

EBA REPORT RESULTS FROM THE 2024 MARKET RISK BENCHMARKING EXERCISE – PART 1 - IMA

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Abbreviations

APR	all price risk
CA	competent authority
CDS	credit default swap
со	commodities
CRD	Capital Requirements Directive
CRR	Capital Requirements Regulation
CS	credit spread
CS01	credit spread value of 1 basis point changes
СТР	correlation trading portfolio
CV	coefficient of variation
EBA	European Banking Authority
EQ	equity
ES	expected shortfall
EU	European Union
FRTB	fundamental review of the trading book
FX	foreign exchange
HPE	hypothetical portfolio exercise
HS	historical simulation
IMV	initial market valuation
IQD	interquartile dispersion
IR	interest rates
IRC	incremental risk charge
IT	information technology
ITS	implementing technical standards
LGD	loss given default
MC	Monte Carlo
MR	market risk
MRWA	market-risk-weighted asset
OFR	Own Funds Requirements
P&L	profit and loss
PD	probability of default
Q&A	question and answer
RTS	regulatory technical standards
RWA	risk-weighted asset
sVaR	stressed value at risk
SBM	Sensitivities Based Method
VaR	value at risk



1. Executive summary

- This report presents the results of the 2024 supervisory benchmarking exercise pursuant to Article 78 of the Capital Requirements Directive (CRD) and the related regulatory and implementing technical standards (RTS and ITS) that define the scope, procedures and portfolios for benchmarking internal models for market risk (MR).
- The report summarises the conclusions drawn from a hypothetical portfolio exercise (HPE) conducted by the EBA during 2023/24. The primary objective of the exercise is to assess the level of variability observed in risk-weighted assets (RWA) for market risk produced by banks' internal models.
- 3. The exercise was performed on a sample of 43 European banks from 13 jurisdictions. The relevant institutions submitted data for 105 instruments recombined into 77 market portfolios across all major asset classes, i.e., equity (EQ), interest rates (IR), foreign exchange (FX), commodities (CO) and credit spreads (CS), as well as five correlation trading instruments recombined into four portfolios (CTPs), for a total of 82 benchmark portfolios. Thus, the exercise covers the entire population of EU banks with internal models for MR at the highest level of consolidation.
- 4. As summarised in this report, the analytical part of the exercise delivered by the EBA provided the competent authorities (CAs) with a list of outliers to be examined in detail. The banks with the most significant number of outliers were also highlighted to their CAs, which addressed the issues reported bilaterally with their banks. CAs and the EBA also collected feedback on improving forthcoming benchmarking exercises where possible.
- 5. Finally, considering the benchmarking exercise's results, CAs were asked to provide the EBA with responses to a questionnaire on the actions they plan to take regarding each participating bank's internal model.



1.1 Main findings of the benchmarking analysis

- 6. The report measures variability in terms of the interquartile dispersion (IQD)¹ and the coefficient of variation (CV)² observed within each benchmark portfolio. The IQD is more robust than the CV when the sample is drawn from an unknown, fat-tailed distribution. As far as the market-risk-weighted asset (MRWA) variability, the IQD metric suggests a level of dispersion for all the risk measures provided by banks that need to be monitored.
- 7. The primary considerations are that the 2024 results show an increase in the dispersion of the initial market valuation (IMV) versus the 2023 exercise concerning all assets classes asset class; see, for instance, Table 2. Equity and Interest Rate and CS remains relatively low (4%, 4% and 5% respectively, compared to 2%, 2% and 3% respectively in 2023). Nonetheless, the FX average IQD increased significantly to 19% (it was 8% in 2023 and 3% in 2022). The reason for this is that FX FD instruments (301, 302, 310 and 311) present an IMV quite dispersed (especially instrument 301 with 1766% IQD). Instrument 301 (Fx FWD) is not a new instrument in the sample, with a low IMV, but also there are banks that report IMV of similar magnitude but opposite sign, which means that there are still some issues linked to the common understanding of the booking for this instrument. A clarification on the booking of the FX Fwd should improve the consistency of the Fx asset class booking in the future exercise. CO remains a substantially high IQD (16%, vs 14% in 2023 and vs 24% in 2022) asset class, which is driven by two instruments (401 and 402), over a total of 5 CO instruments (which is very limited), as well as the total number of submissions, with a negative effect on the average IQD of this asset class.
- 8. Therefore, even if the average IQD of the IMV has increased, this is due to a very restricted sample of instruments with substantially high IQD (the mentioned 301, but 223, 221, and 121). The rest of the instruments have comparable low dispersion with respect the previous exercise. Therefore, based on this year's observations, we can conclude that the quality of the data submitted did not decreased. The quality of the data is extremely important for the benchmarking exercise, and the banks should pay great attention when submitting these data. It should be stressed that to substantially increase the data quality, several rounds of iteration with submitters would be required, which is not feasible within the short time frame of the exercise. The continuous improvement and clarification of the details for the instruments is also an objective that the EBA is always pursuing.
- 9. Dispersions have been examined and most of them have been justified by the banks and CAs. A minority of the outlier observations remain unexplained and are expected to be part of the ongoing activities of supervisors, who are expected to monitor and investigate the situation (see Chapter 5 of this report).

¹ IQD is defined as the absolute value of the ratio of the interquartile range (Q3 – Q1) divided by the sum of the quartiles (Q3 + Q1). The higher the IQD is, the higher the dispersion in the data.

 $^{^{2}}$ CV is computed as the ratio of the standard deviation to the mean.



- 10. From a risk factor perspective, FX portfolios exhibit a lower level of dispersion than the other asset classes. In general, variability is substantially lower than in the previous exercise. This is likely due to an improvement in the data submission, which impacted the dispersion of the risk measures, decreasing the dispersion in general (see Table 5: Interquartile dispersion for IMV, risk metrics and SBM OFR by risk factor).
- 11.Regarding the single risk measures, the overall variability for value at risk (VaR) is lower than the observed variability for stressed VaR (sVaR) (14% and 21%, compared to 16% and 21% in 2023, compared to 21% and 28% in the 2022 exercise, with 27% and 31% in 2021 and with 18% and 29% in 2020).³ More complex measures, such as the incremental risk charge (IRC), show a higher level of dispersion (44%, it was 42% in 2023 exercise, 45% in the 2022, 43% in 2021 and 49% in 2020).
- 12. The variability of risk measures, especially the VaR, is marginally lower than the previous exercise and overall, this exercise mark the lowest level of dispersion of the risk measures since the exercise has started, as shown in the table below.

Table 1: Average IQD by asset class - VaR

	Interquartile range 2024 exercise	Interquartile range 2023 exercise	Interquartile range 2022 exercise	Interquartile range 2021 exercise	Interquartile range 2020 exercise	Interquartile range 2019 exercise	Interquartile range 2018 exercise	Interquartile range 2017 exercise
Equity	16%	17%	25%	24%	18%	14%	23%	22%
IR	15%	16%	21%	19%	13%	16%	9%	19%
FX	9%	12%	11%	27%	12%	22%	17%	41%
Commodity	14%	17%	18%	19%	20%	24%	21%	13%
Credit spreads	16%	18%	28%	37%	23%	28%	26%	27%
СТР								

Average Interquartile dispersion by asset class - VAR

- 13.As for the past exercise, to deepen the analysis of VaR and further investigate the variability drivers, different VaR metrics were computed and compared with the banks' reported VaR, in particular:
 - an alternative estimation of VaR, called profit and loss (P&L) VaR, computed by the EBA using the 1-year daily P&L series submitted by banks using a historical simulation (HS) approach; and
 - a comparable VaR, called HS VaR, corresponds to the regulatory VaR reported by those banks that use an historical simulation (HS) approach (only).
- 14. When comparing the variability between the regulatory VaR and these alternative risk measures, a decrease in the IQD when considering a more homogeneous sample is confirmed (i.e., HS banks only). In fact, for all the risk types, the dispersion observed for the P&L VaR tends to be lower but is still not negligible. This finding suggests that the modelling approach is not the only driver of the observed VaR variability. Other drivers, such as risks not captured in the

³ These values are derived as a simple average of the IQD across all non-correlation trading portfolios.



model or the choice of absolute versus relative returns, offer further explanations for the results' variability (see Table 5: Interquartile dispersion for IMV, risk metrics and SBM OFR by risk factor).

- 15. Even so, within the subset of banks using an HS approach, modelling choices (see Table 7: Coefficient of variation for regulatory VaR (controlling for HS) by modelling choice) seem to make a noticeable difference. Modelling configurations produce mixed results depending on the different asset classes. The same can be said in terms of conservativeness, where different calibrations have different effects depending on the asset class (see Table 8: Average regulatory VaR by modelling choice). But this analysis is extremely sensitive to the different portfolios used to produce the statistic, the low number of subjects available, and the passage of time from one exercise to another. Different model settings impact differently the dispersion; therefore, this report will refrain from trying to generalise the results and define a 'less dispersed' and 'more conservative' configuration of modelling choices.
- 16.As mentioned above, the dispersion in sVaR figures is generally higher than the dispersion observed for regulatory VaR (see Table 21 and Table 22). The stressed period used was the one applied by the bank for capital purposes, so it was not harmonised in the sample. Different choices for the stressed period are permitted by the Capital Requirements Regulation (CRR), and these choices are considered and questioned as part of the regulatory approval process. While allowing banks to use their own individual stress periods reduces the comparability of the sVaR results across the sample, doing so facilitates the estimation of implied capital needs from the HPE. Nonetheless, banks in the exercise are asked to report the stressed period applied. As a result, the EBA selected a subset of homogeneous time windows applied and ran the benchmark for this subsample. It appears clear that when a homogeneous stress window is applied, the sVaR figures tend to be less dispersed (see Table 41: Stress VaR statistics (2008-2009 stress period only)).
- 17. Moreover, to carry out these analyses, the EBA conducted a comparison across banks of the ratio between sVaR and VaR for each of the hypothetical portfolios included in the benchmarking exercise (see Table 6: sVaR–VaR ratio by range (number of banks as a percentage of the total)). The ratio generally varies significantly between the portfolios (from 0.09 to 34.5), with values that cannot be explained except by errors. However, on average, the ratio comes in at around 2.25 (see Table 25: sVaR/VaR statistics).
- 18.As expected, for the larger banks with significant trading activities, the benchmarking portfolios are generally relevant to their actual trading book. For smaller banks, this is less the case, and this is why the EBA included simpler and more plain vanilla instruments starting from the 2019 exercise. The challenge remains to design a benchmarking exercise that can fit banks that have a specialised business model. Overall, the portfolios are, however, reflective of the risk factors experienced by most banks. In the 2024 exercise, it is noticeable a further decrease in the VaR dispersion (14% from the 16% of 2023), still that in some cases (16 over 77 single portfolios see Table 21: VaR statistics). The aggregate portfolios also feature notably low levels of IQDs.



- 19.Regarding the IRC, the average variability (as measured by the average IQD for this category of portfolios) is higher than that observed for all other metrics considered in the report (44%). This high variability is slightly higher than in the previous exercise the IQD was 42% on average in the 2023 exercise (45% in 2022, 43% in 2021) (see Table 14: IRC statistics and cluster analysis). The understanding of the IRC dispersion was further analysed by disaggregating various modelling choices (see Table 15, Table 43, Table 44, Table 45 and Table 46). While the number of risk factors and applying market conventions to the source of LGD seems to have a different impact, depending on the asset classes applied. These results are not consistent with what was observed in the previous exercises, so it looks like even for the IRC, the modelling choices influence the dispersion, but the effect cannot be generalised, and it looks very time dependent.
- 20. An additional metric considered as part of the analysis was the diversification benefits observed for VaR, sVaR and IRC in the aggregated portfolios (see Table 16: Diversification benefit statistics). As expected, there is evidence that larger aggregated portfolios exhibited greater diversification benefits than smaller ones. In general, the level of dispersion observed in diversification benefits tends to be lower than that in the corresponding metrics at the level of the individual portfolios.
- 21.As for previous exercises, an assessment was also carried out on the variability of the empirical estimates of the expected shortfall (ES) at a 97.5% confidence level. The results indicate that the dispersion in this metric across risk factors is like that found for VaR and P&L VaR (see Table 24).

Dispersion in the capital outcome

- 22.Alongside the variability analysis, the EBA also conducted the usual assessment regarding possible underestimations of capital requirements (see Table 17: Interquartile dispersion for capital proxy). As the analysis is based on hypothetical portfolios and the capital requirements were defined using a proxy, the results should be interpreted as approximations of potential capital underestimations. The proxy for the implied capital requirements was defined as the sum of VaR and sVaR across all portfolios. For purposes of comparison, the proxy was computed three times. In one case, the VaR and sVaR figures were multiplied by the banks' total multiplication factor and, in the other, by the regulatory minimum of three only, i.e., ignoring the banks' individual addend(s) set by the CAs. Finally, a subset of banks applying the same stress period was also considered for capital dispersion. This metric enables a comparison of banks and an assessment of their variability in this regard.
- 23. The average variability across the sample as measured by the IQD is significant (around 18%), especially for the most complex portfolios in the credit spread asset class. This dispersion very slightly decreases when considering a more homogenous capital proxy (15% applying three as the multiplier and 14% for banks with the same stress period).

Additional analysis of Risk measures

24.As introduced in the previous exercises, the EBA extended the analysis to other drivers of variation (see Section 4.2.5), such as the size of the bank, the business model of the bank, the



level of approval granted by the CAs and the already mentioned stressed period applied in the sVaR calibration. The size and business model analyses were further provided as they were run in the 2020-2023 reports.

- 25.In a nutshell, based on this additional analysis, we observe that the size (in terms of RWA for market risk) of the bank has an impact on the figures since small and medium-sized banks tend to produce slightly more dispersed results than larger banks (see Table 9: Asset class comparison for VaR in terms of banks' size). Consistently, when considering the size in terms of the trading book (as a ratio of total assets), the bigger a bank is in terms of its trading book, the (slightly) smaller the dispersion (on average).
- 26. Concerning the business model, the EBA applied the internal classification of banks as a criterion, under which many of them are classified as cross-border universal banks (see Table 10: Asset class comparison for VaR within the same business model (cross-border universal bank)). Applying this definition of the business model, a smaller decrease in the IQD was identified due to a more homogenous sample. The business model analysis was further extended by considering the 'Level 3' assets and liabilities in the bank's books as a proxy for a more sophisticated business model linked to more exotic products (see Table 34, Table 35 and Table 36). This further specification did not prove conclusive since the dispersion did not change substantially depending on the 'Level 3' assets and liabilities ratio in the bank's trading book.
- 27. The subsample analysis based on the level of approval delivered interesting results. A priori, it was expected that having banks with different levels of approval would have increased the dispersion of the results of the risk measures. In line with this assumption, the IQD results seem to fluctuate among the subsamples of different approval levels. This is because more homogeneous subsamples tend to produce slightly smaller dispersions, but this positive effect is counterbalanced by the smaller number of firms in the sample. Basically, the benchmark provided and the 25th and 75th quantiles of the distribution tend to be less dispersed with respect to the whole set of banks. This implies that the different level of approval does indeed have an impact on the dispersion of the benchmarking results (see Table 11: Asset class comparison for VaR in terms of level of approval).
- 28. Finally, as already mentioned above, and in line with previous findings, sVaR figures are less dispersed when the benchmark is computed for a homogeneous subsample of firms that applied a similar time period for the stress window used for calibrating the sVaR (see Table 12: Asset class comparison for sVaR in terms of the time window applied).
- 29.As introduced in the 2020 Report, PV statistics are reported (see Table 42). The PVs reported generally have quite low IQDs, and they were useful in distinguishing true outliers and outliers due to mispricing of the portfolios.

SBM and ASA OFR analysis

30.The 2024 benchmarking exercise is the third year of collecting SBM sensitivities and OFR data. It is also the first year of collecting DRC and RRAO data, as well as the application of ASA



Validation portfolios. The amount of data concerning solely the FRTB-ASA methodology has grown with time, and it is now more appropriate to separate this part of the exercise in an independent report.

1.2 CAs' assessments based on supervisory benchmarks

- 31.CAs shared the outcomes of their assessments at the bank level with the EBA (see Figure 16: CAs' own assessments of the levels of MR own funds requirements). The CAs' assessments confirmed the existence of some areas that require follow-up actions on the part of specific institutions whose internal models were flagged as outliers in this benchmarking exercise.
- 32.Overall, CAs' assessment of the over- and underestimation of RWA was encouraging in the sense that CAs were aware of and able to explain the causes of almost all deviations. Although most of the causes were identified and actions put in place in order to reduce the unwanted variability of the RWA, the effectiveness of these actions can be evaluated only by CAs via constant monitoring of the benchmarking results.
- 33. The CAs are expected to pay the utmost attention to the minority of cases in which the overand underestimations were unexplained, to closely monitor these institutions and to put in place additional efforts to reduce these gaps in future exercises.

