macro_exposure	Min_EU_LGD_Sup	Max_EU_LGD_Sup	P50_EU_LGD_Sup	Mean_EU_LGD_Sup	N_EU_LGD_Sup	NMISS_EU_LGD_Sup	Mean_EU_LGD
CORP	0.0%	100.0%	3.0%	14.7%	32	19	29.2%
COSP	0.0%	100.0%	0.8%	23.6%	18	9	22.7%
GOVT	0.0%	100.0%	0.4%	39.9%	10	3	28.2%
INST	0.0%	100.0%	2.6%	23.1%	16	4	30.3%
LCOR	0.0%	100.0%	2.4%	19.1%	33	17	32.1%
MORT	0.0%	100.0%	3.6%	12.9%	56	24	17.2%
RETO	0.0%	100.0%	0.0%	9.8%	49	24	40.5%
RQRR	0.0%	100.0%	0.0%	12.7%	22	10	52.7%
RSMS	0.0%	100.0%	2.8%	13.4%	38	21	18.9%
SMEC	0.0%	100.0%	2.5%	12.5%	30	21	26.7%
SMOT	0.0%	100.0%	0.1%	9.4%	38	24	37.8%

TABLE 11: RANGES OF MocSup RELATIVE TO LGD BY EXPOSURE CLASS – PERFORMING AIRB

LGD_MocSup							
Macro_exposure	Min_EU_LGD_MocSup	Max_EU_LGD_MocSup	P50_EU_LGD_MocSup	Mean_EU_LGD_MocSup	N_EU_LGD_MocSup	NMISS_EU_LGD_MocSup	Mean_EU_LGD
CORP	0.0%	100.0%	10.5%	20.0%	32	19	29.2%
COSP	0.0%	100.0%	18.5%	32.1%	18	9	22.7%
GOVT	0.0%	100.0%	20.3%	44.1%	10	3	28.2%
INST	0.0%	100.0%	8.3%	21.5%	15	5	30.3%
LCOR	0.0%	100.0%	11.6%	23.0%	33	17	32.1%
MORT	-5.0%	100.0%	13.5%	21.8%	53	27	17.2%
RETO	-4.8%	100.0%	9.1%	15.8%	47	26	40.5%
RQRR	-3.8%	100.0%	7.5%	15.9%	22	10	52.7%
RSMS	-0.5%	100.0%	13.3%	20.8%	37	22	18.9%
SMEC	0.0%	100.0%	8.8%	18.1%	30	21	26.7%
SMOT	0.0%	100.0%	6.1%	13.4%	37	25	37.8%

TABLE 12: RANGES OF DOWNTURN-COMPONENT RELATIVE TO LGD BY EXPOSURE CLASS – PERFORMING AIRB

LGD_dwntrn							
Macro_exposure	Min_EU_LGD_dwntrn	Max_EU_LGD_dwntrn	P50_EU_LGD_dwntrn	Mean_EU_LGD_dwntrn	N_EU_LGD_dwntrn	NMISS_EU_LGD_dwntrn	Mean_EU_LGD
CORP	0.0%	84.7%	8.9%	14.3%	32	19	29.2%
COSP	0.0%	28.5%	11.0%	10.1%	17	10	22.7%
GOVT	0.0%	33.3%	0.0%	5.3%	10	3	28.2%
INST	0.0%	35.9%	0.1%	6.1%	15	5	30.3%
LCOR	0.0%	51.7%	3.3%	9.7%	32	18	32.1%
MORT	0.0%	81.8%	15.1%	17.4%	53	27	17.2%
RETO	0.0%	50.1%	7.8%	10.5%	47	26	40.5%
RQRR	0.0%	72.3%	5.7%	9.4%	22	10	52.7%
RSMS	0.0%	81.8%	7.5%	13.4%	37	22	18.9%
SMEC	0.0%	92.5%	12.4%	15.9%	30	21	26.7%
SMOT	0.0%	38.1%	6.1%	9.0%	37	25	37.8%

Non Performing AIRB --- Summary statistics for each LGD add on

TABLE 13: RANGES OF SUPERVISORY ADD-ONS TO LGD BY EXPOSURE CLASS – DEFAULTED AIRB

Exposure class	% LGD submission	Median Supervisory Add-on to LGDs	Median MoCs to LGDs	Median full conservatism	Median downturn component	Median LGDs
CORP	65.2%	0.0%	0.2%	5.8%	2.8%	44.0%
COSP	70.8%	0.0%	3.5%	10.9%	4.7%	38.5%
GOVT	70.0%	0.0%	2.1%	30.5%	0.0%	51.1%
INST	75.0%	0.0%	0.0%	0.2%	0.0%	49.1%
LCOR	67.5%	0.0%	0.3%	9.6%	1.4%	42.7%
MORT	68.8%	0.0%	0.1%	1.8%	1.8%	22.9%
RETO	67.1%	0.0%	0.4%	1.7%	2.0%	55.9%
RQRR	68.8%	0.0%	0.0%	0.5%	1.9%	69.6%
RSMS	66.7%	0.0%	0.2%	3.9%	1.7%	31.5%
SMEC	60.0%	0.0%	0.6%	4.6%	2.5%	41.3%
SMOT	61.0%	0.0%	0.3%	4.5%	1.5%	56.2%

TABLE 14: RANGES OF MOC RELATIVE TO LGD BY EXPOSURE CLASS – DEFAULTED AIRB

LGD_Moc							
Macro_exposure	Min_EU_LGD_Moc	Max_EU_LGD_D_Moc	P50_EU_LGD_Moc	Mean_EU_LGD_Moc	N_EU_LGD_D_Moc	NMISS_EU_LGD_Moc	Mean_EU_LGD_D
CORP	0.0%	21.4%	0.2%	3.4%	30	16	44.6%
COSP	0.0%	34.9%	3.5%	7.9%	17	7	43.6%
GOVT	0.0%	30.5%	2.1%	9.7%	7	3	46.5%
INST	0.0%	7.5%	0.0%	1.4%	12	4	48.5%
LCOR	0.0%	27.3%	0.3%	4.6%	27	13	43.9%
MORT	-24.9%	75.3%	0.1%	5.8%	51	26	26.9%
RETO	-7.0%	17.0%	0.4%	2.4%	45	25	56.5%
RQRR	-15.6%	9.6%	0.0%	0.3%	22	10	64.2%
RSMS	0.0%	82.4%	0.2%	6.7%	37	20	33.6%
SMEC	0.0%	38.2%	0.6%	4.5%	30	20	51.0%
SMOT	0.0%	30.3%	0.3%	3.7%	35	25	56.2%

TABLE 15: RANGES OF SUP RELATIVE TO LGD BY EXPOSURE CLASS – DEFAULTED AIRB

LGD_Sup							
Macro_exposure	Min_EU_LGD_Sup	Max_EU_LGD_D_Sup	P50_EU_LGD_Sup	Mean_EU_LGD_Sup	N_EU_LGD_D_Sup	NMISS_EU_LGD_Sup	Mean_EU_LGD_D
CORP	-55.3%	100.0%	0.0%	8.2%	30	16	44.6%
COSP	-14.9%	100.0%	0.0%	16.0%	17	7	43.6%
GOVT	0.0%	100.0%	0.0%	38.0%	7	3	46.5%
INST	-9.7%	100.0%	0.0%	17.9%	12	4	48.5%
LCOR	-172.4%	100.0%	0.0%	8.0%	27	13	43.9%
MORT	-129.4%	100.0%	0.0%	2.1%	53	24	26.9%
RETO	-731.4%	100.0%	0.0%	-9.7%	47	23	56.5%
RQRR	-340.3%	100.0%	0.0%	-6.8%	22	10	64.2%
RSMS	-103.6%	100.0%	0.0%	5.8%	38	19	33.6%
SMEC	-52.0%	100.0%	0.0%	7.4%	30	20	51.0%
SMOT	-12.1%	100.0%	0.0%	7.7%	36	24	56.2%