1.3 Past exercises and future expected changes

- 34. The 2019 exercise represented a significant change from the 2016-2018 exercises in terms of the simplification of the portfolios. This simplification had a positive effect in obtaining less dispersed results than with the previous portfolios. Furthermore, it improved the significant data quality issues relating to some portfolios while focusing on the model risk elements.
- 35. In the 2020 exercise, the data submitted further improved in quality thanks to the clarification of the legal text description of some instruments and to the further practice that the banks have gained in conducting the present exercise. This had a positive effect in terms of dispersion in the data provided. Improvements in terms of less dispersed results have also stemmed from the change in the methodology to detect outliers for the risk measures.
- 36. In the 2021 exercise, the data quality of the submissions was acceptable. That said, the variabilities of the risk measures (VaR, PL VaR and ES) were substantially higher than in the previous year. This seems to be linked to the increased volatility of the markets in 2021 due to the Covid outbreak, as captured by the market model, which generally provided higher figures for the risk measures. These higher figures, in absolute terms, seem to exacerbate the differences in modelling outputs, producing higher IQD metrics. As a result, this higher dispersion does not seem to be the outcome of a decrease in the quality of the market model.
- 37. For the 2022 exercise, the set of instruments remained mainly similar to the previous exercise, so the EBA reports a similar level in terms of the data quality of the submissions, aside from the mistake in the EQ instruction. The analysis that the EBA ran for the 2022 exercise was the first



in which banks reported sensitivities and OFR figures relating to the sensitivities-based method of the alternative standardised approach (ASA) introduced with the FRTB. The SBM submission was of good quality overall, especially considering the tendency to improve with time.

- 38. For the 2023 exercise the data collection was extended to allow the collection of new instruments and portfolios, in particular as regards the instruments and portfolios that have lately been applied by the industry. These new instruments are also accompanied by a rationalisation of the references of the instruments in Annex V. The result showed that the overall dispersion was significantly reduced by the adjustment to the instruction, while some new instruments present a quite significant dispersion, due of course to their novelty. The exercise did not change substantially, so the EBA and CAs focused on the analysis of the SBM data submitted. It is clear that there was an improvement in sensitivities submission, with respect to the previous exercise, but also during the exercise due to the many resubmissions and CAs control of the data submitted. While the analysis did not detect any major issues in the SBM data submission, it is clear that at the single-bank level and instrument, minor issues can be detected, and overall compliance with SBM requirements could be improved.
- 39.For 2024, the EBA extended the SBM data collection to the other ASA components (DRC and RRAO) to have a complete picture of the standardised approach and also adopted a series of validation instruments for the SBM approach, which was already applied by part of the industry, that should significantly enhance the compliance with the SBM requirements.
- 40. For 2025, the exercise was expected to be reshaped based on the AIMA-FRTB implementation. But during before the ITS 2025 finalisation the European Commission manifested the intention to postpone the FRTB implementation. Therefore, it was decided to maintain the data collection to the format applied in 2024 (for scope and content). The new of the delayed implementation of the FRTB had the indirect impact of postponing the usual timeline of the Market Risk exercise from the usual September-March to January-June, in order to give to banks time to react to the FRTB postponement and to prepare for the exercise.
- 41.At the moment this report is drafted, the exercise 2026 is under planning, i.e. the ITS is in its final phase before consultation. The new benchmarking ITS will see the introduction of the new templates for the FRTB Alternative Internal Model Approach, which were expected in 2025, but also the extension to the data collection of the ASA methodology to all the banks that apply it, subject a proportionality threshold of 500 million.
- 42.On a medium-term horizon, the EBA will consider reshaping the instruments and the portfolios in the exercise in a way that still keeps the instruments simple to ensure clarity regarding the instruments. Nonetheless, further enrichment of the variety of the instruments monitored could be beneficial. The effect of the AIMA and ASA implementation will have a significant impact on future design of the exercise.



2. Introduction of the 2024 market risk benchmarking exercise

43.Based on the EBA benchmarking ITS, the MR benchmarking exercise is carried out by following three main steps. First, the EBA defines the hypothetical instruments and portfolios, which are the same for all banks, in order to achieve a homogeneous and comparable outcome across the sample. Second, banks are asked to submit the data accordingly. Third, and finally, the EBA processes and analyses the data, providing feedback to CAs. During the process, the EBA supports CAs' work by providing benchmarking tools to assess banks' results and detect anomalies in their submissions.

2.1 Definition of the market risk hypothetical portfolios

- 44. The MR portfolios have been defined as hypothetical portfolios composed of both non-CTPs and CTPs, as set out in Annex V of the benchmarking ITS. The exercise includes 95 instruments recombined into 84 portfolios (77 individual and 7 aggregated), capitalised under the VaR, sVaR and IRC models, comprising mainly plain vanilla and some complex financial products in all major asset classes: EQ (21 instruments and 16 individual portfolios), IR (24 instruments and 23 individual portfolios), FX (11 instruments and seven individual portfolios), CO (five instruments and four individual portfolios) and CS (34 instruments and 27 individual portfolios). The EBA also designed aggregated portfolios, obtained by combining individual ones, to consider diversification effects. Each aggregated portfolio has a particular composition: the first (portfolio 10000) encompasses all asset classes; the second (portfolio 11000) is made up of only EQ portfolios; the third (portfolio 12000) is made up of only IR portfolios; the fourth (portfolio 13000) is made up of only FX portfolios; the fifth (portfolio 14000) is made up of only CO portfolios; and the sixth (portfolio 15000) is made up of only CS portfolios.
- 45. In addition, the set of portfolios includes ten instruments, and six portfolios (five individual and one aggregated) used for correlation trading activities, capitalised under the VaR, sVaR and APR models. These portfolios contain positions in index tranches referencing the iTraxx Europe index on-the-run series. The portfolios are constructed by hedging each index tranche with the iTraxx Europe index on-the-run 5-year series to achieve a zero-credit spread value of 1 basis point (CS01) as at the initial valuation date (spread hedged). No further re-hedging is required.



46.A more detailed explanation of the portfolios can be found in the benchmarking ITS on the EBA website.⁴

2.2 Data collection process

47. The data for the supervisory benchmarking exercise were submitted by banks to their respective CAs using the supervisory reporting infrastructure. Banks submitted the specified templates provided in the ITS, where applicable.

2.2.1 IMV

- 48. The reference date for IMV was 21 September 2023, 5.30 p.m. CET. Banks entered all positions on 14 September 2023 ('reset or booking date'), and, once positions had been entered, each instrument aged for the duration of the exercise. Furthermore, banks did not take any action to manage the instruments in any way during the entire exercise period.
- 49. The IMV figure to be reported by the banks for each hypothetical instrument was defined as the mark to market of the instrument on the booking date plus the profit and loss from the booking until the valuation date and time. Therefore, it was the mark to market of the instrument on 21 September 2022, 5:30 p.m. CET.

2.2.2 Risk measures

- 50. Pursuant to the common instructions provided, banks were required to calculate the risks of the positions without considering the funding costs associated with the portfolios (i.e., no assumptions were admitted with regard to the means of funding the portfolios). Moreover, banks were required to exclude, as far as possible, counterparty credit risk when valuing the risks of the portfolios.
- 51.Banks were required to calculate the regulatory 10-day 99% VaR on a daily basis. sVaR and IRC could be calculated on a weekly basis. In such cases, sVaR and IRC had to be based on end-of-day prices for each Friday in the time window of the exercise. For the six CTPs (6001-6005 and 16000), APR was also requested.
- 52.For each portfolio, banks were asked to provide results in the base currency, as indicated in Annex V of the benchmarking ITS. The choice of base currency for each trade was made to avoid polluting results with cross-dependencies on risk factors.

⁴<u>ITS package for benchmarking exercises | European Banking Authority (europa.eu)</u>. Please also refer to Commission Implementing Regulation EU 2016/2070 of 14 September 2016 and Commission Implementing Regulation 2019/439 of 15 February 2019, laying down ITS in accordance with Article 78(2) of Directive 2013/36/EU (Implementing regulation - 2024/348 - EN - EUR-Lex).



53. All collected data underwent a preliminary analysis to spot possible misinterpretations of the common instructions set out in the ITS/RTS on benchmarking and outliers, as defined hereafter.

2.3 Participating banks

- 54. A total of 43 banks representing 13 EU countries participated in the exercise (see Table 18 in the annex). All EU banks with MR internal models approved by CAs were asked to submit data at all levels where own funds requirements are calculated. The EBA collected the results only at the highest level of consolidation.
- 55. CAs are in charge of conducting similar benchmarking investigations for results at a 'solo' level within their own jurisdictions for eligible banks.

2.4 Data quality

- 56. The data collection process aims to ensure the reliability and validity of the data obtained. In this regard, it is obvious that an unwanted driver of variability (which would pollute the results) could be misunderstandings vis-à-vis the portfolios and the specific instruments included in them.
- 57. IMV results reached the EBA in November/December 2023, after which the EBA carried out a preliminary IMV analysis and provided CAs with a tool to help them spot likely anomalies or misunderstandings regarding the interpretation of each portfolio. This was done to enhance the quality of all risk measures so that they would be provided in accordance with a correct interpretation of the portfolios. This step was conducted before the computation of the risk measures by the banks. Where the price of an instrument fell outside a certain range,⁵ more investigation had to be undertaken by the CA, which could if necessary ask the banks in its jurisdiction for a repricing and subsequent resubmission. The same process was carried out for the risk measure submission.
- 58. The issue experienced in the previous exercises linked to the aggregated portfolio figures no longer seems to be a major issue. It is worth noting that some banks reported the IMVs and risk measures for the aggregated portfolios without including all the relevant components.⁶ The reason was that the 2018 (and previous) ITS required banks to report the value of aggregated portfolios even if not all individual portfolios are modelled for the benchmarking exercise. As a result, the submissions were not comparable with those valued in full. This issue was addressed in the 2019 exercise, and since then banks have reported the results for the aggregated

⁵ The range means the interval between the first and third quartiles. These quartiles were considered and subsequently updated when resubmissions were received.

⁶ Some banks reported values for aggregated portfolios, considering only those components for which they had permission to use an internal model. This is clearly not a data quality issue, and it is correct that banks report results only where they have permission to do so for regulatory purposes.



portfolios only if the results of all components have been submitted.⁷ The structure of the 2019-2020 exercise, i.e. a plurality of instruments that are recombined into a plurality of individual portfolios, which are themselves the components of the aggregated portfolios, produced a similar error, i.e. the absence of some instrument components within some of the individual portfolios. Nonetheless, banks should not provide any (aggregated or individual) portfolios where any instrument is missing in order not to distort the risk measures analysis. This specification was further clarified in the ITS 2022, so the possibility that some individual portfolios could have been submitted even when some specific instruments were missing cannot be ruled out. On the other hand, the data submission seems compatible with the correct interpretation of the rule, at least for many submitters.

- 59.It should be recalled that the 2024 exercise is the third exercise where EBA is collection information concerning the sensitivities linked to the SBM and the OFR linked to the SBM from the banks participating in the benchmarking exercise. The complete representation of the sensitivities collected is provided at the moment due to the very granular nature of the data collected. Nonetheless, some issues were detected, mainly linked to the volatility reported (inconsistent representation). All in all, the quality of the submitted sensitivities was appropriate.
- 60. The 2024 exercise also marks the first year where the validation instruments/portfolio for the SBM methodology were introduced by the new Annex 10 of the benchmarking ITS. ITS should be noted that only a small number of banks complained with this new set of requirements.
- 61. In the data analysis, it looks like no major errors in the reporting of any asset class were present. A complete list of the errors in the submitted data is beyond the scope of this report, but the most common and easily avoided mistakes worth mentioning are as follows:
- Equity asset class: in the past it was usually detected cases of use of the wrong notional in the equity positions. In the 2023 Annex, the instruction was corrected, reporting now the exact amount of share (or point of index) that the option or the future should report. This has enhanced the quality of the submission of this asset class substantially. The only issue remained in the Equity Asset class seems to be linked to the instrument 121 (VIX option), where a noticeable dispersion in the IMV is still present.
- Interest rates: confirmed the very good results were obtained in the previous exercise, especially where the international securities identification number was available. The cross-currency swap (instrument 220, now included on IR instruments) finally present a very low IQD (1%) indicating a consistent booking practice of this instrument, with only a couple of exceptions. The 223 (inflation swap) exabits some relevant dispersion (309% IQD) due to a low market value of the instrument, but also to some inconsistency in the booking practice.

⁷ Annex 5, Market risk 2024 BM, Section 1 (Common instructions), letter (ee)



- FX: this asset class shows generally low IQD, with a few of noticeable exceptions in instrument 301, 302 and instrument 310-311, all forward contracts. In this case, the dispersion is attributed to mix of error in booking, and some inconsistent interpretation of the instruction. Luckly this kind of error, does not impact negatively the risk measures provided in the exercise. Nonetheless, the instructions were amended in the 2025, which hopefully should provide additional clarity in the booking phase of the exercise.
- Commodity: high IQD for instruments 401 and 401. This is also not easily explained since the instruments should be well known by the banks.
- Credit spread: very good results in terms of CV and IQD, with very sporadic mistakes entailing possible wrong bookings, and no long position instead of a short, or vice versa.
- 62.Although these mistakes were detected thanks to the EBA and Competent Authorities data analysis and corrected by resubmission/cleansing of the data from the banks, unnoticed errors in data submissions could still be present in the dataset analysed, and this can potentially drive and pollute the results.
- 63.Nonetheless, data quality for the 2024 exercise has been generally good. Ensuring data quality is a fundamental step for the benchmarking exercise. However, reporting errors might still occur in future exercises, and the process will allow both regulators and participating banks to learn from it.



3. Market risk benchmarking framework

- 64. The benchmarking exercise aims to assess the variability in banks' MR models and to identify the drivers that account for it. Variability in banks' models can come from three types of drivers.
- 65. First, variability can stem from banks' modelling choices that are explicitly envisaged in the regulation. For example, when modelling VaR institutions can choose to use a lookback period longer than the minimum (i.e., the previous year), use a weighting scheme for the data series, calculate the 10-day VaR directly or, alternatively, obtain a 1-day VaR and rescale it using the square root of time approximation. Likewise, when modelling IRC, banks can choose from several sources of the probability of default (PD) and have a certain degree of freedom when choosing the transition matrices applied, or when deciding on the liquidity horizon applied to a particular instrument. It should be highlighted that all these possibilities are, in principle, acceptable under the current regulatory framework (the CRR), provided that they have been agreed on with the CA during the approval process. Therefore, given the wide range of approaches that each institution using internal models can choose to implement, some degree of variability is expected.
- 66. Second, there are other modelling choices that are not explicitly envisaged in the regulations, which may cause variability. Examples include differences in simulation engines; differences in pricing model assumptions; the modelling of returns, volatility, correlations and other indirect parameter estimates; additional risk factors considered in the models; different approaches to P&L computation and attribution; and a stochastic framework for the simulated shocks.
- 67. Finally, another source of potential variability originates from supervisory practices. In particular, the use of regulatory add-ons in the form of both VaR and sVaR multipliers and additional capital charges (e.g. to encompass risk not in VaR issues, any information technology (IT) and organisational weaknesses, independent pricing valuations or detected flaws) and, quite significantly, the application of limits to the diversification benefits applied by banks (i.e. not allowing a single calculation at consolidated level and, instead, requesting an aggregation of the capital results at sub-consolidated and/or subsidiary levels) are likely to increase the observed variability in capital. In most cases, these supervisory actions have been established to address known flaws or model limitations, or to add an additional layer of prudence. Therefore, they typically result in higher capital requirements than would otherwise be the case. However, they can also increase the variation in market own funds requirements between banks, particularly across jurisdictions. Although the effects on capital levels of these supervisory actions can be substantial, a benchmarking portfolio exercise is not suitable for assessing some of these supervisory actions. In particular, any constraints on diversification benefits and direct capital add-ons cannot be properly assessed, since these effects are entirely portfolio dependent. To assess these effects, it would be necessary to use a much more realistic (hypothetical) portfolio,



comprising thousands of instruments and including partial model approval. Nevertheless, some supervisory actions can be assessed and the effects of regulatory add-ons on the VaR and sVaR multipliers will be analysed as part of this assessment.

68. Possible additional drivers of variation include:

- misunderstandings regarding the positions or risk factors involved that could not be resolved during the preliminary assessment (see Section 2.2);
- non-uniform market conventions and practices adopted in the hypothetical portfolio booking;
- incompletely implemented models (e.g., because a pricing module is being tested, or an additional risk factor is being taken into consideration);
- missing risk factors not incorporated into the model;
- differences in calibration or data series used in the modelling simulation;
- additional risk factors incorporated into the model;
- alternative model assumptions applied; and
- differences attributable to the methodology used (i.e. Monte Carlo (MC) versus HS or parametric).

3.1 Outlier analysis

- 69. After the data quality assurance process, the EBA performed an 'extreme value' analysis with the aim of excluding from the computation of the benchmarks those values for which the IMV and risk measures (RMs: VaR, SVaR, P&L VaR and ES) were found to lie outside a certain tolerance range due to misinterpretation of the trade or mistyping of bookings by the banks.
- 70. The presence of clear outliers in the data used to assess variability is deemed inappropriate, since these data points are likely to weigh heavily on the results, distorting the actual level of variability observed.
- 71. Extreme IMVs and RMs are defined as values outside the range of two truncated standard deviations⁸ from the median. Since some results exhibited empirical distributions that had fatter tails than expected, outliers were defined as values differing by twice the truncated standard deviation or more from the median.

⁸ The truncated standard deviation is computed by excluding the values below the 5th and above the 95th percentile of the data series.



- 72. If a bank's IMV or RM are found to be an extreme value for a particular instrument, then this observation is removed from the computation of the final benchmark statistics. The empirical evidence indicates that excluding the RMs based solely on IMV submissions, as in the previous exercise, implied that some extreme RM submissions are wrongly reflected in the benchmarking computation, while some good observations are removed. Changing this methodology did not influence the benchmarking data point, i.e., the median result. In addition, the overall dispersion of the portfolio was only marginally affected (slightly improved). The significant enhancement is in the communication to the CAs of the significant outliers to be examined with the bank. This approach, which was first adopted for the 2020 market risk benchmarking exercise, increased the overall quality of the benchmark data, providing more consistency for the benchmarks of these metrics.
- 73. The dispersion across the contributions is summarised by the IQD coefficient, which is more robust than the coefficient of variation (CV) for data derived from fat-tailed distributions. The higher the IQD, the more dispersed the data. IQD is defined as:

$$IQD = abs[(Q_{75th} - Q_{25th})/(Q_{75th} + Q_{25th})],$$

where Q_{75th} and Q_{25th} denote the 75th and 25th percentiles, respectively.

74. Another metric used in the variability studies is the CV, which is defined as the ratio between the standard deviation⁹ and the mean (in absolute values):

$$CV = abs[StD/Mean].$$

75. The analysis reports both metrics because they jointly allow detection of the highest peaks of variability.

⁹ The standard deviation was considered to gain a sense of the entire variability and a harmonised approach across the HPE. Obviously, a truncated standard deviation may appear more consistent for some highly dispersed trades.



Table 2: IMV statistics and extreme values

EU Statistics for IMV by instrument

					Main st	atistics					Percentiles		
	Instr. ID	Min	Max	Ave.	STDev	STDev_trunc ¹	MAD (median absolute deviation)	Coefficient of variation (STDev/Mean)	Num obs. ²	25th	50th	75th	IQD
	101	4,200,428	4,233,786	4,222,974	6,080	23,579	966	0%	32	4,222,034	4,223,000	4,224,845	
	102 103	477,403 -477,719	478,200 -473,000	477,716 -475,098	174 1,072	278 6,157	0 692	0% 0%	29 25	477,700 -475,435	477,700 -475,391	477,706 -474,503	
	103	-184,604	-171,790	-176,538	2,800	4,123	1,422	2%	27	-178,173	-176,601	-174,454	
		-2,289,009	-2,235,786	-2,273,078	9,861	19,421	2,762	0%	29	-2,274,411	-2,273,714	-2,270,424	
	106 107	-16,190 -101,550	-15,745 -100,325	-15,908 -100,847	121 321	168 383	50 166	1% 0%	25 28	-15,929 -100,931	-15,866 -100,833	-15,863 -100,649	
	108	-101,330	-111,901	-113,096	742	808	727	1%	29	-113,473	-100,855	-100,049	
		34,194	38,066	36,934	848	1,615	393	2%	26	36,677	37,190	37,441	
	110	-52,717	-46,527	-49,431	1,349 800	2,176 893	688 451	3% 7%	26 24	-50,076	-49,418	-48,582	
Equity	111 112	9,617 13,933	12,379 17,590	11,066 15,518	1,072	1,257	506	7%	24	10,222 14,776	11,353 15,391	11,584 16,657	
		28,928	32,234	30,230	873	1,414	470	3%	26	29,703	30,164	30,608	
	114 115	-20,032	-15,499	-17,877	1,089 275	1,328 878	430 121	6% 14%	28 26	-18,533	-18,138 1.976	-17,514	
	115	1,727	3,095 2,475	2,038 1.986	275	333	76	14%	26	1,871 1,903	2.040	2,145 2.059	
		-645,600,000	-634,999,914	-639,925,356	3,100,627	4,439,684	1,550,000	1%	26	-642,200,000	-641,086,514	-637,557,451	
	118	846,294	1,121,764	974,578	43,543	196,069	5,185	5%	22	967,017	971,771	980,000	
	119 120	186,604 152,319	210,982 230,017	196,898 186,710	5,166 16,256	7,085 24,876	1,802 5,816	3% 9%	29 25	194,542 179,178	197,181 185,636	198,065 189,668	
	121	40,115	724,770	472,955	229,483	229,483	218,247	49%	13	303,535	482,260	700,507	
	201	-63,776	-48,984	-56,593	3,646	4,558	1,372	6%	35	-58,618	-57,072	-53,428	
	202 203	-269,000 -11,043	-204,277 -8,355	-217,693 -9,694	19,007 692	31,678 845	2,495 262	9% 7%	32 35	-214,216 -10,043	-212,517 -9,912	-209,427 -9,000	
	204	15,670	25,472	20,996	2,677	2,677	1,371	13%	39	19,080	20,294	24,024	
		939,344	1,032,043	995,124	28,327	68,099	15,122	3%	15	977,537	990,187	1,026,849	
	206 207	1,157,991 -835,908	1,208,441 -834,730	1,162,202 -835,453	8,262 330	42,074 389	521 257	1% 0%	34 35	1,160,568 -835,731	1,160,958 -835,493	1,161,510 -835,170	
	208	1,145,040	1,158,683	1,155,297	2,028	51,052	263	0%	32	1,155,141	1,155,605	1,155,891	
	209	953,201	956,131	953,777	475	2,497	174	0%	37	953,521	953,615	953,910	
	210 211	906,877 -897,497	908,677 -894,021	908,104 -895,259	360 546	700 1,419	206 286	0%	36 37	907,911 -895,547	908,089 -895,161	908,314 -894,944	
(211 212	-1,226,702	-894,021 -1,222,241	-895,259 -1,223,575	546 810	1,419	410	0%	37	-895,547 -1,223,795	-895,161 -1,223,428	-894,944 -1,223,018	
Interest Rate		1,014,605	1,019,252	1,016,147	1,038	2,983	665	0%	36	1,015,359	1,015,863	1,016,848	
	214 215	939,461 -784,654	942,770 -783,380	940,447 -784,090	580 417	1,239 807	257 273	0%	36 33	940,151 -784,421	940,348 -784,026	940,691 -783,891	
	215 216	-784,654 967,938	-783,380 972,850	-784,090 971,077	417	2,173	273	0%	33 25	-784,421 970,449	-784,026 971,210	-783,891 972,095	
		923,955	933,000	929,078	2,118	3,324	1,552	0%	29	927,526	928,948	930,718	
	218	107,273	129,378	119,077	5,201	7,418	1,934	4%	35	117,996	119,148	122,407	
	219 220	5,000 -127,000	6,297 -95,254	5,653 -119,092	332 4,554	397 18,433	151 888	6% 4%	37 36	5,476 -120,209	5,703 -119,427	5,843 -118,435	
		-4,821	342	-2,279	1,265	1,340	893	56%	37	-3,006	-2,219	-1,330	
	222 223	1,077,969	1,099,711	1,080,152	3,636	49,486	437	0%	32	1,079,180	1,079,574	1,079,994	
	225	-34,229 -203,328	5,686 -80,235	-4,439 -110,436	10,971 20,847	25,058 67,541	2,982 2,136	247% 19%	31 37	-4,278 -113,787	-1,679 -112,535	2,188 -109,642	
	301	-64,608	65,453	6,682	31,841	35,322	13,414	477%	34	-15,504	552	13,842	1
	302	80,952	203,804	154,283	39,954	44,430	9,016	26%	33	120,434	169,513	181,147	
	303 304	9,194,805 32,991	9,523,810 38,247	9,379,052 35,037	44,733 1,038	112,787 1,600	2,696 602	1% 3%	34 33	9,379,100 34,453	9,380,863 35,161	9,390,102 35,575	
	305	1,067,718	1,096,015	1,083,014	7,230	20,678	4,460	1%	31	1,078,668	1,085,261	1,088,434	
	306	-336,053	-309,225	-320,493	5,785	10,561	2,425	2%	33	-324,052	-322,873	-317,612	
	307 308	-63,058 1,457,000	-51,924 1,508,630	-57,761 1,488,396	2,469 12,177	3,400 16,173	1,247 8,401	4% 1%	33 34	-58,923 1,480,485	-57,786 1,487,181	-56,105 1,499,193	
	309	-1,015,403	-985,038	-1,002,589	7,806	14,125	4,453	1%	33	-1,008,687	-1,000,729	-998,617	
	310	-44,388	-4,923	-19,323	10,451	10,191	1,358	54%	33	-26,007	-25,232	-7,156	
	311 401	-68,557 16,627	281,996 32,877	130,589 26,331	120,449 5,476	130,738 8,406	68,643 4,369	92%	25	47,404 21,738	173,738 28,827	239,075 31,705	
		-51,084	-22,141	-31,633	7,904	1,619,157	5,181	25%	15	-36,504	-32,145	-23,961	
Commodities	403	163,642	334,634	252,223	35,100	46,675	3,953	14%	14	250,049	252,633	257,955	
	404 405	-182,847 670,389	-130,882 721,580	-157,936 687,460	14,170 15,715	43,347 21.102	4,576 11.381	9% 2%	14 12	-165,474 674,143	-161,847 680,429	-154,934 696,134	
	501	-23,838	-23,562	-23,722	88	133	51	0%	22	-23,798	-23,748	-23,638	
		-1,861	-1,185	-1,575	177	313	105	11%	23	-1,649	-1,601	-1,411	
	503 504	22,152 10,940	22,842 11.447	22,553 11,229	144 141	246 167	56 108	1% 1%	23 20	22,475 11,142	22,559 11,238	22,611 11,339	
	505	36,894	37,935	37,559	273	955	108	1%	20	37,377	37,716	37,747	
	506	-33,127	-31,674	-32,578	349	517	252	1%	22	-32,851	-32,541	-32,347	
	507 508	4,033 -15,186	4,471 -14,212	4,309 -14.811	115 256	141 401	42 62	3% 2%	24 23	4,280 -14,963	4,313 -14,946	4,387 -14.687	
	508 509	-15,186 10,409	-14,212 11,516	-14,811 10,803	256	401 354	62 49	2%	23	-14,963 10,757	-14,946 10,846	-14,687 10,873	
		-15,181	-14,075	-14,512	194	576	24	1%	25	-14,519	-14,496	-14,475	
	511 512	9,518 15,433	10,561 15,673	10,175 15,582	216 57	365 135	42 27	2% 0%	22 21	10,037 15,566	10,230 15,592	10,264 15,610	
	512	15,433 28,176	15,673 29,995	15,582 29,486	433	135	2/ 223	2%	21 21	29,330	15,592 29,463	15,610 29,863	
		33,040	35,168	33,974	450	1,326	196	1%	24	33,804	33,994	34,168	
	515	-28,509	-27,553	-28,120	214	358	43	1%	24	-28,207	-28,161	-28,087	
	516 517	17,096 992,174	18,443 999,489	17,713 996,011	322 1,812	451 7,394	177 583	2% 0%	25 24	17,504 995,309	17,557 996,455	17,922 997,052	
Credit Spread		118,447	122,855	119,619	1,199	2,996	696	1%	22	118,653	119,325	120,024	
	519 520	929,524	935,069	931,597	1,145	2,942	411	0%	26	931,306	931,676	932,128	
	520 521	841,666 -858,344	852,577 -848,891	846,383 -853,314	4,341 2,206	4,323 3,170	1,920 691	1% 0%	29 26	842,792 -853,615	844,041 -852,822	851,627 -852,232	
		760,964	822,247	792,102	17,426	43,345	8,386	2%	28	783,685	787,123	806,730	
	523	1,088,937	1,094,415	1,091,444	1,150	5,544	657	0%	27	1,090,800	1,091,444	1,092,197	
	524 525	-89,041 665,960	-83,162 670,751	-86,532 668,390	1,526 1,185	1,633 1,259	1,387 805	2% 0%	23 27	-87,916 667,845	-86,359 668,391	-85,138 669,335	
		-109,208	-98,450	-104,162	2,778	3,764	1,491	3%	22	-106,050	-103,601	-102,787	
	527	659,551	663,979	661,650	1,161	1,313	756	0%	27	660,937	661,641	662,599	
	528 529	-111,789	-93,749 -122,967	-102,765 -124,978	4,007 1,202	5,030 1,641	2,035 577	4% 1%	20 21	-104,450	-102,682 -124,511	-100,363 -124,305	
	529 530	-127,174 -66,482	-122,967 -39,676	-124,978 -55,233	1,202 7,917	1,641 11,572	2,451	1% 14%	21 14	-126,158 -59,044	-124,511 -58,225	-124,305 -55,652	
		908,961	912,342	910,838	800	2,291	261	0%	22	910,590	911,116	911,244	
	532	879,900	892,995	885,549	2,783	4,074	740	0%	20	883,898	885,533	886,181	
	533 534	833,534 911,171	837,951 914,573	835,410 912,821	1,008 718	2,241 1.578	575 420	0%	23 23	834,930 912,379	835,203 912,840	835,957 913,143	
	601	-390,217	-291,771	-332,275	52,530	52,530	3,711	16%	5	-389,381	-295,481	-294,525	
	602	-304,258	-237,802	-278,002	28,695	28,695	15,100	10%	5	-300,130	-289,158	-258,661	
	603 604	291,771	390,217	332,275 278.002	52,530 28,695	52,530 28,695	3,711	16%	5	294,525	295,481 289,158	389,381	
	604 605	237,802 143,457	304,258 150,907	278,002 146,454	28,695 3,631	28,695 3,631	15,100 855	10% 3%	5	258,661 143,708	289,158 144,312	300,130 149,888	
	606	-43,806	-35,354	-39,747	3,203	3,203	1,789	8%	5	-41,531	-39,742	-38,304	
	607	-150,907	-143,457	-146,454	3,631	3,631	855	3%	5	-149,888	-144,312	-143,708	
	608	35,354 -473,627	43,806 -291,771	39,747 -381,545	3,203 88,345	3,203 88,345	1,789 86,789	8% 23%	5	38,304 -466,817	39,742 -380,028	41,531 -295,481	
	609												

² STDev trunc is the standard deviation computed excluding values below the 5th and above ² Refers to the number of banks included in the computation of the statistics



Table 3: Average IMVs' interquartile dispersion by asset class

Average Interquartile dispersion by asset class - IMV

	Interquartile range 2024 exercise	Interquartile range 2023 exercise	Interquartile range 2022 exercise	Interquartile range 2021 exercise	Interquartile range 2020 exercise	Interquartile range 2019 exercise	Interquartile range 2018 exercise
Equity	4%	2%	21%	2%	1%	2%	2%
IR	4%	2%	16%	19%	2%	3%	8%
FX	19%	8%	3%	4%	16%	15%	6%
Commodity	16%	14%	24%	4%	10%	6%	8%
Credit spreads	5%	3%	1%	1%	1%	3%	6%
СТР	4%				5%	8%	103%

- 76. Table 2 and Table 3 show the results at the level of both each individual instrument and each risk type. As shown, the highest dispersion at the level of the individual instruments is detected for Fx instrument 301 (Fx forward) (IQD 1766%). It appears that the variety of interpretation of the instruction make it particularly difficult for banks to book it consistently. Same issue with the instruction could be the cause of the high IQD of instrument 302, 310 and 311 (all Fx forwards). Overall, excluding these four instruments with high dispersion, it would lead to an average IQD of 1% for the Fx asset class i.e., comparable or lower with respect the previous exercises.
- 77.On the IR asset class, it should be highlighted instrument 223, with 309% of IQD. This significant dispersion, beside probably some inconsistencies in the booking of the instrument, is also due to the 'low value' of the instruments. In terms of its construction the IQD is a ratio of two absolute measures (difference of the 25th and 75th quantiles, divided by the sum of the two). Therefore, a difference of a few hundred euros in the IMV generates very high IQD statistics, which is the case for some derivative instruments that exhibit an IMV of close to zero at inception, since they are entered at market rates. The same differences in the case of instruments that are much more valuable generate IQDs close to zero.
- 78. The Cmd instruments 401 and 402 also show moderately high IQDs (19% and 21%). This is likely due to a combination of the low IMVs value, which exacerbate the IQDs, and different market practise linked to these instruments, since the instruments are not changed with respect the previous exercise, so such worsening of the IMVs submission would not be explained otherwise.
- 79. The EQ instrument 121 is the only one with medium-high IQDs (40%). These high IQD is likely due to the underling (Vix) which makes the instruments slightly more exotic with respect to the rest of the EQ instruments.
- 80.Overall, the IQD of the IMVs by asset class for the instruments of the 2024 exercise is slightly decreased when comparable to the past exercises for all asset classes. The worsening of the dispersion is driven by specific instruments (e.g., instrument 121, 223, 301, 401 and 401). This



means that some specific clarification and amendment to the instructions could still be beneficial (this was done in the ITS 2025).