TABLE 16: RANGES OF MOCSUP RELATIVE TO LGD BY EXPOSURE CLASS – DEFAULTED AIRB

LGD_MocSup							
Macro_exposure	Min_EU_LGD_MocSup	Max_EU_LGD_MocSup	P50_EU_LGD_MocSup	Mean_EU_LGD_MocSup	N_EU_LGD_MocSup	NMISS_EU_LGD_MocSup	Mean_EU_LGD
CORP	-43.9%	100.0%	5.8%	11.7%	30	16	44.6%
COSP	-10.8%	100.0%	10.9%	23.5%	17	7	43.6%
GOVT	2.1%	100.0%	30.5%	47.7%	7	3	46.5%
INST	-6.5%	100.0%	0.2%	19.3%	12	4	48.5%
LCOR	-165.7%	100.0%	9.6%	12.7%	27	13	43.9%
MORT	-186.5%	100.0%	1.8%	7.8%	51	26	26.9%
RETO	-789.9%	100.0%	1.7%	-8.9%	45	25	56.5%
RQRR	-409.1%	100.0%	0.5%	-9.0%	22	10	64.2%
RSMS	-54.7%	100.0%	3.9%	13.2%	37	20	33.6%
SMEC	-48.6%	100.0%	4.6%	11.9%	30	20	51.0%
SMOT	-10.8%	100.0%	4.5%	11.6%	35	25	56.2%

TABLE 17: RANGES OF DOWNTURN RELATIVE TO LGD BY EXPOSURE CLASS – DEFAULTED AIRB

LGD_dwntrn							
Macro_exposure	Min_EU_LGD_dwntrn	Max_EU_LGD_dwntrn	P50_EU_LGD_dwntrn	Mean_EU_LGD_dwntrn	N_EU_LGD_dwntrn	NMISS_EU_LGD_dwntrn	Mean_EU_LGD
CORP	0.0%	73.8%	2.8%	12.3%	30	16	44.6%
COSP	0.0%	30.5%	4.7%	9.2%	17	7	43.6%
GOVT	0.0%	13.2%	0.0%	2.0%	7	3	46.5%
INST	0.0%	97.3%	0.0%	12.5%	12	4	48.5%
LCOR	0.0%	66.4%	1.4%	7.3%	27	13	43.9%
MORT	0.0%	100.0%	1.8%	14.1%	51	26	26.9%
RETO	0.0%	99.9%	2.0%	7.5%	45	25	56.5%
RQRR	0.0%	75.2%	1.9%	7.2%	22	10	64.2%
RSMS	0.0%	81.8%	1.7%	8.5%	36	21	33.6%
SMEC	0.0%	97.1%	2.5%	12.2%	30	20	51.0%
SMOT	0.0%	94.6%	1.5%	8.5%	35	25	56.2%

Performing FIRB --- Summary statistics for each add on

TABLE 18: RANGES OF SUPERVISORY ADD-ONS TO PDs BY EXPOSURE CLASS – PERFORMING FIRB

Exposure class	% PD submission	Median Supervisory Add-on to PDs	Median MoCs to PDs	Median full conservatism	Median PDs
CORP	71.4%	0.0%	5.7%	11.6%	1.1%
COSP	73.7%	0.0%	0.0%	0.8%	0.6%
GOVT	77.8%	0.0%	0.0%	0.0%	0.0%
INST	61.0%	0.0%	0.0%	11.3%	0.1%
LCOR	66.0%	0.0%	4.9%	18.4%	0.6%
SMEC	71.4%	0.0%	4.8%	11.4%	1.8%

TABLE 19: RANGES OF MOC RELATIVE TO PD BY EXPOSURE CLASS – PERFORMING FIRB

pd_Moc							
Macro_exposure	Min_EU_pd_Moc	Max_EU_pd_Moc	P50_EU_pd_Moc	Mean_EU_pd_Moc	N_EU_pd_Moc	NMISS_EU_pd_Moc	Mean_EU_PD
CORP	0.0%	63.8%	5.7%	11.0%	33	16	1.3%
COSP	0.0%	10.0%	0.0%	1.6%	13	6	0.8%
GOVT	0.0%	73.8%	0.0%	6.3%	18	9	0.1%
INST	-1.1%	46.6%	0.0%	9.7%	25	16	0.5%
LCOR	0.0%	71.1%	4.9%	15.8%	34	19	0.8%
SMEC	0.0%	73.4%	4.8%	10.6%	33	16	1.9%

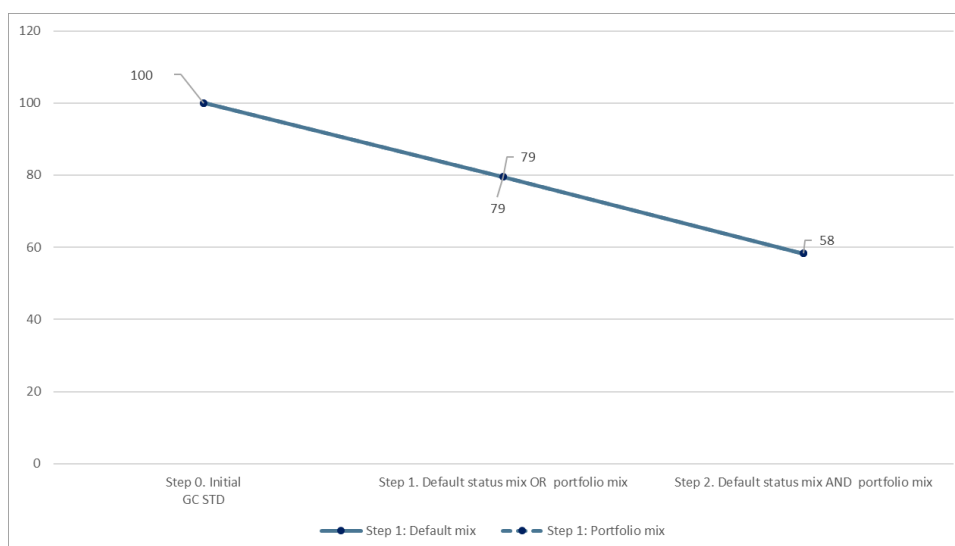
TABLE 20: RANGES OF SUP RELATIVE TO PD BY EXPOSURE CLASS – PERFORMING FIRB

pd_Sup							
Macro_exposure	Min_EU_pd_Sup	Max_EU_pd_Sup	P50_EU_pd_Sup	Mean_EU_pd_Sup	N_EU_pd_Sup	NMISS_EU_pd_Sup	Mean_EU_PD
CORP	0.0%	100.0%	0.0%	7.2%	35	14	1.3%
COSP	0.0%	11.8%	0.0%	1.7%	14	5	0.8%
GOVT	0.0%	100.0%	0.0%	11.5%	21	6	0.1%
INST	0.0%	100.0%	0.0%	13.5%	25	16	0.5%
LCOR	0.0%	100.0%	0.0%	13.4%	35	18	0.8%
SMEC	0.0%	100.0%	0.0%	6.6%	35	14	1.9%

TABLE 21: RANGES OF MOC SUP RELATIVE TO PD BY EXPOSURE CLASS – PERFORMING FIRB

pd_MocSup							
Macro_exposure	Min_EU_pd_MocSup	Max_EU_pd_MocSup	P50_EU_pd_MocSup	Mean_EU_pd_MocSup	N_EU_pd_MocSup	NMISS_EU_pd_MocSup	Mean_EU_PD
CORP	0.0%	100.0%	11.6%	18.3%	33	16	1.3%
COSP	0.0%	11.8%	0.8%	3.5%	13	6	0.8%
GOVT	0.0%	100.0%	0.0%	12.7%	20	7	0.1%
INST	0.0%	100.0%	11.3%	19.2%	24	17	0.5%
LCOR	0.0%	100.0%	18.4%	25.8%	33	20	0.8%
SMEC	0.0%	100.0%	11.4%	16.4%	33	16	1.9%

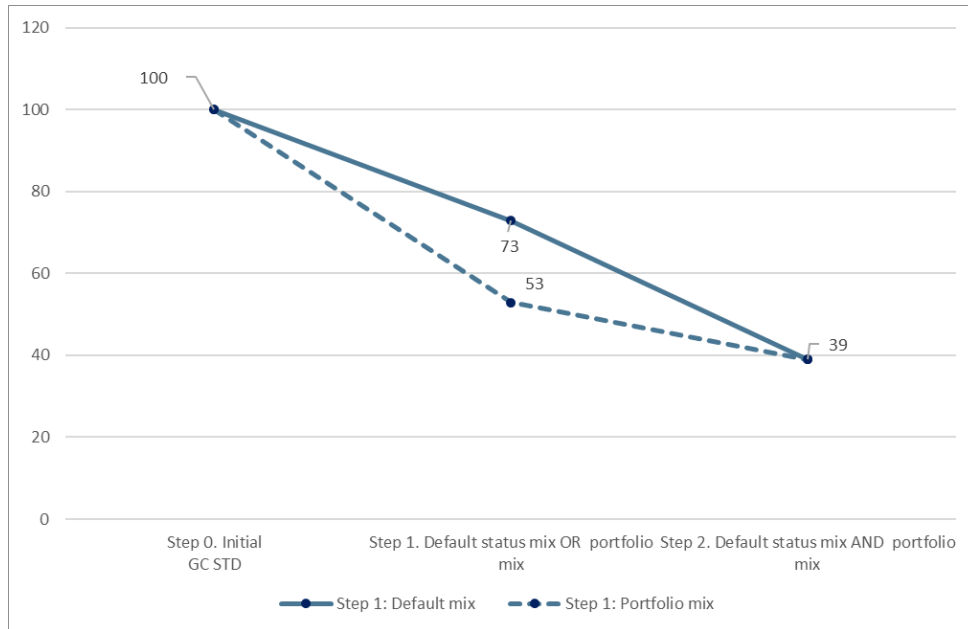
2.3 Variability of capital requirements under the IRB – as of 31.12.2022

FIGURE 18: DECOMPOSITION OF THE GC STANDARD DEVIATION INDEX – HDP AND LDP

Sample: 80 institutions; for the missing variables the median values have been used, initial standard deviations 17% (last year 21%).