- 81.Comparing the 2024 instruments with the 2023 instruments purely on the basis of the IQD, once the few instruments with abnormal IQD have been excluded, it would appear that the quality of the data submission is acceptable, and comparable with the previous exercise.
- 82.From an aggregated risk-type perspective, as in the past, Fx and CO instruments show the highest dispersion.
- 83.A cluster analysis (see Table 4 and Figure 1, Figure 2, Figure 18) was performed to strengthen and deepen the aforementioned descriptive insights. It shows the dispersion of the IMVs by instrument and helps in identifying clusters in the instruments' pricing that could explain the scattering of IMVs for some trades. The results of this analysis suggest that the clusters are observable for instruments121, 223, 301, 302, 310, 311 (i.e. also instruments with higher IQD).



Table 4: IMV cluster analysis – number of banks by range

2024 IMV cluster analysis by instrument: number of banks by range (x = ratio with the median)

	Instr. ID	300% < X	300% ≥ X >200%	200% ≥ X >150%	150% ≥X >100%	100% ≥ X >50%	50% ≥ X >0	0 ≥ X >- 100%	-100% ≥ X > -200%	Num
	101 102				14 11	22 22				36 33
	103 104				16 16	16 16				32 32
					16	16				32
	106 107				14 12	16 20				30 32
	108 109				16 15	16 16				32 31
	110 111				15 13	16				31 27
Equity					13	14 14				27
	113 114				15 15	16 16				31 31
	115 116	2		1	11	14 14				28 28
					15	16				31
	118 119				12 17	10 17	2			24 34
	120 121			2		14 5	2			27 13
	201 202				21 20	21 21	1			43 41
	203 204		1		20 21	20 21	1			42
	205 206				9 19	9 19				18 38
					21	21				42
	208 209				18 21	18 21				36 42
	210 211				21 21	21 21				42 42
Interest Rate	212 213				18 20	24 21				42 41
					20	21				41
	215 216				20 14	20 15				40 29
	217 218				14 21	17 22				31 43
	219 220				21 19	22 17	2			43 38
		1	2	6	12	13	2	5		41
	222 223	9	1	3		18 1	3	3	6	36 29
	224 301	3	1	1		21				41
	302 303				19 17	12 20	7			38 37
	304 305				18 18	19 19				37 37
	306 307	1			19 17	18 19				37 37
	308				18	19				37
	309 310 311			1		19 2 2	16 5	1		37 38 29
	401 402	1		1		8	2	c		29 16 16
Commodities	402 403 404	1			7	8 8 8				15
	405 501			1	6 13	7				13
	502 503	1			12	11	1	1		26
	504				11	12				23
	505 506				11 12	12 12		1		23 25
	507 508				12 13	15 14				27
	509 510				13 13	14 14				27
					13	14				27
	512 513				13 12	14 13				27
	514 515				13 12	14 15				27
	516 517				13 13	14				27
Credit Spread					12	13 12				24
	519 520				15 15	15 15				30 30
	521 522				15 15	15 15				30 30
	523 524				14	16				30
					15	13 15				30
	526 527				12 15	12 15	1			25 30
	528 529				12 12	12 12				24 24
					7	7	1			15
	531 532				12 12	13 12				25 24
	533 534				13 13	13 13				26 26
	601 602				2	3 3				5 5
	603 604				2	3				5 5
	605 606				2	3				5 5
	607 608				2	3				5



84. In particular, as shown in Table 3 and Figure 2:

- Instrument 121 (EQ) reports few submissions (13) with some extreme value, and two clusters (around 300k and 700K of IMV);
- 223 exhibits extreme outliers in terms IMVs and in its IQD, which imply some residual issue in term of correct booking from banks.
- Instruments 301, 302, 310 and 311 (FX): generally high IQD (47%), with substantial clustering highlight issue in the interpretation of the instructions.
- 85.Some of these extreme outlier banks were classified as a high priority for the CAs (see also Chapter 5), so they were followed with greater attention during the exercise in order to specifically define the reason for the extreme result.
- 86.Despite many recommendations, some minor misalignments in the IMV have been detected due to the reporting of the 'clean price' (i.e., the price of a trade excluding the accrued interest) instead of the 'dirty price' (i.e., the price of a trade including any interest), which is what was intended for the mark to market valuation. This has been detected especially in the bond price, as in instruments 517-527. This problem was more frequent in the past, but it is evident that not all the banks follow the instructions in this regard. On the other hand, this mistake does not significantly prejudice the provision of the risk measures.
- 87. In addition, the EBA recommends that banks make better use of the Q&A tool by submitting questions before the start of the exercise to avoid misinterpretations in the future. Banks are kindly invited to provide, using the Q&A tool, their best practice and market standard conventions when further specifications of the hypothetical trades are needed.
- 88.Evidence from a large majority of the banks is that IMV comes from front office systems. This is acknowledged as the best practice for alignment with real market-trading activities.
- 89. Figure 1 and Figure 2 report the clusters found in the IMV results for a sample of low IQD instruments (0% IQD or close to zero) and high IQD (the highest in the asset class) instruments. All the instruments' IMV distributions are available in the annex in Figure 18.



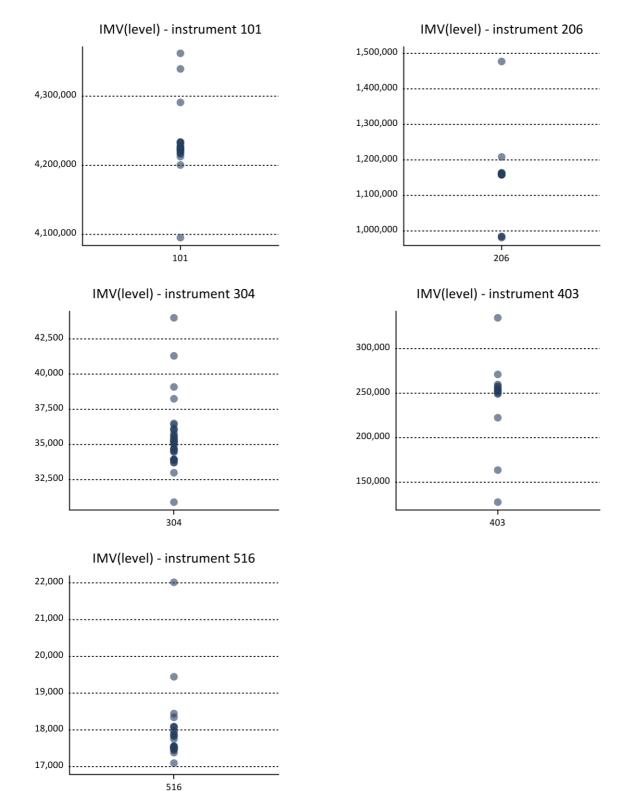


Figure 1: IMV scatter plots – low-IQD instruments



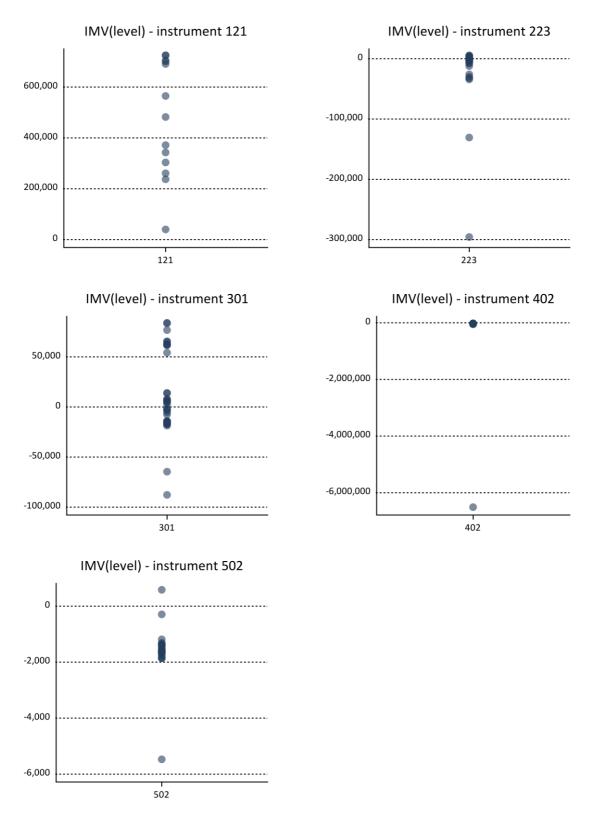


Figure 2: IMV scatter plots – high-IQD instruments

90.The 'concentration index' as per the percentage of values between 50% and 150% of the median value in Table 4 shows that, overall, 95% of the observations lie between those ranges.



- 91. This result is similar to what reported last year's MR benchmarking exercise, demonstrating a consistent level in terms of submissions quality.
- 92. Given the EBA's experience of past benchmarking exercises, values lying in this range might be considered acceptable on the basis of fine-tuning as successive benchmarking exercises are run.
- 93.For many hypothetical instruments, the IMV variability is explained by the divergence in terms of both fixings and market practice assumptions by the participating banks. Therefore, the interpretation of the deals and market practices substantially explains the observed variability.

3.2 Risk and stressed measures assessment

- 94.For VaR and sVaR, variability was assessed by using the banks' reported VaR and sVaR over a 2week period (from 15 January 2024 to 26 January 2024). Banks submitted weekly or daily observations, depending on their models, and the final risk measures by portfolio were obtained by averaging the observations over the 2 weeks.
- 95. In the sample, 14 out of 43 banks calculated weekly sVaR measures. The remaining 29 banks computed daily sVaR measures.
- 96.Moreover, a P&L VaR measure produced by the EBA using the P&L data provided by banks via an HS approach was analysed. The relevant banks delivered a yearly 1-day P&L vector for each of the individual and aggregated portfolios modelled. These were used to compute the P&L VaR.
- 97.The additional P&L information for non-APR portfolios allowed the EBA to compute the alternative measure for VaR previously defined, and to check the variability of the results across banks by calculating VaR using a 1-year lookback period.
- 98.Additional checks were carried out for the available P&L vectors, such as the 1-day P&L versus the 10-day P&L (either overlapped or not), where applicable. Furthermore, the time series with the wrong time window were dropped. P&L vectors provided by banks with no HS model were also dropped. A final consistency checks across the HS banks entailed computing the ratio between P&L VaR and the regulatory VaR provided, which can be expected to be close to 1.¹⁰
- 99. Clearly, the P&L VaR assessment is possible only for banks applying an HS approach, and with at least 185 days of results submitted. Accordingly, banks applying an MC or parametric approach, or another approach other than HS, cannot be subject to this assessment, and have been dropped from the sample (see also Section 2.4, 'Data quality issues').

¹⁰ It should be noted that this expectation depends on the lookback period for VaR.



100. The P&L VaR was computed as the absolute value of the empirical first percentile of the P&L vector rescaled to 10 days by applying the square root of time approximation, without applying any data-weighting scheme:¹¹

$$VaR_{99\%}^{10day} = \sqrt{10} * VaR_{99\%}^{1day}$$

- 101. The P&L vector is used to assess the degree of P&L correlation across banks, as well as the level of volatility shown in each bank's vector. This analysis provides useful insights into the degree of market consensus on the relevant risk factors in terms of both market dynamics and volatility levels. Obviously, this analysis, like most of those discussed here, relies on sufficient data points and portfolios being modelled by banks to ensure robustness and consistency.
- 102. The IRC analysis cannot be deepened in this way for VaR because of the higher level of confidence (99.9%) and longer capital horizon (1 year) applied in these metrics. Nevertheless, a variability analysis was performed. In the paragraph concerning IRC, particular emphasis is reserved for missing, zero or unrealistically low results, which suggest that key underlying risk factors are not efficiently captured by the IRC internal model.
- 103. In the sample, 15 out of 27 banks computed weekly IRC measures.
- 104. It is apparent that more complex risk measures, such as IRC, are computed at a less frequent pace (i.e., a weekly basis instead of a daily basis).
- 105. For APR, only a small number of contributions were submitted because of the scarcity of approved internal models on CTPs and because most institutions consider the CTP business to be declining significantly as a result of the recent financial crisis. Therefore, the sample is quite limited.
- 106. The ES, as an alternative risk metric to VaR, has been estimated from the daily P&L series by averaging the P&L observations below the 2.5th percentile converted by the square root of time approximation and taking the absolute value:

$$ES_{97.5\%}^{10day} = \sqrt{10} * ES_{97.5\%}^{1day} = \sqrt{10} \frac{1}{n} \sum_{i=1}^{n} P\&L_{t_i}$$

where n = number of days describing the 2.5th quantile rounded to the highest decimal.

107. For the aggregated portfolios, diversification effects were checked with regard to the VaR, sVaR and IRC metrics, regardless of whether they were provided or estimated.

¹¹ Some banks apply data weightings at a risk factor level, and these will be present in the P&L vectors. This is an implicit source of variability that cannot be controlled.



- 108. For the most inclusive portfolios i.e., the aggregate portfolios the implied capital charges were also computed, and their variability analysed. Where possible, the idiosyncratic factors that drive variability and the impact of regulatory add-ons (e.g., multipliers) were analysed.
- 109. It is worth noting that, although the effects on capital levels of these supervisory actions can be substantial, an HPE is not suitable for assessing such differences. This is especially the case for diversification benefits since these effects are entirely portfolio dependent. More on this is included in the following subsection entitled 'Limitations'.
- 110. Finally, to make the analysis more comprehensive, CAs were asked to complete a questionnaire about the takeaways from this benchmarking analysis and the actions they plan to take to overcome potential weaknesses in the banks' MR models (see Section 5 of this report). Thanks to the interview process, the EBA had the opportunity to discuss directly some issues raised by CAs when challenging the models in the ongoing assessment process.

3.2.1 Limitations

- 111. The design of the benchmarking portfolio exercise described in the ITS aims to ensure the quality of the data used in the report to be produced by the EBA and, more importantly, to identify the banks and portfolios that need specific attention on the part of the responsible CAs. Nevertheless, any conclusions regarding the total levels of capital derived from the hypothetical data should be treated with due caution. The hypothetical portfolios are very different from real portfolios in terms of size and structure. What is more, the data cannot reflect all the actions taken by supervisors.
- 112. From a methodological perspective, the sVaR metric variability observed could originate either from differences in modelling or from the different data periods used for sVaR computation. Further variability stems from banks' different stress periods because there is no common benchmarking stress period. To allow more specific analysis of this aspect, since the 2019-2020 benchmarking exercise more information about the stressed VaR time window has been requested from banks by expanding the relative template envisaged in Annex VI of the benchmarking ITS (in this regard, see subsection 4.2.5.d, 'Common stress period considered' below).
- 113. Another limitation that was tackled in this analysis is that of producing a segregated analysis for institutions with partial model approval (e.g., general risk only) in order to split the result for portfolios with specific risk to filter the additional unwarranted dispersion of VaR figures. The benchmark analysis was run by splitting banks with full approval for equity and IR from those with partial approval to filter out the variability of the risk measure introduced by the partially approved banks.
- 114. Banks with partial model approval provided insights into how they approached the benchmarking exercise. It has been found that the differences reported by the banks in respect of the EBA's benchmark measure are almost entirely explained by considering the internal



measure of risk, which is not approved for capital purposes but is more complete in terms of risk factor coverage.

115. In summary, the reporting of partial use approval results should be continued for the purpose of the exercise. However, it should be considered within the specific sample in order to assess any bias these partial use approval results could introduce into the results for the rest of the sample observed.