Note: When the GC is missing, it is assumed to be equal to the benchmark value.

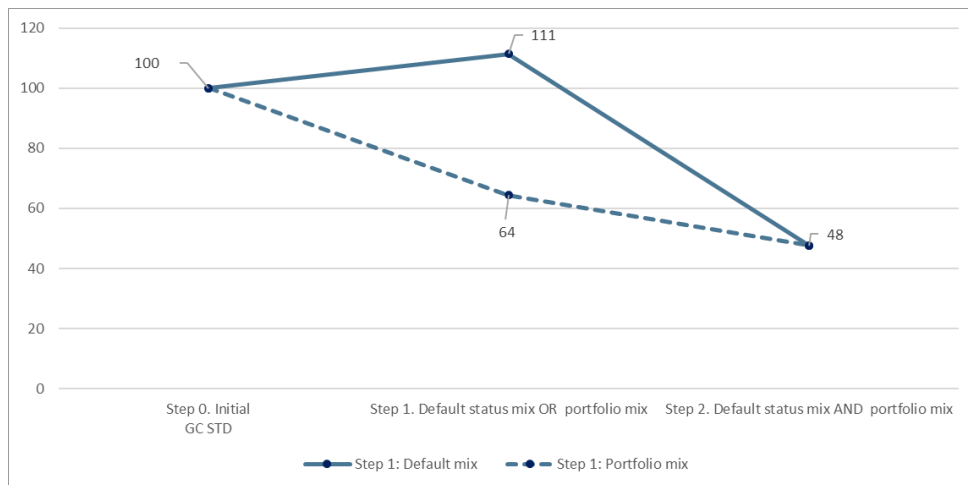
FIGURE 19: DECOMPOSITION OF THE GC STANDARD DEVIATION INDEX – LDP



Sample: 85 institutions. Initial standard deviation 35% (last year 29%).

Note: When the GC is missing, it is assumed to be equal to the benchmark value.

FIGURE 20: DECOMPOSITION OF THE GC STANDARD DEVIATION INDEX – HDP



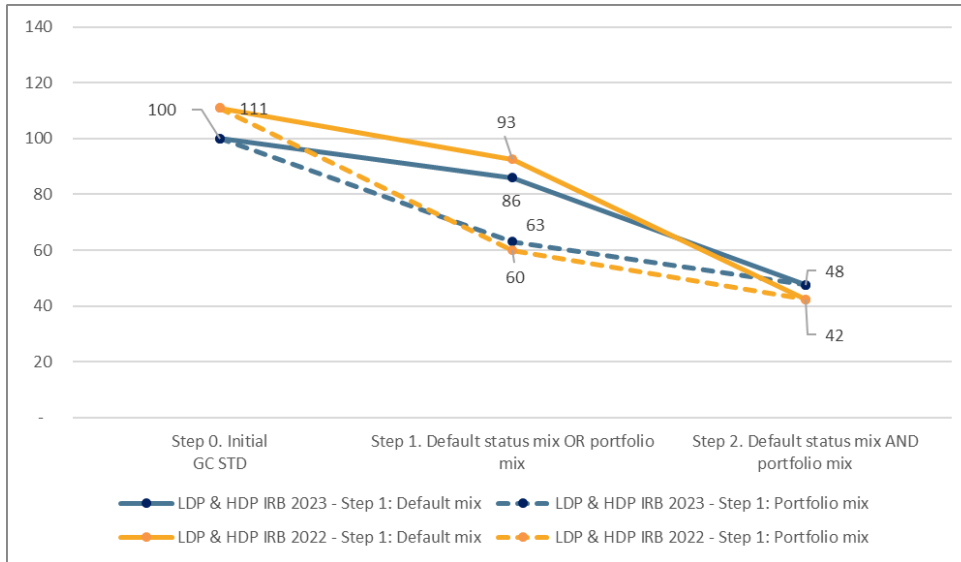
Sample: 94 institutions. Initial standard deviation 22% (last year 24%).

Note: When the GC is missing, it is assumed to be equal to the benchmark value.

1.1.1 Results compared with previous exercise

FIGURE 21: COMPARISON OF THE TOP-DOWN ANALYSIS, HDPs AND LDPs, 2022 AND 2023 EXERCISES (COMMON SAMPLE)

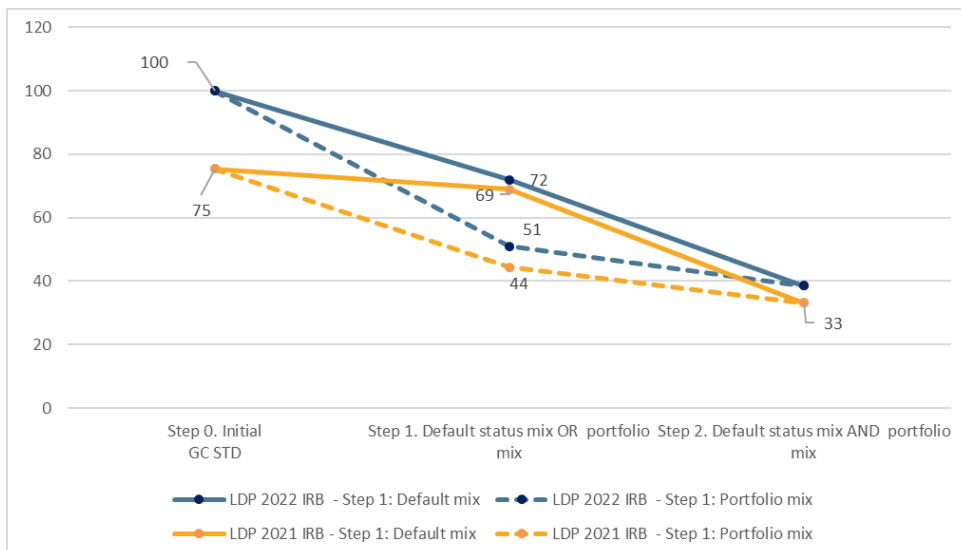
TpDw_Results



Sample: 89 institutions (only common institutions between 2022 and 2023 are kept). Initial STD 20%.

For comparison, the explained variability in last year’s sample was 58% for both HDPs & LDPs (figure 25 of the 2022 Chart Pack). Based on the common 2022-2023 sample, the 2022 share of explained variability is equal to $(100-42)=58\%$, but considering the different initial STD (that is equal to 110 instead of 100) the explained variability within this year common sample would be $(100-48)/111*100 = 52\%$.

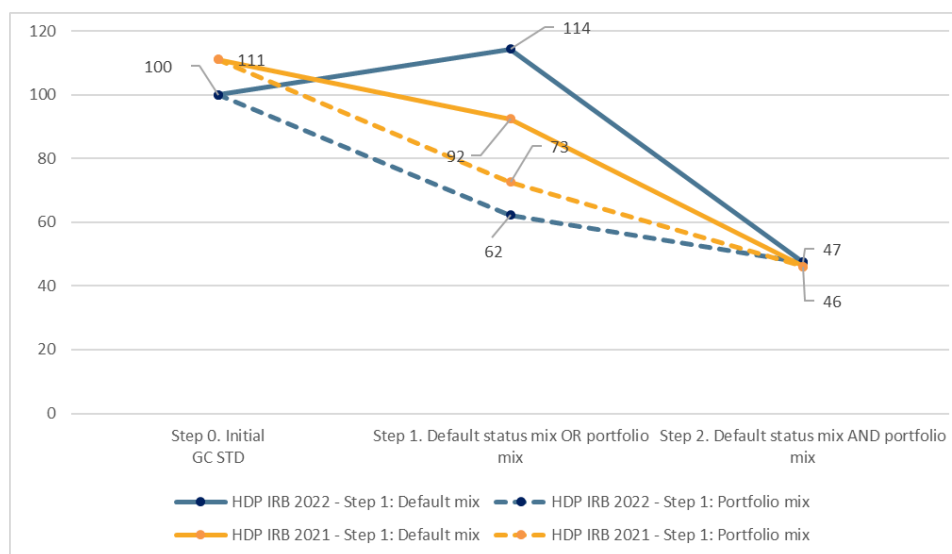
FIGURE 22: COMPARISON OF THE TOP-DOWN ANALYSIS, LDPs, 2022 AND 2023 EXERCISES (COMMON SAMPLE)



Sample: 77 institutions (only common institutions between 2022 and 2023 are kept). Initial standard deviation (CY) 36%.

For comparison, the explained variability in last year's sample was 56% for LDPs (figure 26 of the 2022 Chart Pack). Based on the common 2022-2023 sample, the 2022 share of explained variability is equal to $(75-33)/75=42\%$, but considering the different initial STD (that is equal to 75 instead of 100) the explained variability within this year common sample would be $(100-40)/75*100 = 80\%$.

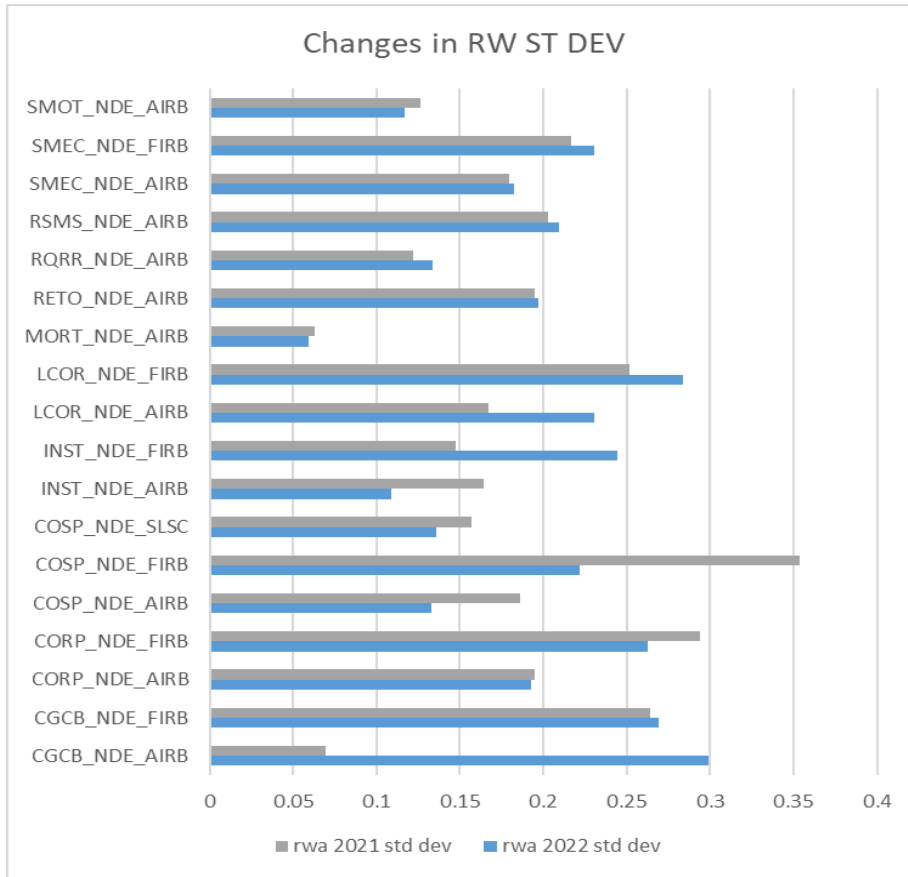
FIGURE 23: COMPARISON OF THE TOP-DOWN ANALYSIS, HDPs, 2022 AND 2023 EXERCISES (COMMON SAMPLE)



Sample: 85 institutions (only common institutions between 2022 and 2023 are kept). Initial standard deviations CY 21%

For comparison, the explained variability last year sample was 71% for HDPs (figure 27 of the 2022 Chart Pack). Based on the common 2021-2022 sample, the 2022 share of explained variability is equal to $(111-47)/111=64\%$, but considering the different initial STD (that is equal to 111 instead of 100) the explained variability within this year common sample would be $(100-46)/111 * 100 = 48.6\%$.

FIGURE 24: CHANGE IN THE STANDARD DEVIATION OF THE RW BY REGULATORY APPROACH, NON-DEFAULTED EXPOSURES



2.4 Variability of IRB key metrics in low default portfolios – as of 31.12.2022

1.1.2 Results on the latest collected data

TABLE 22: SUMMARY STATISTICS ON THE RW DEVIATIONS (INTERQUARTILE RANGE) BY SVB EXPOSURE CLASS AND REGULATORY APPROACH FOR THE 2022 AND 2023 EXERCISE

		AIRB					FIRB	
		Dev 1 (ALL)	Dev2 (PD)	Dev3 (LGD)	Dev4 (M)	Dev5 (LGD _{unsec})	Dev 1 (ALL)	Dev2 (PD)
Large corporates	2023	10%	8%	5%	6%	5%	7%	5%
	2022	9%	9%	6%	6%	5%	7%	6%
Sovereigns	2023	9%	2%	8%	2%	8%	6%	5%
	2022	8%	2%	5%	1%	3%	4%	6%
Institutions	2023	7%	4%	2%	4%	7%	7%	5%
	2022	11%	4%	4%	5%	6%	5%	5%

NB: this table presents a gross comparison of the metrics between 2021 and 2022 data, without controlling for the sample composition of institutions and counterparties reported (see next section).

In terms of relative deviation, the following metrics are observed:

		AIRB					FIRB	
		Dev 1 (ALL)	Dev2 (PD)	Dev3 (LGD)	Dev4 (M)	Dev5 (LGD _{unsec})	Dev 1 (ALL)	Dev2 (PD)
Large corporates	Q1	-8%	-2%	-3%	-7%	-4%	-4%	-1%
	Q3	3%	5%	2%	-1%	1%	3%	4%
	median	-1.6%	0.8%	0.0%	-3.0%	0.0%	-0.3%	0.0%
	Q3 -Q1	10%	8%	5%	6%	5%	7%	5%
Sovereigns	Q1	-1%	0%	-1%	0%	-1%	-4%	-3%
	Q3	8%	2%	7%	1%	7%	3%	3%
	median	3.7%	0.0%	0.2%	0.6%	0.7%	0.0%	0.0%
	Q3 -Q1	9%	2%	8%	2%	8%	6%	5%
Institutions	Q1	-11%	-1%	-2%	-9%	-5%	-5%	-2%
	Q3	-3%	3%	0%	-5%	2%	1%	3%
	median	-7.6%	0.6%	0.0%	-8.2%	0.1%	-1.7%	0.0%
	Q3 -Q1	7%	4%	2%	4%	7%	7%	5%

1.1.1 Results compared with previous exercise

In this section, the interquartile range of risk estimates (RW, PD and LGD) for one counterparty is used as a measure of the variability. Figure 25 shows the evolution of the variability for the worst counterparties, i.e. where the interquartile range of risk estimates is the highest.¹