4. Overview of the results obtained

4.1 Analysis of VaR and sVaR metrics

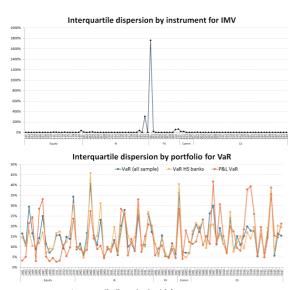
- 116. The dataset used to perform the assessment of risk measures for the 2024 exercise was determined based on the actual dispersion of the risk measures analysed. The outcome of the IMV extreme value analysis was used as an early indication of the potential problems to be reported to banks by their CAs. As explained in Section 3.1, banks' data were taken into account only for portfolios for which the RM is between the benchmark (50th percentile) +/- two times the truncated standard deviation in the portfolio analysed. The rest was classified as an outlier. As shown in Figure 27, we can see that this methodology, contrary to what was used until the 2019 exercise, does not exclude RMs that are clearly consistent with the benchmark.
- 117. To check if submissions (by portfolio) were at least approximately symmetrically distributed around the mean and/or the median, the EBA checked for any significant differences between the mean and median values for the truncated sample. Table 20 in the annex reports the banks' VaR results in relation to the median, aggregated into six buckets, to enable the detection of unexpected clusters.
- 118. As Table 20 and Table 21 show, the variability of the VaR (on average 15% in IQD vs an average variability of 17% in 2023 and 23% in 2022) has improved compared to the previous year, where basically all asset classes report some decrease in the IQDs. The analysis also identifies clusters for portfolios 1016 (EQ), portfolio 2008 and 2019 (IR), and 5009, 5012, 5014 and 5024 (credit spread). This improvement is likely due to a substantial amount of resubmission which improved the quality of Risk Measure dispersion, as long as the fixing and clarification of some instructions.
- 119. As in the previous exercise, the VaR values for CTPs (portfolios 6001 to 6005) are not reported because of insufficient numbers of these data submission to guarantee the significance of the statistics provided and the anonymity of the submissions.
- 120. The cluster analysis presented above is superior to a simple outlier analysis that flags submissions more than a designated number of standard deviations from the mean, as this method cannot easily be used for clustered or strongly asymmetric portfolios.

Interquartile dispersion

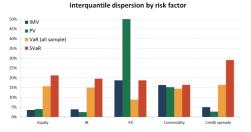
121. Figure 3 and Table 5 summarise the variability of the results, measured via the IQD and coefficient of variation, for the IMV as well as all three VaR measures (i.e. VaR, VaR for HS banks only and VaR calculated from the 1-year P&L series submitted by HS banks). IQD and CV for IMV, PV, VaR and stress VaR, divided by risk factors, are reported at the bottom of Figure 3. Table 5 also includes the VaR results for MC simulation banks and the expected shortfall.



- 122. In terms of risks across different assets classes, the IQDs for VaR for all asset classes are decreased, and they are all well below 20%. The asset class with the lower level of IQD is FX, with just 9% (it was 12% in 2023). The asset class with the highest IQD remain the CS (16%, it was 18% in 2023, 28% in 2022; and it was 37% in 2021) and EQ (16%). Overall, the IQD is lower (14%) than in the previous exercises (in 2021 exercise there was an average dispersion of the VaR of 25%, whereas this decrease to 21% in the 2022 exercise, and 16% in 2023), and it is now lower of the 17% before Covid pandemic in 2020. This decrease in the IQD of the VaR is likely to have stemmed from a stable decrease in the market volatility, but also to a good refinement of the instructions and submission of the data.
- 123. As expected, the IQD for sVaR is higher than for VaR (see the bottom panels of Figure 3), with an average IQD of 21% (22% in 2023, 28% in 2022, 29% in 2021 and 25% in 2020). The CS asset class features a higher dispersion once again (29% as it was in 2023, and 35% in 2022; in 2020 and in 2021 it was 34%). Higher sVaR dispersion is likely to be due to the differences between banks in their choice of the 1-year stress period used, which is chosen based on each participating bank's actual portfolio. It might therefore be the case that the sVaR is not calculated with respect to the 1-year period that maximises VaR for the given hypothetical portfolio.







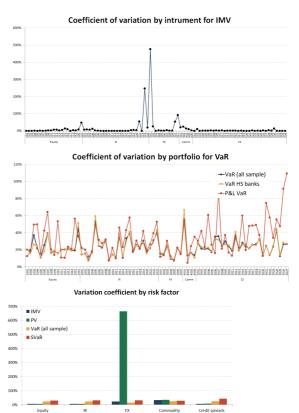




Table 5: Interquartile dispersion for IMV, risk metrics and SBM OFR by risk factor

	IMV	VaR (all sample)	SVaR	P&L VaR	VaR HS banks	VaR MC banks	Exp shortfall	SBM OFR
Equity	4%	16%	21%	12%	12%	10%	11%	12%
IR	4%	15%	20%	14%	16%	8%	13%	8%
FX	19%	9%	19%	7%	8%	5%	8%	2%
Commodity	16%	14%	16%	16%	13%	5%	17%	20%
Credit spr.	5%	16%	29%	18%	14%	13%	18%	14%

Average Interquartile dispersion by risk factor

- 124. Table 5 confirms that when a homogeneous subset of banks is considered (i.e., HS or MC banks), the VaR results show less dispersion than the total sample (average 13% vs. 14%). Regarding the P&L VaR, the dispersion is also 13% (on average among different assert classes) is slightly lower with respect to the all-sample VaR for almost all the asset classes (not for CS). This is consistent with the assumption that fewer differences in the methodology would imply less dispersion among the risk measures.
- 125. When comparing variability for HS VaR and MC VaR, also this year's result tells us that the MC VaR values are less dispersed than those of the HS VaR, as it was in the past exercise. Nonetheless, the analysis needs to take account of the fact that the sample of MC banks is quite small compared with that of HS banks (i.e., 7 MC banks versus 30 HS banks). As far as parametric banks are concerned, a similar analysis is not informative as the total number of parametric banks is very small (i.e., two banks in the sample the remaining three apply a combination of methods, and one failed to report).
- 126. The ratio between sVaR and VaR was also analysed across the sample (see Table 25 in the annex). Some banks have ratios below 1 for many portfolios, while other banks have extremely high ratios for some portfolios. While it is generally expected that the sVaR is greater than the VaR, the clear disparity between these values is usually a natural indication that something is wrong with the data submitted, and the EBA and CAs must pay attention to these observations.
- 127. Table 6 shows the distribution of the sVaR–VaR ratio classified into three buckets (i.e., below 1, between 1 and 3, and above 3) for each portfolio. It is worth noting that a significant number of portfolios for EQ, and IR have a significant proportion of ratios below 1.



Table 6: sVaR–VaR ratio by range (number of banks as a percentage of the total)

Distribution of sVaR / Var ratio over portfolios (X = ratio with the median)

	Port. ID	X > 3	1 < X ≤ 3	X≤1
	1001	17.9%	78.6%	3.69
	1002	86.4%	13.6%	0.09
	1003	17.4%	78.3%	4.39
	1004	19.0%	71.4%	9.5%
	1005	33.3%	66.7%	0.0%
	1006	12.5%	83.3%	4.2%
	1007	55.0%	40.0%	5.0%
Equity	1008	9.1%	86.4%	4.5%
	1009	8.0%	92.0%	0.09
	1010	88.0%	12.0%	0.09
	1011	11.1%	88.9%	0.09
	1012	14.8%	85.2%	0.09
	1013	10.3%	62.1%	27.69
	1014	14.3%	85.7%	0.09
	1015	10.5%	89.5%	0.09
	1016	27.3%	63.6%	9.19
	2001	0.0%	82.4%	17.69
	2002	0.0%	52.6%	47.49
	2003	0.0%	75.8%	24.29
	2004	2.8%	36.1%	61.19
	2005	21.4%	64.3%	14.39
	2005	0.0%	88.9%	14.37
	2000	0.0%	76.7%	23.39
			85.2%	
	2008	3.7%	85.2% 89.2%	11.19
	2009	0.0%		
	2010	0.0%	72.7%	27.39
	2011	0.0%	68.4%	31.69
Interest Rate	2012	0.0%	78.8%	21.29
	2013	2.7%	59.5%	37.89
	2014	40.0%	52.0%	8.09
	2015	28.6%	60.0%	11.49
	2016	0.0%	57.1%	42.99
	2017	86.2%	10.3%	3.49
	2018	0.0%	68.6%	31.49
	2019	14.7%	73.5%	11.89
	2020	50.0%	39.5%	10.5%
	2021	3.2%	71.0%	25.89
	2022	0.0%	82.8%	17.29
	2023	0.0%	81.1%	18.99
	3001	6.3%	90.6%	3.19
	3002	0.0%	93.3%	6.79
	3003	10.7%	89.3%	0.09
	3004	6.7%	90.0%	3.39
	3005	54.5%	45.5%	0.09
	3006	19.4%	66.7%	13.99
	3007	35.7%	64.3%	0.09
	4001		73.3%	
	4001	20.0% 7.7%	92.3%	6.79
Commodities	4002	18.2%	92.3%	0.09
	4003			
		0.0%	100.0%	0.09
	5001	18.2%		0.09
	5002	62.5%	37.5%	0.09
	5003	30.4%	69.6%	0.09
	5004	52.6%	47.4%	0.09
	5005	68.2%	31.8%	0.09
	5006	47.8%	52.2%	0.09
	5007	18.2%	68.2%	13.69
	5008	4.2%	70.8%	25.09
	5009	3.8%	80.8%	15.49
	5010	4.3%	78.3%	17.49
	5011	8.3%	70.8%	20.89
	5012	57.1%	33.3%	9.5%
	5013	22.7%	77.3%	0.09
	5014	50.0%	40.9%	9.19
Credit Spread	5014			9.1%
Credit Spread	5014	0.0%	90.9%	
Credit Spread			90.9% 78.9%	0.09
Credit Spread	5015	0.0%		
Credit Spread	5015 5016	0.0% 21.1% 26.3%	78.9%	0.09
Credit Spread	5015 5016 5017	0.0% 21.1%	78.9% 73.7%	0.09
Credit Spread	5015 5016 5017 5018	0.0% 21.1% 26.3% 21.1%	78.9% 73.7% 78.9% 81.8%	0.09 0.09 4.59
Credit Spread	5015 5016 5017 5018 5019 5020	0.0% 21.1% 26.3% 21.1% 13.6% 0.0%	78.9% 73.7% 78.9% 81.8% 77.8%	0.09 0.09 4.59 22.29
Credit Spread	5015 5016 5017 5018 5019 5020 5021	0.0% 21.1% 26.3% 21.1% 13.6% 0.0% 52.4%	78.9% 73.7% 78.9% 81.8%	0.09 0.09 4.59 22.29 0.09
Credit Spread	5015 5016 5017 5018 5019 5020 5021 5022	0.0% 21.1% 26.3% 21.1% 13.6% 0.0% 52.4% 0.0%	78.9% 73.7% 78.9% 81.8% 77.8% 47.6% 89.5%	0.09 0.09 4.59 22.29 0.09 10.59
Credit Spread	5015 5016 5017 5018 5019 5020 5021 5022 5023	0.0% 21.1% 26.3% 21.1% 13.6% 0.0% 52.4% 0.0% 15.4%	78.9% 73.7% 78.9% 81.8% 77.8% 47.6% 89.5% 84.6%	0.09 0.09 4.59 22.29 0.09 10.59 0.09
Credit Spread	5015 5016 5017 5018 5019 5020 5021 5022 5023 5023 5024	0.0% 21.1% 26.3% 21.1% 13.6% 0.0% 52.4% 0.0% 15.4% 15.8%	78.9% 73.7% 78.9% 81.8% 77.8% 47.6% 89.5% 84.6% 84.2%	0.09 0.09 4.59 22.29 0.09 10.59 0.09 0.09
Credit Spread	5015 5016 5017 5018 5019 5020 5021 5022 5023 5024 5025	0.0% 21.1% 26.3% 21.1% 13.6% 0.0% 52.4% 0.0% 15.4% 15.8% 8.7%	78.9% 73.7% 78.9% 81.8% 77.8% 47.6% 89.5% 84.6% 84.2% 91.3%	0.09 0.09 4.59 22.29 0.09 10.59 0.09 0.09 0.09
Credit Spread	5015 5016 5017 5018 5019 5020 5021 5022 5023 5024 5025 5026	0.0% 21.1% 26.3% 21.1% 13.6% 0.0% 52.4% 0.0% 15.4% 15.8% 8.7% 0.0%	78.9% 73.7% 78.9% 81.8% 77.8% 47.6% 89.5% 84.6% 84.2% 91.3% 92.0%	0.09 0.09 4.59 22.29 0.09 10.59 0.09 0.09 0.09
Gredit Spread	5015 5016 5017 5018 5019 5020 5021 5022 5023 5024 5025 5026 5027	0.0% 21.1% 26.3% 21.1% 13.6% 52.4% 0.0% 15.4% 15.8% 8.7% 0.0% 0.0%	78.9% 73.7% 78.9% 81.8% 77.8% 47.6% 89.5% 84.6% 84.2% 91.3% 92.0% 84.0%	0.09 0.09 4.59 22.29 0.09 10.59 0.09 0.09 0.09 0.09 0.09
Credit Spread	5015 5016 5017 5018 5019 5020 5021 5022 5023 5024 5025 5026 5027 6001	0.0% 21.1% 26.3% 21.1% 13.6% 52.4% 0.0% 15.4% 15.8% 8.7% 0.0% 0.0% 75.0%	78.9% 73.7% 78.9% 81.8% 77.8% 89.5% 84.6% 84.2% 91.3% 92.0% 84.0% 25.0%	0.09 0.09 4.59 22.29 0.09 10.59 0.09 0.09 8.09 8.00 16.09
	5015 5016 5017 5018 5019 5020 5021 5022 5023 5024 5025 5026 5027 6001 6002	0.0% 21.1% 26.3% 21.1% 13.6% 0.0% 52.4% 0.0% 15.4% 15.8% 8.7% 0.0% 0.0% 75.0%	78.9% 73.7% 78.9% 81.8% 47.6% 89.5% 84.6% 84.2% 91.3% 92.0% 84.0% 25.0% 50.0%	0.09 0.09 4.59 22.29 0.09 10.59 0.09 0.09 0.09 16.00 0.09
Credit Spread	5015 5016 5017 5018 5019 5020 5021 5022 5023 5024 5025 5024 5025 5026 6001 6002 6003	0.0% 21.1% 26.3% 11.1% 13.6% 0.0% 52.4% 15.8% 8.7% 0.0% 0.0% 75.0% 50.0% 0.0%	78.9% 73.7% 78.9% 81.8% 47.6% 89.5% 84.6% 84.2% 91.3% 92.0% 84.0% 50.0% 50.0%	0.09 0.09 22.29 0.09 10.59 0.09 0.09 0.09 16.09 0.09 0.09 0.09 0.09
	5015 5016 5017 5018 5019 5020 5021 5022 5023 5024 5025 5026 5027 6001 6002 6003 6004	0.0% 21.1% 26.3% 21.1% 13.6% 0.0% 52.4% 0.0% 15.4% 15.8% 8.7% 0.0% 0.0% 50.0% 0.0%	78.9% 73.7% 78.9% 81.8% 77.8% 47.6% 89.5% 84.6% 84.6% 92.0% 84.0% 25.0% 50.0% 100.0%	0.09 0.09 22.29 0.09 10.53 0.09 0.09 16.09 16.09 0.09 0.09 0.09
	5015 5016 5017 5018 5019 5020 5021 5022 5023 5024 5025 5024 5025 5026 6001 6002 6003	0.0% 21.1% 26.3% 11.1% 13.6% 0.0% 52.4% 15.8% 8.7% 0.0% 0.0% 75.0% 50.0% 0.0%	78.9% 73.7% 78.9% 81.8% 47.6% 89.5% 84.6% 84.2% 91.3% 92.0% 84.0% 50.0% 50.0%	0.09 0.09 22.29 0.09 10.53 0.09 0.09 16.09 16.09 0.09 0.09 0.09
	5015 5016 5017 5018 5019 5020 5021 5022 5023 5024 5025 5026 5027 6001 6002 6003 6004	0.0% 21.1% 26.3% 21.1% 13.6% 0.0% 52.4% 0.0% 15.4% 15.8% 8.7% 0.0% 0.0% 50.0% 0.0%	78.9% 73.7% 78.9% 81.8% 77.8% 47.6% 89.5% 84.6% 84.6% 92.0% 84.0% 25.0% 50.0% 100.0%	0.09 0.09 4.59 2.22 0.09 10.59 0.09 0.09 16.09 0.09 0.09 0.09 0.09 0.09
	5015 5016 5017 5018 5020 5021 5022 5023 5024 5025 5026 5027 6001 6002 6003 6004 6005	0.0% 21.1% 26.3% 0.0% 52.4% 0.0% 15.4% 15.8% 0.0% 50.0% 50.0% 50.0%	78.9% 73.7% 78.9% 81.8% 77.8% 47.6% 89.5% 84.6% 84.0% 92.0% 84.0% 50.0%	0.09 0.03 4.55 22.23 0.03 0.09 0.09 0.09 8.09 16.09 0.09 0.09 0.09 0.09 0.09
CTP ALL-IN no-CTP	5015 5016 5017 5018 5020 5021 5022 5023 5024 5025 5026 5027 6001 6002 6003 6004 6005	0.0% 21.1% 26.3% 21.1% 13.6% 0.0% 52.4% 0.0% 52.4% 15.8% 8.7% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0%	78.9% 73.7% 78.9% 81.8% 47.6% 89.5% 84.6% 84.2% 91.3% 92.0% 84.0% 25.0% 50.0% 100.0% 100.0% 90.9%	0.09 0.09 4.55 22.29 0.09 0.09 0.09 1609 0.09 0.09 0.09 0.09 0.09 0.09 0.09
CTP ALL-IN no-CTP Equity Cumulative	5015 5016 5017 5018 5019 5020 5021 5022 5023 5024 5025 5026 5026 5026 5027 6001 6002 6003 6004 6005 10000 11000	0.0% 21.1% 26.3% 21.1% 13.6% 0.0% 52.4% 15.8% 8.7% 0.0% 0.0% 50.0% 0.0% 50.0% 9.1%	78.9% 73.7% 78.9% 77.8% 47.6% 89.5% 84.6% 84.6% 84.6% 92.0% 84.0% 25.0.% 50.0% 50.0% 50.0% 50.0% 50.0% 50.0% 50.0%	0.09 0.09 4.55 22.29 0.09 0.09 0.09 0.09 0.09 0.00 0.00
CTP ALL-IN no-CTP Equity Cumulative IR Cumulative FX Cumulative	5015 5016 5017 5018 5019 5020 5021 5022 5023 5024 5025 5026 5027 6001 6002 6003 6004 6005 10000 11000 12000	0.0% 21.1% 26.3% 21.1% 13.6% 0.0% 52.4% 0.0% 15.4% 15.8% 8.7% 0.0% 50.0% 0.0% 50.0% 13.8% 0.0% 8.8%	78.9% 73.7% 78.9% 81.8% 77.8% 80.5% 84.2% 91.3% 92.0% 84.0% 25.0% 50.0% 100.0% 50.0% 100.0% 50.0% 90.9% 77.4% 77.4%	0.09 0.09 4.55 22.29 0.09 10.55 0.09 0.00 0.00 0.00 0.00 0.00 0.00
CTP ALL-NN no-CTP Equity Cumulative IR Cumulative	5015 5016 5017 5018 5019 5020 5021 5023 5024 5025 5027 6001 6002 6003 6004 6005 10000 11000 11000 13000	0.0% 21.1% 26.3% 21.1% 13.6% 0.0% 52.4% 0.0% 52.4% 0.0% 52.4% 0.0% 0.0% 5.0.0% 5.0.0% 9.1% 31.8%	78.9% 73.7% 78.9% 77.8% 47.6% 89.5% 84.6% 84.6% 84.6% 92.0% 84.0% 25.0.% 50.0% 50.0% 50.0% 50.0% 50.0% 50.0% 50.0%	0.09 0.00 4.55 2.22 0.09 0.09 0.09 0.09 0.00 0.00 0.00