FIGURE 25: EVOLUTION OF RW

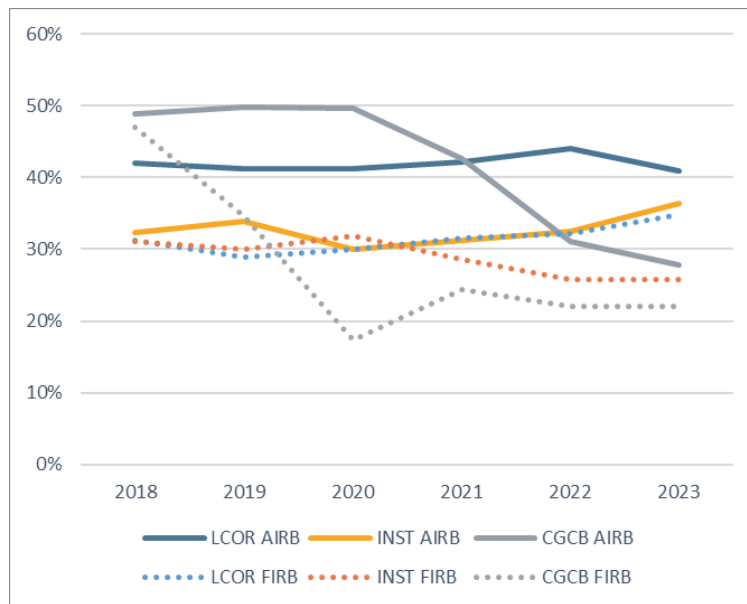
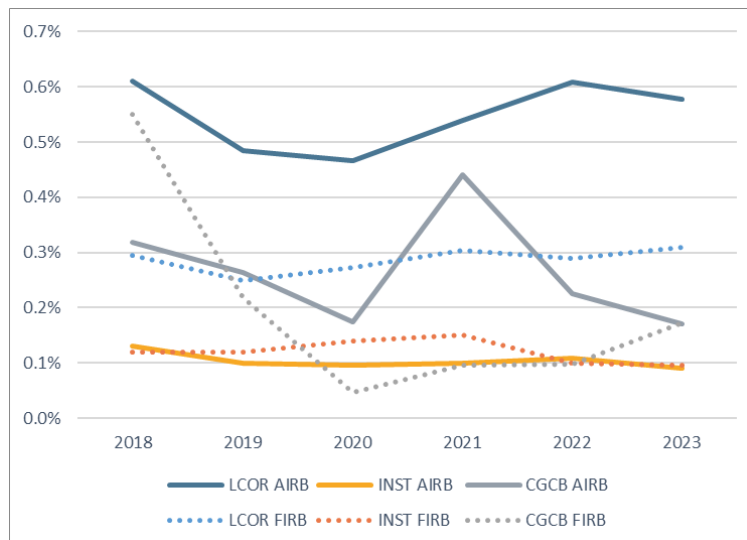


FIGURE 26: EVOLUTION OF PD



¹ The third quartile is used to select the counterparties.

FIGURE 27: EVOLUTION OF LGD

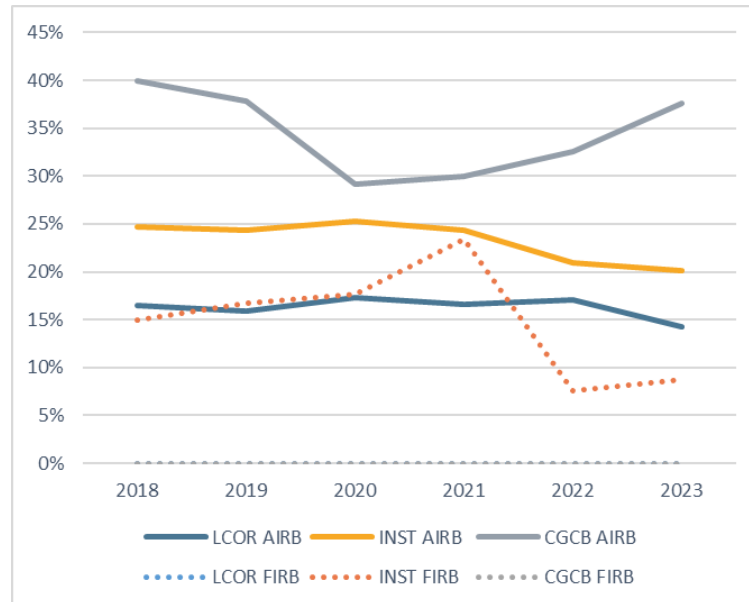
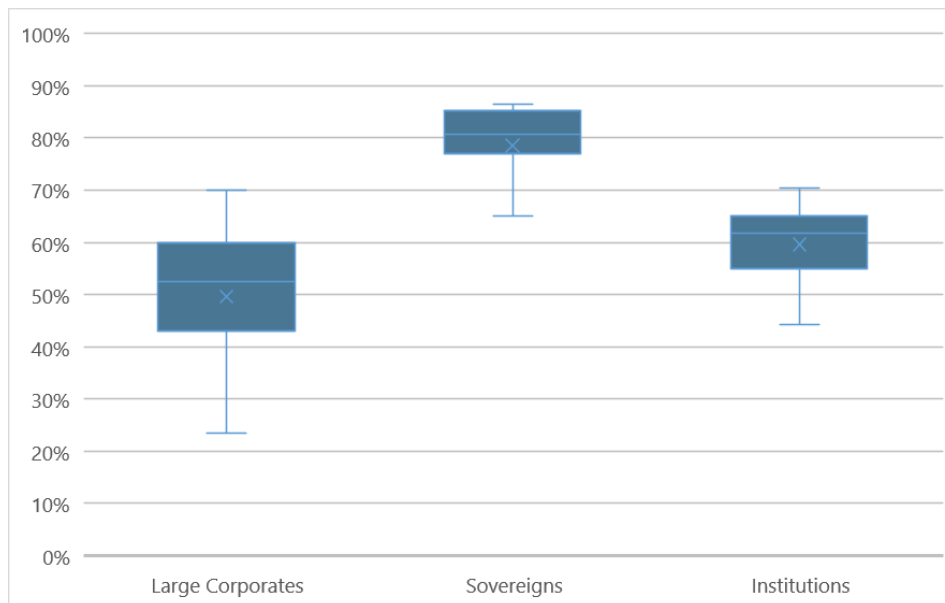


FIGURE 28: INTERQUARTILE RANGE, MEDIAN AND AVERAGE OF KENDALL TAU METRICS



2.5 Variability of IRB key metrics in high default portfolios – as of 31.12.2022

FIGURE 29: INTERQUARTILE RANGE OF THE RATIO OF DR 1Y TO PD AND THE RATIO OF DR 5Y TO PD, FOR NON-DEFAULTED EXPOSURES, BY SVB EXPOSURE CLASS AND REGULATORY APPROACH

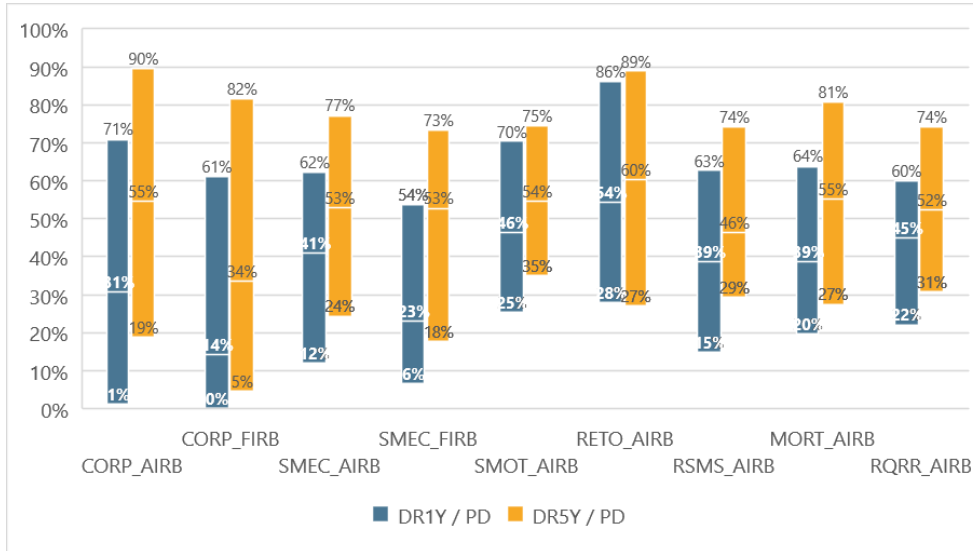
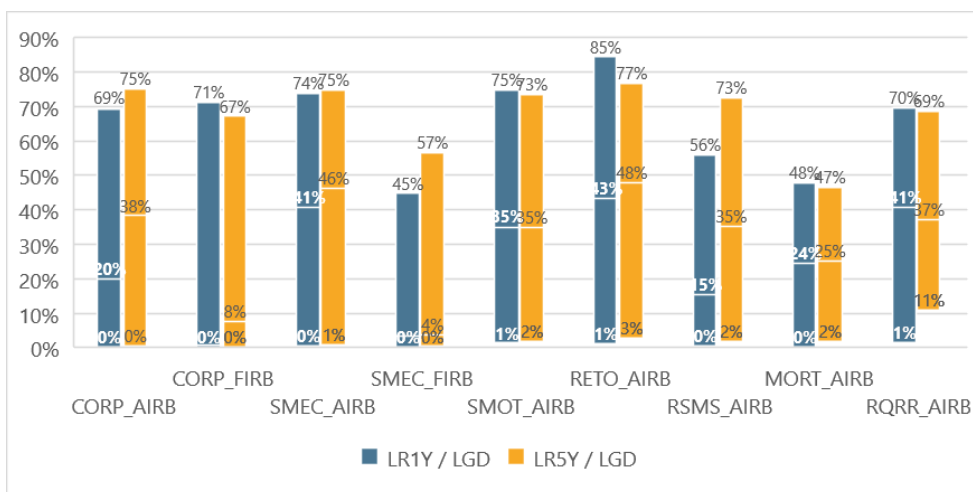