4.2 A closer look at the VaR and sVaR results

- 128. Figure 4 and Figure 5 give an overview of the VaR and sVaR results for portfolios 1001 to 6005, i.e. they do not include the aggregated portfolios, where fewer observations were available for the reasons explained above (see Section 2.4).
- 129. Broken down by portfolio, the figures show the average VaR and sVaR over the 10-day submission period for each bank, normalised by the median¹² of the given portfolio.¹³
- 130. Comparing Figure 4 and Figure 5, it shows the dispersion for sVaR than for VaR (sVaR 21% IQD versus 14% VaR IQD on average). Differences in dispersion between VaR and sVaR seem steady but are more marked for the CS portfolios, in which sVaR shows a higher level of dispersion than in the other asset classes (29%).
- 131. FX and CO are the asset classes with the lowest levels of dispersion for VaR (9% and 14%), as they are for sVaR (19% and 16%).

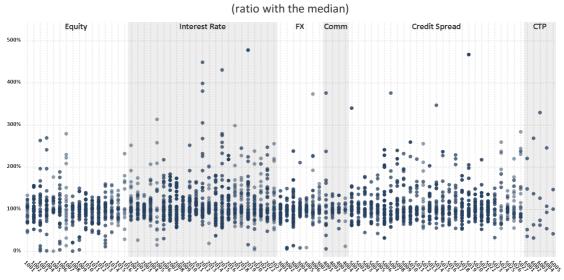
¹² The portfolio median is the median of the average VaR and sVaR over the submission period.

¹³ Note that the figures are restricted to VaR–median and sVaR–median ratios below 450%.

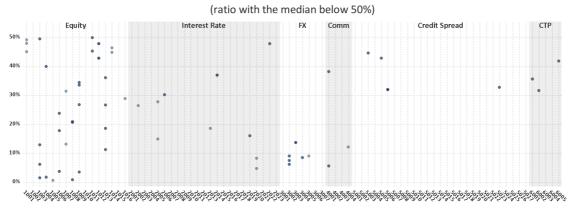


Figure 4: VaR submissions normalised by the median of each portfolio

VaR: all portfolios (exc. aggregated)



VaR: all portfolios (exc. aggregated)





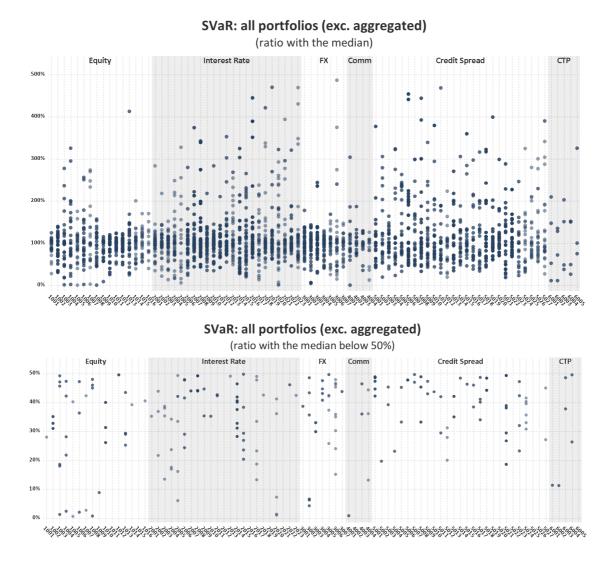


Figure 5: sVaR submissions normalised by the median of each portfolio

132. Table 21 and Table 22 in the annex report all the VaR and sVaR statistics along with EU benchmarks for all HPE portfolios.

4.2.1 Comparison of sVaR and VaR ratios

- 133. Banks were assessed in relation to the full sample not only by their VaR and sVaR values, but also by their sVaR–VaR ratios (Table 25). In general, it should be expected that sVaR would be at least as high as VaR, as sVaR is calibrated to a 1-year period of significant stress. This is verified in 88% of cases. This was 71% in 2023, 89% in 2022 and 73% in 2021.
- 134. Figure 6 shows the ratio of the average sVaR to the average VaR for each bank. The sVaR– VaR ratio varies significantly across the portfolios. Excluding outliers, the average sVaR–VaR ratio per portfolio varies between 0.09 and 34.50 and averages 2.25.



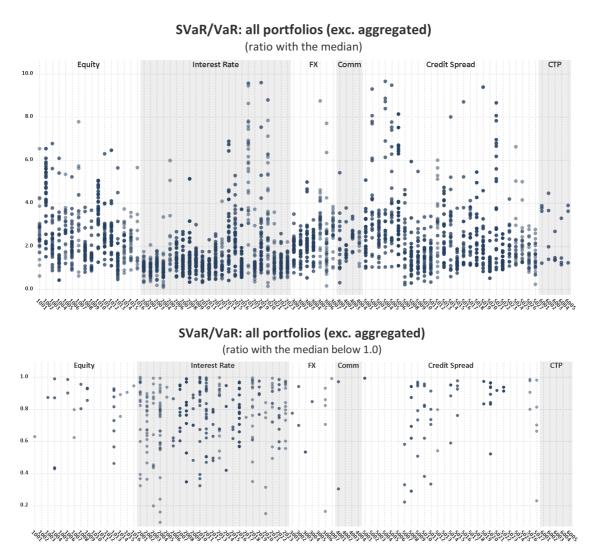


Figure 6: sVaR–VaR ratio for the average VaR and sVaR by portfolio

135. A few banks have a high sVaR–VaR ratio for portfolios in certain asset classes only. This suggests that these asset classes dominate the banks' real trading portfolios and, for that reason, drive the calibration of the sVaR window.

4.2.2 Drivers of variation

136. Based on the qualitative information provided by banks (Figure 7 to Figure 11), the most common methodological approach used by banks to model MR is HS (71%). Although most banks use the same methodological approach, the dispersion of VaR remains substantial because other modelling choices play a key role in producing variability of the risk measures (e.g., differences in time scaling and/or weighting scheme choices, absolute versus relative returns for different asset classes).



Figure 7: Qualitative data: VaR methodological approaches

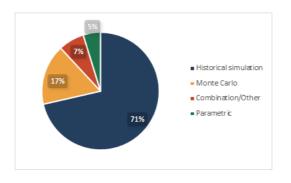
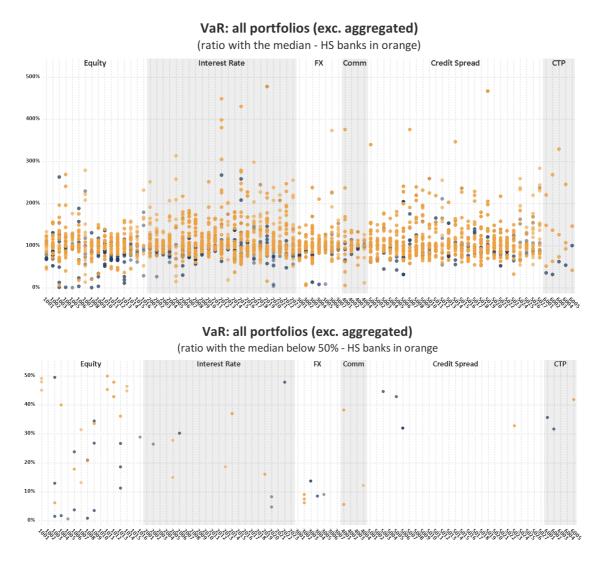


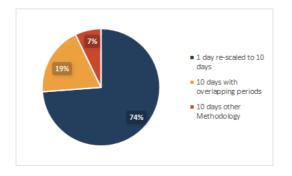
Figure 8: VaR submissions normalised by the median of each portfolio (by methodological approach)



137. Regarding the regulatory 10-day VaR computation, by far the preferred method is rescaling the 1-day VaR to the 10-day VaR using the square root of time approximation.

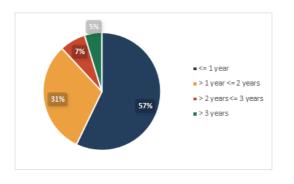


Figure 9: Qualitative data: VaR time-scaling techniques



138. Regarding the historical lookback period used to calibrate banks' VaR models, 57% of the banks use the minimum period of one year and applying a period longer than 2 years is very unusual.





139. As for the possible use of a data-weighting scheme, the great majority of banks' models use unweighted data in the regulatory VaR computation (79% of respondents).

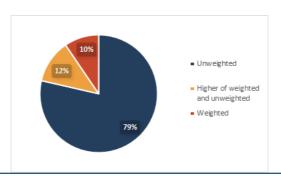


Figure 11: Qualitative data – VaR weighting choices



- 140. Finally, regarding supervisory actions on regulatory add-ons, 72% of the banks in the sample have a total multiplication factor greater than the minimum of 3, which includes the addend resulting from the number of over-shootings (Table 1 in Article 366 of the CRR) and any supervisory extra charge(s). The average total multiplication factor in this sample is equal to 3.56, with a maximum of 5.63. As a result, quite a few banks either must correct for excessive over-shootings or are subject to supervisory measures. In addition, some banks have been assigned other kinds of added penalties that encompass risk 'not in VaR' and additional charges for IRC and APR. This was apparent from the additional and related information provided by some CAs about their supervised banks, and from discussions with some banks during the interviews.
- 141. These responses suggest that the observed variation may be due to a few different drivers. The EBA chooses to present the analysis using the following broad headings:
 - supervisory actions;
 - modelling differences; and
 - other drivers of variation.

4.2.3 Supervisory actions

142. Supervisory actions can take different forms and are therefore difficult to capture fully in the analysis. However, the effects of some types of supervisory charges can be approximated. The effect of a higher VaR or sVaR multiplier imposed by a CA because of model weaknesses, for example, can be studied using the following proxy:

Capital proxy =
$$m_{vaR} * VaR + m_{sVaR} * sVaR$$

where m_{vaR} and m_{sVaR} are the total regulatory multipliers given by 3 plus any add-on resulting from excessive backtesting exceptions and other prudential extra charges imposed by the regulator (where appropriate).

- 143. Including the multipliers in the analysis did not significantly change the results in terms of variability across the sample; that is, the positioning across the sample changed, but, on average, the extent of the dispersion did not.
- 144. Other supervisory measures, such as capital add-ons, cannot be easily captured. They are normally calculated at an aggregate level based on the banks' actual portfolios and cannot therefore be readily computed for the hypothetical portfolios used for benchmarking. Moreover, it tends to be the case that these add-ons are intended to capture difficulties in modelling risks associated with more exotic trades not represented well in the HPE.

4.2.4 Modelling differences



- 145. As outlined in Chapter 3, the CRR permits banks to tailor their VaR models to their specific requirements by making different modelling choices. To test the impact of different modelling choices in a controlled manner, four portfolios were selected based on low IQD. Obviously, the average sample size in this analysis is limited.
- 146. The portfolios portfolios 1010, 2010, 3004 and 5020 cover the main asset classes (i.e., EQ, IR, FX and CS) and were chosen due to the relative low variability of the submissions received for them. Six subsets of banks were defined within (and hence controlling for) the sample of banks using historical simulation, distinguishing the following modelling choices:
 - 1-day scaled versus 10-day overlapping returns¹⁴;
 - the length of the historical lookback period (1 year versus > 1 year)¹⁵; and
 - keeping constant the 1-day and unweighted modelling choices and varying the length of the lookback period (1 year versus > 1 year).¹⁶
- 147. As shown in Table 7 and Table 8, there seems to be evidence that the modelling choices have an impact on dispersion and the conservativeness of the VaR. For instance, for the EQ portfolio the 1-day calibration, more than 1 year and unweighted choices produce less dispersed results. On the contrary, for IR, FX and CS portfolios, 10-days calibration produces less dispersion.
- 148. In terms of conservativeness, for all portfolios selected, 1-day and 'more than 1 year' calibration produces more conservative results.
- 149. Columns 5 and 6 of Table 7 and Table 8 illustrate the effect of increasing the lookback period (1-year compared to 'more than 1 year') when we keep the other factors (1-day & unweighted shocks) the same. No clear path appears on the modelling choice that would produce less dispersed and more conservative results across assets classes.
- 150. Considering the evolution of the evidence in the years, these results depend on the portfolios' selection but also on the period applied for this analysis. Therefore, based on this analysis, it is difficult to conclude that one specific model choice will lead to consistently more conservative and less dispersed risk measures, at least on a stable basis.

¹⁴ 31 banks adopted 1-day returns, while 10 banks adopted 10-day returns.

¹⁵ 24 banks adopted 1-year, while 17 banks adopted > 1 year.

¹⁶ 16 banks adopted 1-day, unweighted & 1-year, while 9 banks adopted 1-day, unweighted & >1 year.