FIGURE 29: INTERQUARTILE RANGE OF THE RATIO BETWEEN LR 1Y AND LGD AND THE RATIO BETWEEN LR 5Y AND LGD, FOR NON-DEFAULTED EXPOSURES, BY PORTFOLIO AND REGULATORY APPROACH

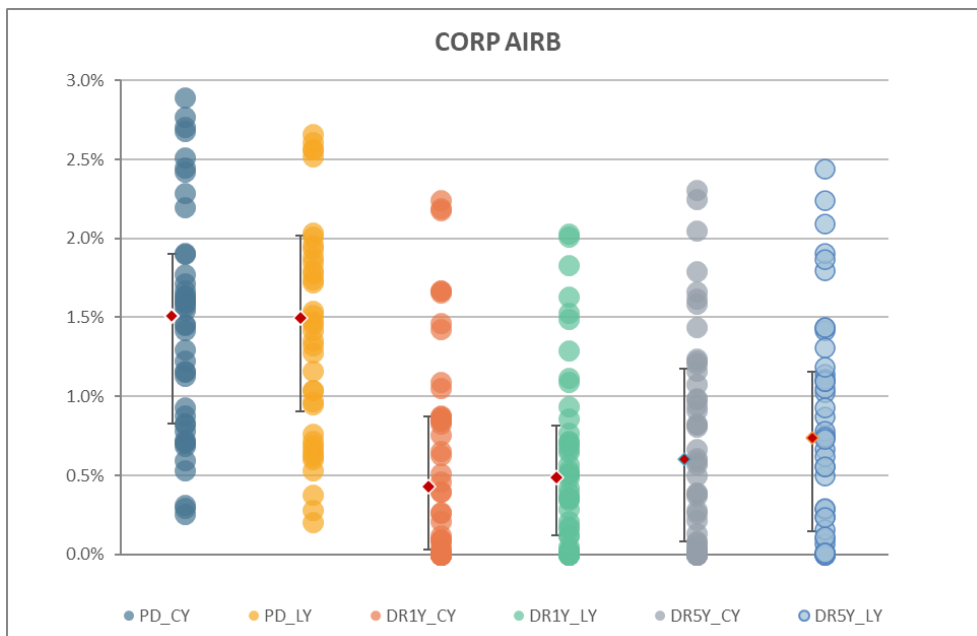


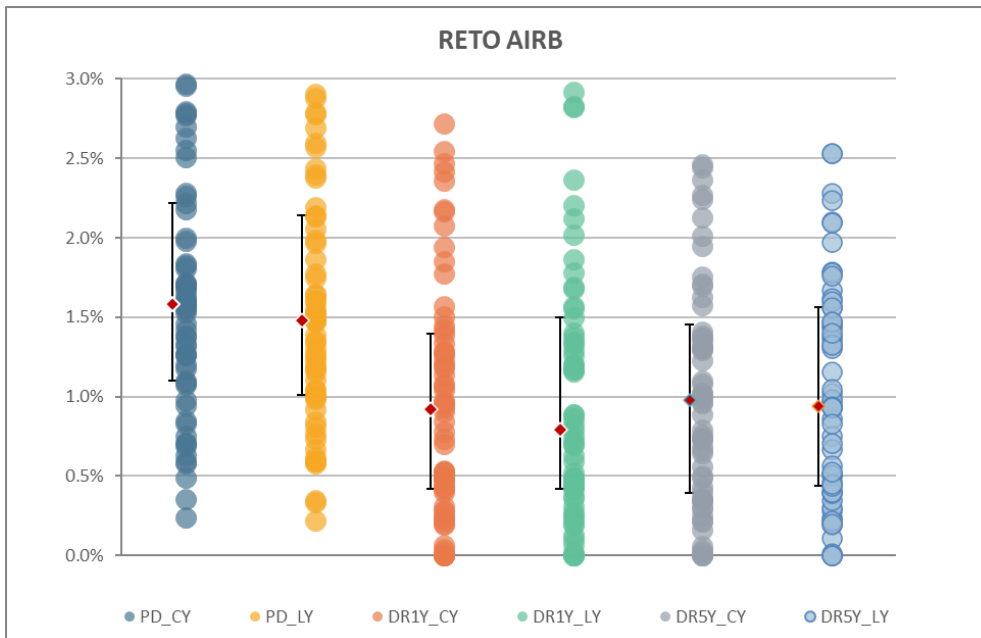
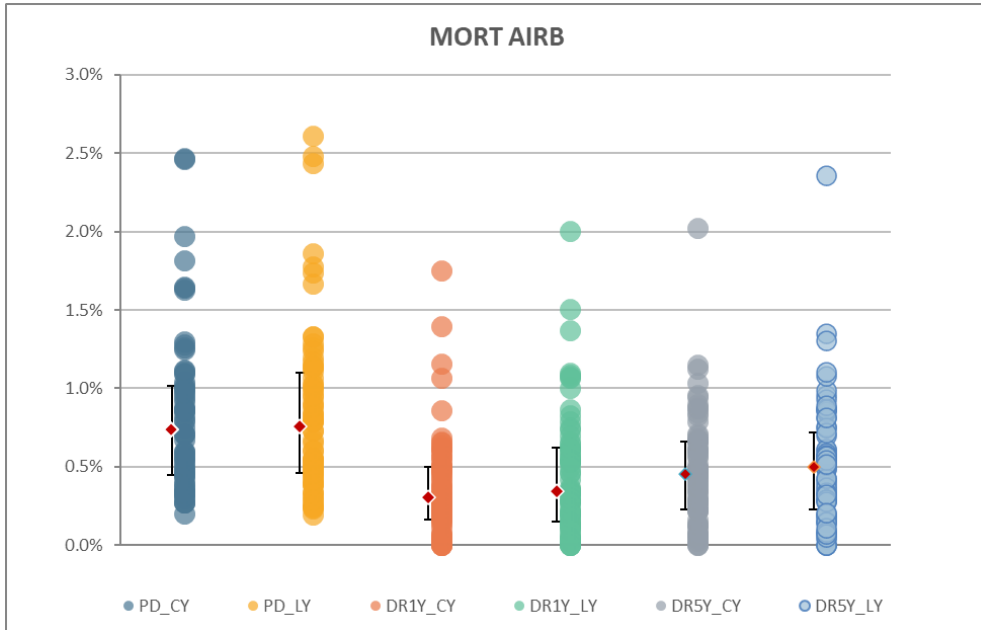
2.6 Results compared with previous exercise – PD & DR – By exposure class

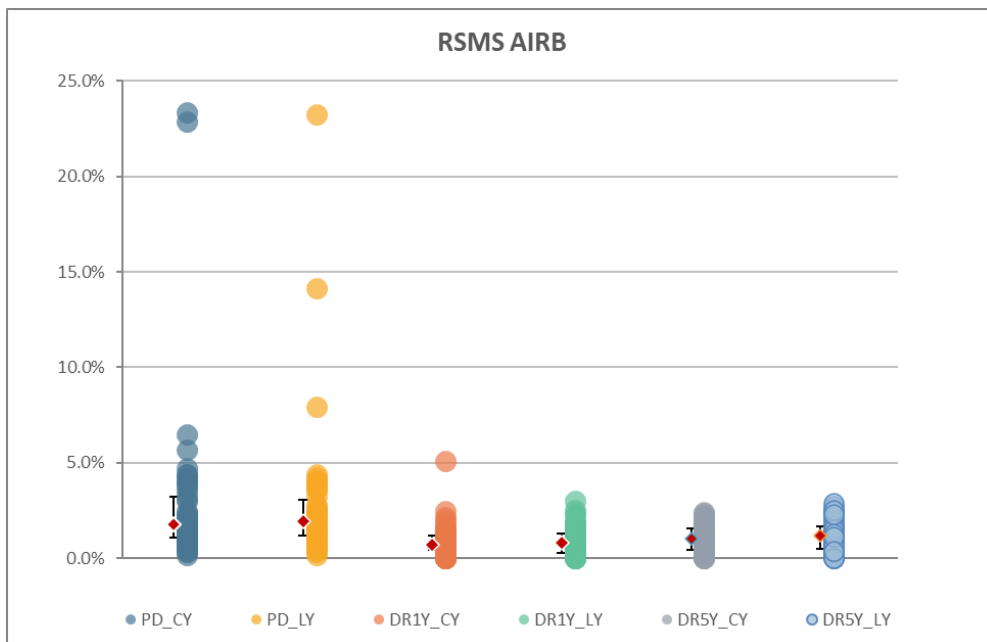
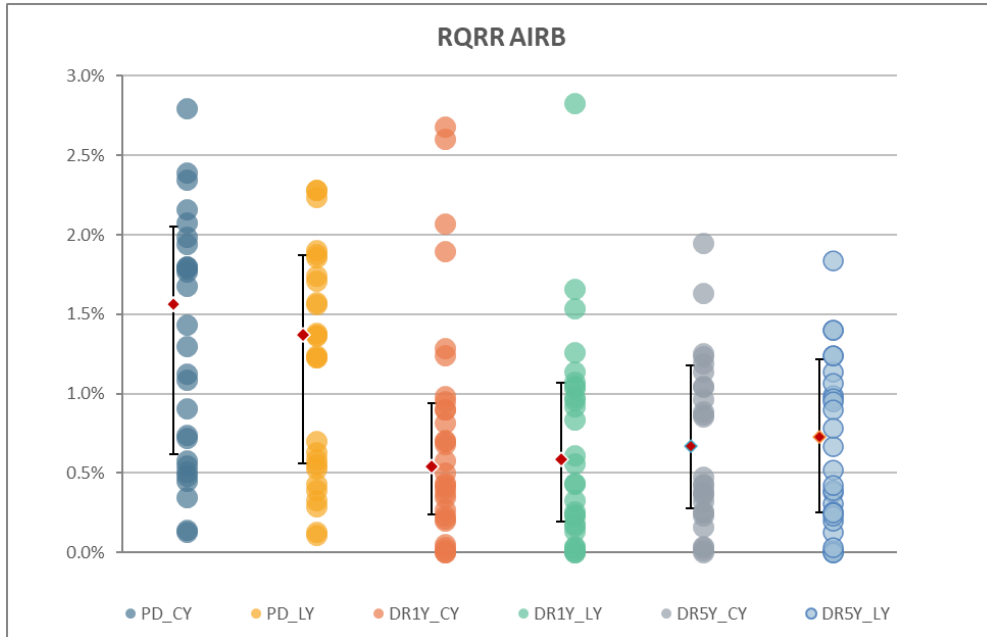
Figure 30 provides a comparison between the data collection in 2021 and in 2020 as regards the dispersion of PD estimates and one-year and five-year average default rates. This information is provided by exposure class.

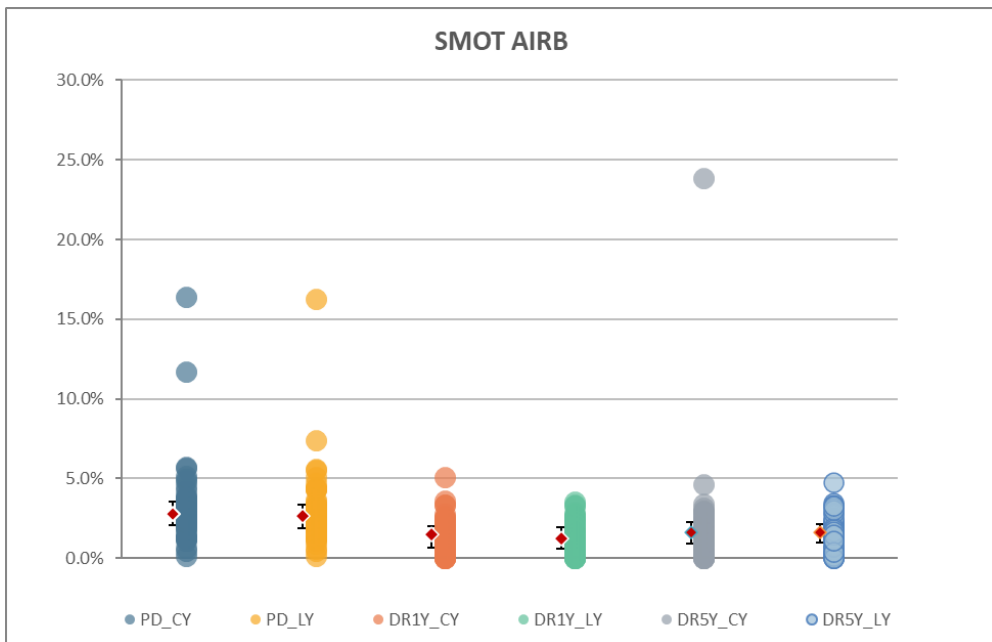
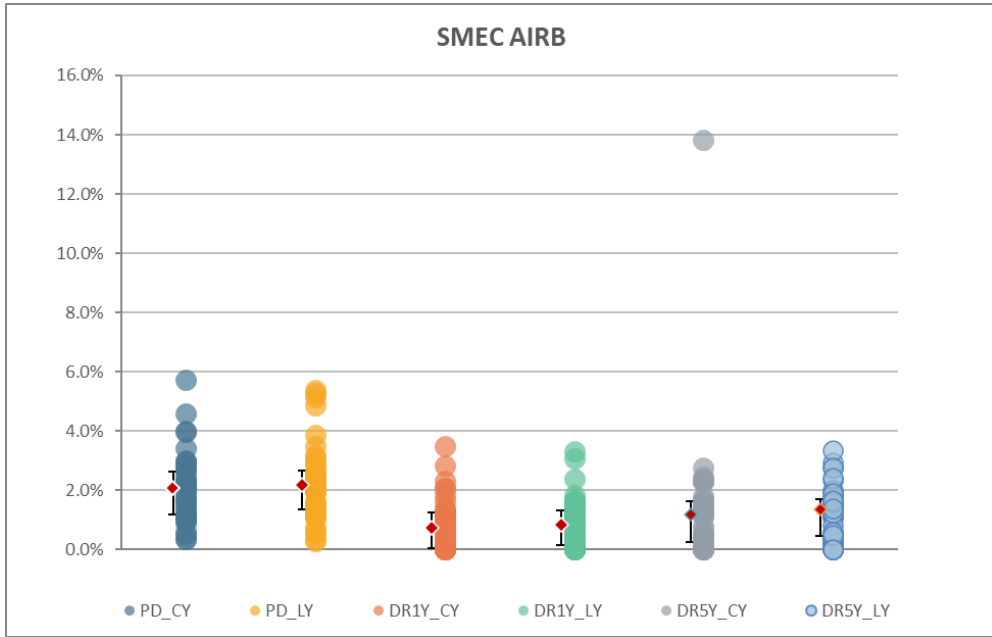
The red dot in the charts below marks the median and the black line indicates the interquartile range, which is used to assess the dispersion.

FIGURE 30: COMPARISON OF THE DISPERSION IN THE PD, ONE-YEAR DEFAULT RATES (DR1Y) AND FIVE-YEAR DEFAULT RATES (DR5Y) FOR 2021 (CY) AND 2020 (LY)