	Coefficient of Vari	efficient of Variation for regulatory VaR (controlling for HS)									
Port.	1-day	10-day	1y	>1y	1d, 1y, unw	1d, >1y, unw					
EQ 1010	15.6%	17.7%	16.5%	12.8%	18.9%	8.5%					
IR 2010	15.8%	11.3%	14.5%	14.7%	15.8%	18.8%					
FX 3004	9.5%	9.1%	9.2%	9.7%	10.0%	10.7%					
CS 5020	14.2%	8.3%	12.2%	14.9%	13.6%	18.7%					
mean	13.8%	11.6%	13.1%	13.0%	14.6%	14.2%					

Table 7: Coefficient of variation for regulatory VaR (controlling for HS) by modelling choice (%)

Table 8: Average regulatory VaR by modelling choice

	Average VaR subsamples							
	1-day	10-day	1y	>1y	1d, 1y, unw	1d, >1y, unw		
EQ 1010	33,126	32,314	31,028	35,280	31,386	36,523		
IR 2010	181,120	172,366	174,304	183,361	179,953	186,906		
FX 3004	454,580	451,234	451,244	456,798	448,837	459,960		
CS 5020	168,137	157,925	165,041	165,861	165,279	170,110		

4.2.5 Other drivers of variation

- 151. In addition to the drivers of variation discussed in the preceding two subsections, there may be other drivers of variation. In the section 4.2.4 'Modelling differences', for instance, only results obtained with HS VaR were discussed, although the methodological aspects considered are expected to be important for other model types (e.g., MC simulation) as well.
- 152. Another driver of variation are the risks not captured in a model. Due to the simplification of the exercise compared to initial benchmarking exercises (2016-2018), most of the most exotic instruments were deleted, so most of the possible risk factors not in the models are no longer present in the exercise. Moreover, banks that are not able to model specific trades are allowed by the Benchmarking RTS not to submit the risk measure. This is shown, for example, in instrument 205 (IR 'Cap and Floor' on 10-year note), where only 13 observations (across 43 banks, where the average number of submissions is 33 for IR asset class) are available. Nonetheless, for this non-vanilla product the IQD is 41% for the VaR (portfolio 2005, it was only 2% the IQD of the 205 IMV), which is considerably higher with respect to other IR portfolios (average IQD for the asset class is 16%), therefore it is likely that few risks not in VaR were present.
- 153. The use of proxies probably leads to spurious variability in some of the hypothetical portfolios characterised by less liquid risk factors, for example some credit spreads. This consideration also applies to the sVaR.



154. As in the previous exercise, four additional drivers of variation will therefore be tested in the following areas: (a) size of the bank, (b) business model, (c) level of approval of model (e.g., general interest risk versus general and specific interest risk approval, or general equity risk versus general and specific equity risk approval) and (d) time window selected for the calibration of the stressed VaR. As for the previous exercise (2020-2023), the EBA also tested different definitions of size and business models.

a. Size of the bank

- 155. The size of the bank could influence the internal model. Larger banks could have more resources to invest into internal modelling, and this could have an impact on the quality of the model and the results submitted. The same can be said of banks that invest more in market activities in terms of their whole bank activity. The composition of the bank's trading portfolio could also have some influence on the design and performance of the internal model. Nonetheless, size is not a uniquely definable variable.
- 156. For the scope of the analysis, the size of the banks was selected based on banks' common reporting results concerning the RWA for market risk. The market risk RWA was preferred in selecting the size because a bigger bank in terms of total RWA can have a smaller market risk trading book in relative terms. The market risk RWA variable was therefore preferred. It should be noted that market risk RWA also incorporates the standardised measure but classifying the bank by the internal model market risk RWA did not change the composition of the sample substantially.
- 157. The banks were divided into three subsamples: large (above the 75th quantile), medium (between the 75th and 25th quantiles) and small (lower than the 25th quantile). Detailed VaR tables are presented in the annex (see Table 27, Table 28 and Table 29).
- 158. Table 9 summarises the effect of the bank's size. Because of the decreased number of submitters, the 'small banks' sample lost a little of its significance. Fewer banks imply fewer submissions, and the smaller banks usually report less information. Therefore, it is more interesting to look at the difference in dispersion among medium and large banks. Almost for all asset classes, it seems that dispersion sightly decreases with the size of the banks. This implies that the banks' size has some influence and that variability in size increases the dispersion of the general results submitted.
- 159. Further analysis of this aspect can be carried out in terms of the factors selected to define the size. If we run the same analysis using the size of the trading book¹⁷ instead of the size of the bank (defined by RWA for market risk), we can see that dispersion varies again across different asset classes and different sizes of banks. The results are reported in Table 30, Table

 $^{^{17}}$ The size of the trading book was defined as: (assets held for trading + liabilities held for trading) / (total assets × 2). Data source: FINREP data)



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31 and Table 32. Looking solely at the trading book size, we obtain different results. The average IQD ratio decrease with the size of the trading book. The average IQD is 13% for small TB banks (very few portfolios submission need to be considered as a factor here), 12% for medium TB and 11% for large TB banks.

		VaR - Avg. Inter	quartile Range	
	All Banks	Small Banks	Medium Banks	Large Banks
Equity	16%	11%	13%	12%
Interest Rate	15%	14%	13%	14%
FX	9%	8%	10%	7%
Commodities	14%	21%	10%	10%
Credit Spread	16%	11%	14%	13%
СТР				33%
All-in	10%	5%	11%	11%

Table 9: Asset class comparison for VaR in terms of banks' size

b. Business model

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- 160. The business model of the banks in the sample was selected based on a previous analysis run by the EBA (EBA LCR Report¹⁸). In the sample of 43 banks, 23 were classified as cross-border universal banks, which is by far the most numerous business model in the sample. The remaining banks were either not classified or had different business models (e.g., local universal banks), but they were too few to use as a subsample for this kind of analysis. As a result, the cross-border universal bank business model was selected.
- 161. Specific VaR results for banks classified as cross-border universal banks are shown in Table 33 of the annex. Table 10 summarises the impact of the business model on different asset classes. The business model selected is so predominant in the sample that it does not allow for proper discrimination among the whole sample; therefore, the dispersion of the banks belonging to the same business model is very close to the dispersion of the whole sample for the banks. Judging from the results, there is some weak evidence that the variety business model has some effect in increasing the dispersion of the VaR submission.
- 162. Further analysis of the business model can be carried out in terms of factors selected to define the business model. If we run the analysis based on the amount of 'Level 3 assets and liabilities' in relation to the size of the trading book¹⁹ (FINREP data), the results are reported in Table 34, Table 35 and Table 36. The average IQD is 10% for the low level of Level 3 A&L banks, 13% for the medium level and 12% for the high level of Level 3 A&L banks. Therefore, it seems

¹⁸ <u>https://www.eba.europa.eu/regulation-and-policy/liquidity-risk</u>

¹⁹ (Level 3 assets held for trading + level 3 liabilities held for trading) / (assets held for trading+ liabilities held for trading)



that a more exotic composition of the bank's trading book does not affect the variability of the results.

	VaR - Av	vg. Interquartile Range
	All Banks	Cross-border Universal bank
Equity	16%	14%
Interest Rate	15%	13%
FX	9%	8%
Commodities	14%	12%
Credit Spread	16%	13%
СТР		30%
All-in	10%	12%

Table 10: Asset class comparison for VaR within the same business model (cross-border universal bank)

c. Level of approval

- 163. Banks have different levels of approval for equity and interest rate risks. To be more specific, banks can apply to obtain approval for the general equity or interest rate risk or they can apply for approval of the specific equity or interest rate risk as well. See also the discussion in Section 3.2 on this point. In general, having approval for both the general and the specific parts of the equity and interest rate risks allows banks to fully model the instruments in the equity and credit spread sections of the exercise. Nonetheless, banks with only general approval are required to report these instruments as well, but this has been known to generate additional dispersion in the risk measures submitted. For this reason, in this exercise the EBA filtered all the results submitted and produced IQD statistics for the banks belonging to the sample of banks with different levels of approval.
- 164. Among the banks that submitted results for interest rate risk, 23 banks in the report have general and specific approval (see Table 37) and 17 banks have only general approval (see Table 38). Among the banks that submitted results for equity asset risk, 26 banks in the report have general and specific approval (see Table 39) and 8 banks have only general approval (see Table 40).
- 165. Table 11 summarises the result of the analysis when the filter for the level of approval is applied. The presence of banks with different levels of approval tends to moderately impact the benchmarking results.
- 166. Looking at Table 11, we see that the EQ asset class IQD is marginally smaller when considering only the subsample of firms with the full level of approval with respect to the full sample. The CS asset class also decreases, if only general risk is considered, but it should be considered that almost no banks without specific IR approval submitted any CS results. Finally, for the IR asset class splitting the sample between banks with general and specific approval and banks with only general approval produces some marginal changes in the benchmark for this asset class, confirming that the submissions from banks with partial approval tends to increase the IQD of the submissions.



	VaR - Avg. Interquartile Range							
	All Banks	IR Gen + Specific	IR Gen only	Eq Gen + Specific				
Equity	16%			15%				
Interest Rate	15%	15%	13%					
Credit Spread	16%	16%	9%					

Table 11: Asset class comparison for VaR in terms of level of approval

d. Common stress period considered

- 167. The stress window applied by the participating banks has always been understood as one of the main sources of the greater dispersion of the sVaR compared to the VaR, but this hypothesis was tested only from the 2019 exercise onwards due to a lack of information regarding the time window applied by the banks to calibrate the sVaR. This information was collected for the 2020-2023 exercises as well and applied to test the impact of the stress time window selected to calibrate the sVaR.
- 168. In their time window for the sVaR the banks select periods that include either 2008-2009 or 2011 in order to calibrate their sVaR, with a preference for 2008-2009. Because of the higher number of banks selecting 2008-2009, the EBA filtered the sample of the banks that applied a 2008–2009-time window for sVaR calibration, obtaining a subsample of 26 banks. The benchmark and the related statistics for this subsample of banks are available in Table 41 in the annex, and they are easily comparable with the full sample sVaR statistics in Table 22.
- 169. Table 12 summarises this stress period filtering analysis. It seems clear that the different time window selected for the bank has a significant impact on sVaR statistics. This means that the subsample with the same stress period generally exhibits smaller dispersion results for sVaR than the whole sample.

	SVaR - Avg. In	terquartile Range
	All Banks	Stressed Period
Equity	21%	17%
Interest Rate	20%	17%
FX	19%	13%
Commodities	16%	10%
Credit Spread	29%	26%
СТР		50%
All-in	17%	15%

Table 12: Asset class comparison for sVaR in terms of the time window applied



4.2.6 Portfolio comparison

- 170. Selective comparison of VaR results across portfolios can be informative in instances where the riskiness of those portfolios may be ranked in a model-independent way. For example, all else being equal, it is expected that a more diversified and hedged portfolio would lead to a lower VaR than a more concentrated and unhedged portfolio.
- 171. This hypothesis can be tested with several portfolios in the 2024 exercise. Use of the following portfolios is suggested:
- portfolio 2006, which is composed of instruments 206 (long 1 million German bond 10 years) and 207 (short 1 million German bond – 5 years);
- portfolio 2007, which is composed of instruments 206 (long 1 million German bond 10 years), 207 (short 1 million German bond 5 years) and 208 (long 1 million Italian bond 10 years), so it is equal to portfolio 2006 plus instrument 208.
- 172. Both portfolios comprise sovereign bond instruments, yet portfolio 2006 is concentrated on only one issuer and is partially hedged (long and short positions). Portfolio 2007 adds a second issuer to this portfolio without any hedge. Against this backdrop and in view of the specific portfolio definitions, we would expect the following result:

 $VaR_{Portfolio\ 2007}$. > 200% × $VaR_{Portfolio\ 2006}$

173. Table 13 reports when this hypothesis holds true.

 Table 13: Portfolio comparison for VaR, sVaR and IRC

	VaR(P2007) > VaR(P2006)	sVaR(P2007) > sVaR(P2006)	IRC(P2007) > IRC(P2006)
Num of banks	35 out of 35	35 out of 35	26 out of 26
	VaR(P2007) > 1.5*VaR(P2006)	sVaR(P2007) > 1.5*sVaR(P2006)	IRC(P2007) > 1.5*IRC(P2006)
Num of banks	35 out of 35	35 out of 35	26 out of 26
	VaR(P2007) > 1.75*VaR(P2006)	sVaR(P2007) > 1.75*sVaR(P2006)	IRC(P2007) > 1.75*IRC(P2006)
Num of banks	35 out of 35	34 out of 35	26 out of 26
	VaR(P2007) > 2*VaR(P2006)	sVaR(P2007) > 2*sVaR(P2006)	IRC(P2007) > 2*IRC(P2006)
Num of banks	34 out of 35	32 out of 35	26 out of 26

174. The comparison between the two portfolios with respect to regulatory VaR shows that only 1 out of 35 banks do not meet the initial expectation. The same comparison based on sVaR yields 3 banks that are not in line with this expectation. Regarding the IRC model, no bank does not meet the a priori expectation.



4.3 Analysis of IRC and APR

- 175. Banks with an approved IRC model constitute a subsample of those with an approved VaR model; only banks using internal models for specific risks of debt instruments are permitted to use IRC models (Article 372 of the CRR).
- 176. The full set of submissions for IRC results for each trade, after the data-cleaning process has been run as previously described, is reported in Table 14.
- 177. In the context of the HP exercise, only a subset of banks made submissions for IRC, and a number of those banks submitted very low figures. This suggests that important risk factors (in the context of the HPE) have not been modelled. While the submission of low figures may be linked to risk factors not modelled, this should not be taken to mean that banks with higher IRC figures included all risk factors from a given portfolio in their model.
- 178. The number of submissions is limited for some of the all-in portfolios. Statistical inferences for these portfolios are thus not appropriate. A prerequisite for consideration of banks' submissions for the all-in portfolios is that a bank needs to be able to model all the corresponding underlying portfolios.
- 179. As in the case of VaR, a selective comparison of IRC results across portfolios can be informative in instances where the riskiness of those portfolios may be ranked in a model-independent way. As shown in subsection 4.2.6, the expected diversification relationship holds true for all but one of the banks that submitted such results.
- 180. It is recommended that CAs assess the extent to which these missing risk factors are important in the context of banks' overall risk, and whether they need to be added to the model.
- 181. CAs should give particular attention to portfolios 2006, 2018-2019, 5001, 5004, 5010, 5014-5017, 5019-5020, 5022 and 5027, i.e., where IRC shows a higher level of dispersion (above 50%) above the average.
- 182. As is the case for VaR and sVaR, banks can choose from a range of permitted modelling approaches for IRC. For example, banks need to choose:
 - a source of credit risk estimates such as PD and loss given default (LGD).
 - the number of systemic factors used to model the co-movement among obligors in their portfolios.
 - the size and granularity of credit spread shocks to apply to positions with an obligor following a rating transition; and
 - the liquidity horizons to assign to positions with a particular obligor.
- 183. The responses to the qualitative questionnaire relating to the IRC methodological aspects suggest that the use of market LGD is highly applied among respondents (Figure 12), with 10 out of 27 banks using market convention as the source of LGD. A minority of banks 3 out of 27 –



use their own IRB models as the source of LGD. The majority – 14 banks – use various other sources to obtain the LGD.

184. The PDs are provided by rating agencies in 64% of cases, by the IRB in 21% and by other sources in %. The transition matrices are mostly taken from rating agencies (20 respondents out of 26), and the rest of the banks use their IRB, 'market implied transition matrices and various other sources.

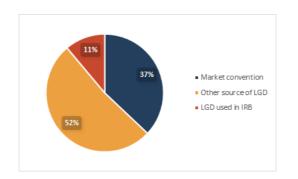


Figure 12: Qualitative data: source of LGD for IRC modelling

- 185. Moreover, many respondents stated that they use more than two systemic modelling factors at the overall IRC model level (Figure 13).
- 186. The liquidity horizon applied at the portfolio level for the IRC model is predominantly between nine and 12 months (70% of the responses).

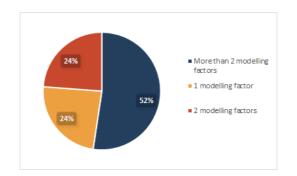


Figure 13: Qualitative data – number of modelling factors for IRC

187. Hence, in the context of IRC the modelling practices across the sample of banks participating in the benchmarking exercise seem to be consistent.