2.7 Variability of capital requirements under the SA – as of 31.12.2022

FIGURE 31: CHANGE IN THE STANDARD DEVIATION OF THE RW UNDER SA BY REGULATORY APPROACH, NON-DEFAULTED EXPOSURES

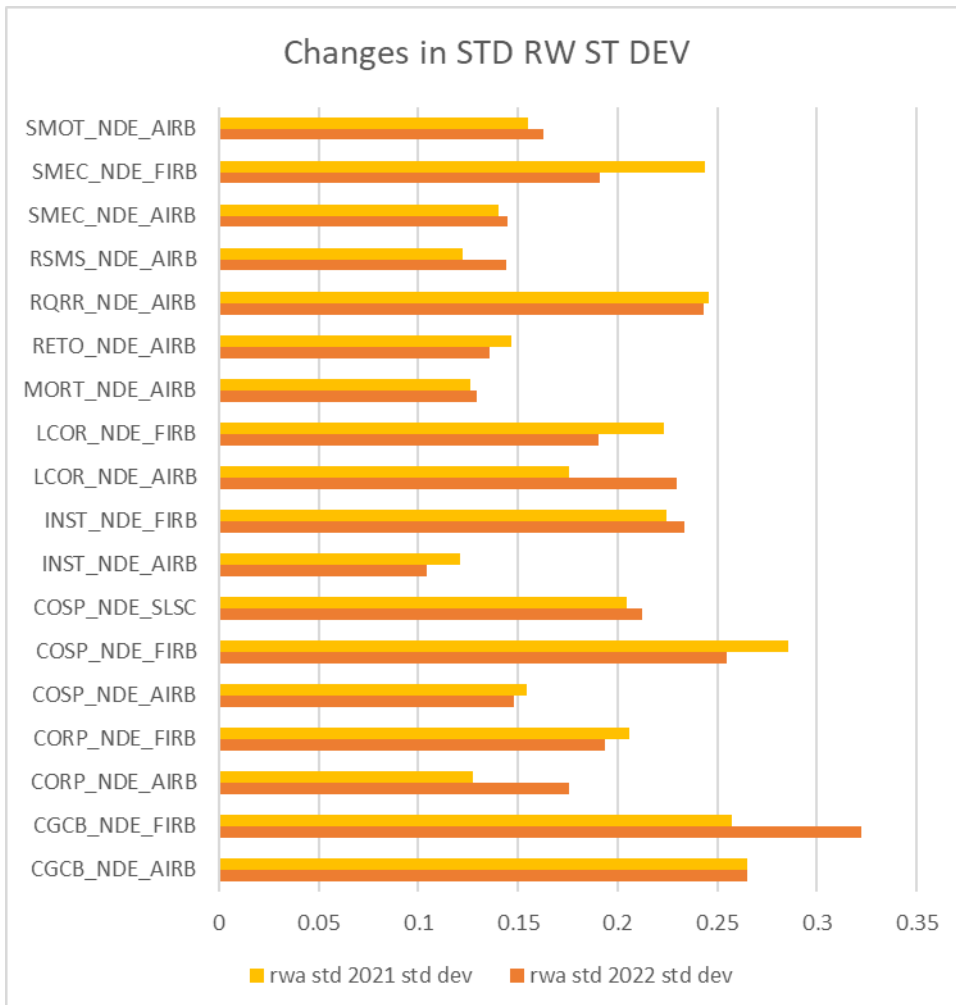
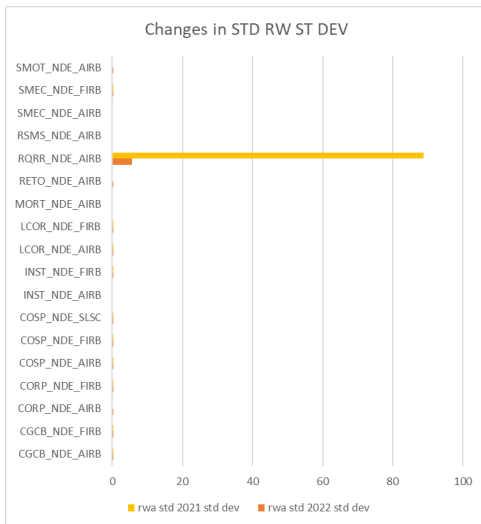
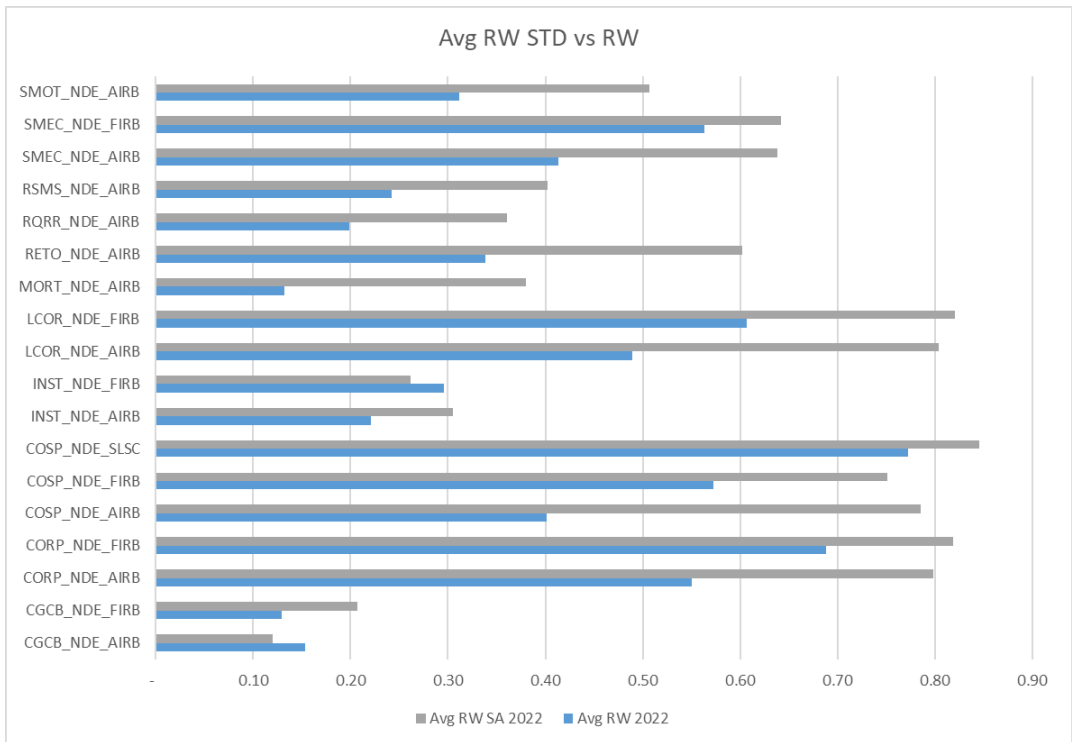
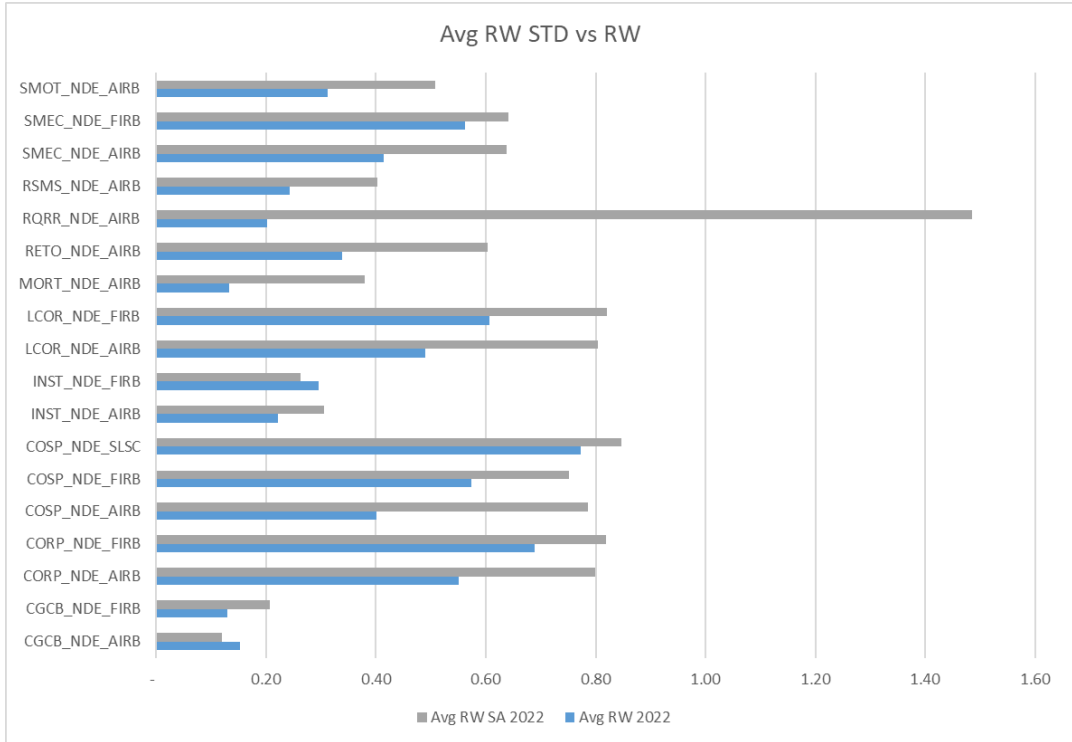


FIGURE 32: RW UNDER SA VS RW UNDER THE IRB BY REGULATORY APPROACH, NON-DEFAULTED EXPOSURES





Tour Europlaza, 20 avenue André Prothin CS 30154
92927 Paris La Défense CEDEX, FRANCE

Tel. +33 1 86 52 70 00

E-mail: info@eba.europa.eu

<https://eba.europa.eu>