Table 14: IRC statistics and cluster analysis

					Main st	atistics					Percentiles		
	Port. ID	Min	Мах	Ave.	STDev	STDev_trunc ¹	MAD (median absolute deviation)	Coefficient of variation (STDev/Mean)	Num obs. ²	25th	50th	75th	IQD
	2005	20,889	425,631	212,008	132,131	145,652	91,152	62%	14	126,035	182,208	271,298	379
	2006	2,085	56,173	25,410	17,065	28,847	12,633	67%	21	10,392	25,794	43,314	61
	2007	98,981	874,866	490,358	250,168	234,388	192,517	51%	26	313,440	524,463	642,674	34
	2008	147,137	1,579,283	872,641	457,314	427,464	330,773	52%	26	460,881	973,364	1,259,739	46
Interest Rate	2013	9,762	197,073	59,243	50,823	84,353	25,474	86%	21	24,790	53,964	64,031	44
merest nute	2014	197,368	983,179	672,235	231,013	282,084	184,811	34%	19	515,657	752,801	854,905	25
	2016	152,347	1,763,730	950,131	487,809	449,663	378,497	51%	26	602,957	1,004,202	1,376,721	39
	2018	35,999	717,199	354,984	230,908	219,209	211,936	65%	27	98,489	376,064	572,887	71
	2019	35,999	717,199	334,877	227,998	214,454	202,774	68%	25	98,489	343,209	490,296	67
	2022												
	5001	10,359	392,390	96,624	116,827	174,514	19,517	121%	21	26,144	58,248	109,359	61
	5002	40,542	116,646	69,775	24,519	29,015	17,390	35%	19	49,921	67,279	82,704	25
	5003	22,335	115,485	67,822	24,758	27,043	15,822	37%	21	52,239	69,146	80,465	21
	5004	16,266	412,563	116,727	127,261	180,245	37,741	109%	18	26,099	69,584	207,585	78
	5005	12	93,569	42,699	24,025	68,752	14,311	56%	24	34,627	43,524	58,312	25
	5006	350,193	833,886	632,211	140,281	184,571	95,671	22%	22	554,810	620,034	791,178	18
	5007	34,720	256,434	120,062	53,594	89,646	25,414	45%	21	99,509	120,295	143,814	18
	5008	387,435	856,002	599,729	133,112	142,206	111,848	22%	24	505,297	586,232	728,160	18
	5009	2,052	24,974	8,726	6,933	16,892	2,371	79%	25	4,095	7,026	8,801	36
	5010	3,559	143,846	55,628	47,928	57,573	28,529	86%	23	12,695	41,265	91,556	76
	5011	18,369	252,246	110,032	65,311	76,688	36,556	59%	24	63,074	108,170	124,312	33
	5012	29,231	185,315	103,328	38,501	67,934	31,262	37%	21	76,964	102,381	132,877	27
	5013	3,329	47,523	19,759	11,549	13,636	7,508	58%	24	9,584	22,885	25,907	46
Credit Spread	5014	11,070	447,899	115,263	133,047	181,374	38,884	115%	20	21,843	92,157	167,332	77
	5015	115	119,015	36,224	35,400	59,511	16,043	98%	23	7,768	28,230	67,256	79
	5016	24,107	263,065	116,961	78,972	92,544	42,991	68%	19	51,419	106,868	196,140	58
	5017	199	74,886	29,113	26,028	59,017	15,153	89%	19	10,362	26,139	44,399	62
	5018	40,591	266,616	99,001	65,719	106,926	23,417	66%	18	60,298	82,677	116,814	32
	5019	115	85,803	28,997	27,258	45,156	15,388	94%	21	7,768	25,609	39,031	67
	5020	35,883	580,264	241,279	160,658	205,810	138,306	67%	24	113,704	231,596	367,375	53
	5021	15,774	106,754	46,744	25,709	43,848	13,000	55%	18	29,838	48,256	55,838	30
	5022	2,563	330,539	90,994	92,104	128,458	48,802	101%	21	23,996	79,509	115,052	65
	5023	9,209	92,772	42,702	24,319	63,882	8,613	57%	15	25,929	34,346	69,175	45
	5024	82,452	572,097	276,802	160,404	184,395	104,026	58%	21	158,671	228,399	393,024	42
	5025 5026	459,874	676,401	559,804	62,333	88,961	36,869	11%	18	522,002	567,587	574,974	5
		276,989	604,547	432,951	81,054	88,453	45,129	19%	21	403,493	445,631	454,837	6
	5027	28,788	740,403	349,920	207,835	187,423	159,033	59%	24	154,926	383,505	516,275	54
ALL-IN no-CTP **	10000	645,623	1,435,718	981,547	278,750	378,427	268,502	28%	14	695,228	1,045,730	1,144,995	24
CS Cumulative **	15000	492,813	1,021,210	754,661 5th and above the	151,343	135,786	116,951	20%	24	641,570	761,851	869,511	15

EU Statistics for IRC

3 Deer ronk, is in exandant oberation (Complexe exclusing values below the 3 m and a above ine 3 m percentine Refers to the number of banks included in the computation of the statistic * For the aggregated portfolios (80 to 66), banks that reported at least a missing partfolio IMV among the ones composing the aggregate are not included in the computation of the benchmarks for that particular aggregate partfolio.

- 188. Table 14 shows that the average variability of IRC is higher than that observed for VaR. This table presents a summary of the descriptive statistics concerning the IRC values submitted, along with the median, first and third quartiles used to select out-of-range values to be discussed with the banks during the interviews. EBA received on average 21 submissions for IRC in relation to the IR and CS hypothetical trades. We can observe that, even if the IQD for the single portfolios is sometimes quite significant, at lea at the aggregate level, the IQD is approximately 20%.
- 189. The EBA also provided a disaggregated analysis of sources of LGD and numbers of modelling factors. It is possible to split the sample between market convention and non-market convention (IRB and other sources) and the number of modelling factors (1-2 vs. more than 2). In Table 15 below, the average interquartile is reported. The full set of results is also reported in Table 43, Table 44, Table 45 and Table 46.
- 190. The IQD dispersion of the subsample is very stable for IR and CS portfolios among different model choices.



		VaR - A	vg. Interquartile	Range	
		Source o	of LGDss	No. modelli	ng factors
	All Banks	Market	Non-market	1 2 factors	>2 factors
		Convention	Convention	1-2 factors	>2 factors
Interest Rate	49%	58%	41%	49%	49%
Credit Spread	43%	35%	42%	39%	40%
All-in	13%	17%	10%	18%	17%

Table 15: Coefficient of variation for regulatory IRC by modelling choice (%)

- 191. This report is no longer reporting the summary of the responses to the qualitative questionnaire relating to the APR methodological aspects, since only 4 responses are available at the overall CTP model level, so no disclosure is possible without disclosing some specific information on the submitters.
- 192. The average variability of the APR charge is also no longer reported, since the limited data available do not allow a meaningful computation of the IQD of each CTP.

4.4 P&L analysis

- 193. The P&L analysis is complementary to the outcome of the assessment of variability based on VaR modelling. For each individual portfolio, the P&L vectors provided by banks using HS were compared, and a benchmark analysis is provided in the annex (see Table 23).
- 194. A graphic exemplification of low and high IQD portfolios is presented below in Figure 14 and Figure 15. Even though the P&L vectors available are much longer, only 3 months (1 November 2023 to 1 February 2024) are reported to simplify the representation. Additional examples of low and high IQD portfolios can be found in the annex in Figure 25 and Figure 26. P&L vector series that perform better tend to be closer to the benchmark. On the other hand, the low absolute value of the P&L, as per the risk measures, tends to provide misleading information if we consider the IQD figures alone.

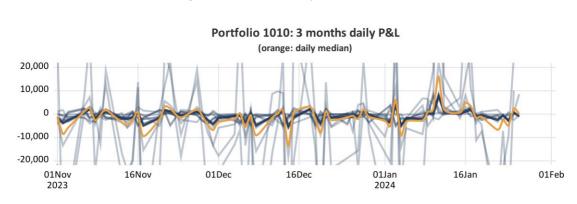
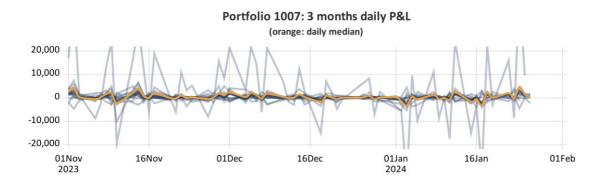


Figure 14: P&L chart example of low IQD



Figure 15: P&L chart example of high IQD



- 195. Another useful check for the P&L results submitted was a comparison of the ratio between the P&L VaR computed by the EBA (see Section 3.2 and Table 26) and the regulatory VaR submitted by the participating banks. A significant deviation of this ratio from 1 indicates an incoherent submission by the bank (see Table 26 in the annex). Moreover, it allows the tightness or the width of the realised P&L distribution for each bank to be checked at each hypothetical trade position. This can be done by referring to the standard deviation of the P&L series.
- 196. Another metric computed by the EBA from the P&L series provided by HS banks is the empirical ES (see Table 24 in the annex). The empirical ES results have approximately the same level of dispersion as the P&L VaR (see Table 5 in Section 5.1).

4.5 Diversification benefit

- 197. An additional metric considered as part of the analysis was the diversification benefit observed for VaR, sVaR and IRC in the aggregated portfolios.
- 198. The diversification benefit of a given metric (e.g., VaR) is computed as the absolute benefit, i.e., the difference between the sum of the single results for each individual position and the result for the aggregated portfolio, divided by the sum of the single results from each individual portfolio. Table 16 summarises the results of the analysis.
- 199. As expected, there is evidence that larger aggregated portfolios exhibited greater diversification benefits than smaller ones. The diversification benefit for all-in portfolio 10000 (all-in no-CTP portfolio), for instance, clearly exceeds the benefit for the other risk types, whose all-in portfolios are based on fewer individual instruments. Regarding the dispersion shown by the diversification benefits, it is possible to observe a significantly higher IQD for some portfolios than for others, and in some cases a quite comparable dispersion across VaR, sVaR and IRC (e.g., interest rate and commodity risk categories).



Interq dispersion

2% 7% 4% 12% 30% 27%

78% 72% 61% 47% 9% 12%

Table 16: Diversification benefit statistics

Diversification benefit statistics

Diversification benefit = (Sum of single portfolios VaR - Aggregated Port. VaR)/Sum of single portfolios VaR

,	VaR								
			(Other statistics	5	Percentiles			
		Port.	Ave.	STDev	Num obs. ³	25th	50th	75th	
	ALL-IN no-CTP	10000	77%	3%	9	75%	76%		
	Equity Cumulative	11000	67%	6%	23	63%	67%		
	IR Cumulative	12000	61%	7%	34	57%	59%		
	FX Cumulative	13000	41%	9%	33	36%	43%		
	Commodity Cumulative	14000	7%	4%	13	5%	6%		
	Credit spread Cumulative	15000	9%	4%	22	7%	9%		

sVaR

		(Other statistics	;				
	Port.	Ave.	STDev	Num obs. ³	25th	50th	75th	Interquartile dispersion
ALL-IN no-CTP	10000	36%	5%	9	35%	35%	37%	3%
Equity Cumulative	11000	23%	10%	23	18%	21%	24%	14%
IR Cumulative	12000	59%	17%	34	49%	53%	65%	14%
FX Cumulative	13000	22%	9%	33	17%	20%	26%	20%
Commodity Cumulative	14000	4%	3%	13	2%	3%	4%	25%
Credit spread Cumulative	15000	6%	3%	22	4%	5%	9%	36%

IRC

	Other statistics						
Port.	Ave.	STDev	Num obs. ³	25th	50th	75th	Interquartile dispersion
Credit spread (36 to 53)** 27	2%	1%	22	1%	2%	3%	39%



4.6 Dispersion in capital outcome

- 200. As a final means of comparison, for each individual position a variable equating to the sum of the regulatory VaR and sVaR was computed. This variable was used in two ways: using the banks' total multiplication factor, and using only the regulatory multiplication factor, i.e., ignoring the banks' individual addend(s) set by the CAs. The results were averaged across a given risk type, thus arriving at a proxy for the implied capital outcome.
- 201. Moreover, the exercise also attempted to isolate the effect of the time windows selected as the stress period. Therefore, the same statistics were reported for banks applying the 2008-9 stress period.

Table 17: Interquartile dispersion for capital proxy

_	Capital proxy (banks own mult)	Capital proxy (fixed mult, =3)	Capital proxy Stressed period (fixed mult, =3)
Equity	17%	15%	13%
IR	18%	15%	14%
FX	16%	13%	10%
Commodity	16%	13%	12%
Credit spreads	23%	20%	18%
СТР			

Interquartile dispersion for capital proxy

202. Table 17 suggests that variability is slightly exacerbated by regulatory add-ons. The ranges of capital value dispersion remain broadly aligned whether the banks' actual multiplication factors are used. On the other side, filtering for banks with the same stress window seems to have a marginal impact in decreasing the variability. However, we need to take into consideration the fact that the sample of banks decreases in number when analysing the subsample of banks with the same stress period, which – other things being equal – tends to increase the IQD.

4.7 Present value

203. The 2020 exercise introduced the PV as a statistic to be provided by the banks. The full set of statistics is provided in Table 42 for this year's exercise as well.



- 204. The average IQD of the PV among the single portfolios is quite significant and not comparable to the low IQD of the previous years (it was 5% in 2023, it was 4% in 2022 and 11% in 2021). This IQD would be much comparable (3%) with the past if portfolios with a relatively high IQD (Portfolios 1016, 3006, and 3007) were excluded. By asset class, the IQD is distributed as follows: EQ (4%- or 2% if portfolio 1016 is excluded), IR (4%), FX (1% when 3006 and 3007 are excluded), CO (15%) and CS (3%).
- 205. PV measures are useful to CAs to verify the RM values. The ratio of RM over PV helps the CAs to quickly verify if the RM outlier comes from a simple mispricing of the portfolio or if it is indeed a true outlier with respect to the RM benchmark.



5. Competent authorities' assessment

- 206. For each participating institution, the CAs provided individual assessments of any potential underestimation of the capital requirement as required by Article 78(4) of the CRD and Articles 9 and 10 of the draft RTS on supervisory benchmarking. This chapter highlights some key information derived from these assessments.
- 207. The EBA designed a questionnaire about this assessment, which asked CAs to provide detailed information concerning the level of priority, based on both judgemental and qualitative/quantitative examination results, the overall assessment concerning the MR capital requirements of the internal models and, finally, the CAs' ongoing monitoring activities.
- 208. A total of 40 questionnaires from 12 jurisdictions, provided by the CAs, have been considered in this assessment of the MR benchmarking exercise.
- 209. Regarding the level of priority of the assessments, 4 banks were reported to be a high priority for intervention by CAs. The CAs gave high priority because of the valuable comparison coming from the benchmarking exercise for that jurisdiction and for specific focus given to the SBM implementation.
- 210. Figure 16 reports the CAs' own overall assessments of the levels of own funds requirements. When it comes to benchmark deviations, justified or not, 33 banks were reported by CAs as under or overestimating MR own funds requirements, of which 28 provided justifications for this. Obviously, 'not justified' implies that further and targeted CA investigation is required. Finally, 7 banks had consistent results (i.e., no benchmark deviations).
- 211. CAs' assessments acknowledge two cases out of 40 of unjustified underestimation and 3 of 40 of overestimation of internal model market capital requirements that require further indepth analysis. Obviously, CAs and the joint supervisory teams, where applicable pay close attention to the potential cases of underestimation and overestimation, both across the portfolio and across the risk categories. 4 out of 5 of these cases were classified as low priority by their supervisors.



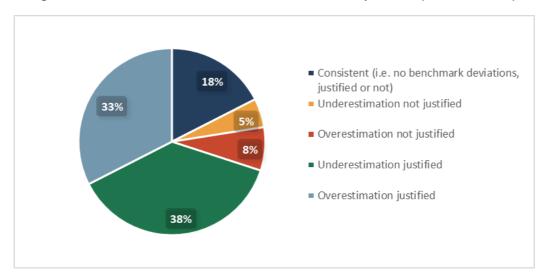
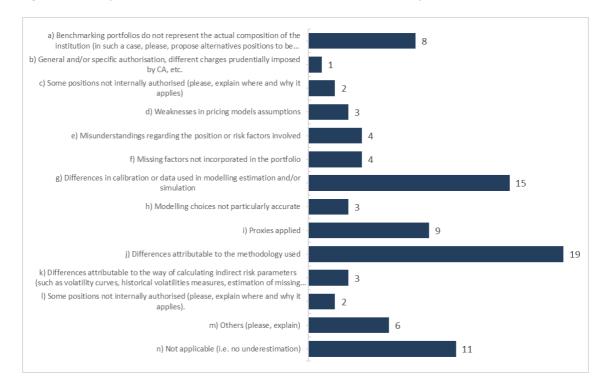


Figure 16: CAs' own assessments of the levels of MR own funds requirements (BM exercise 2023)

212. The main (see Figure 17) factors and reasons that may explain possible underestimations are as follows: benchmarking portfolios that do not represent the actual composition of the real trading portfolios of the institutions (8/90); differences in calibration or data used in modelling estimation and/or simulation (15/90); proxies applied (9/90); and differences attributable to the methodology used (19/90). These explanations, and very often a combination of these explanations, were offered by a large majority of the applicable respondents.







- 213. One bank identified as underestimating without justification partially motivated the underestimation to its CAs with issues on the input data which are at the base of the modelling computation. The second bank identified as underestimating without justification assessed that the waiting scheme of the model, the limited scope of approval, and some additional simplification could have generated the differences reported. Nonetheless no full explanation was provided for these cases found by the bank of the competent authority.
- 214. Overall, CAs planned or reported action in respect of 8 banks, such as:
 - a. reviewing the banks' internal VaR and IRC models;
 - b. extra supervisory charges;
 - c. additional resubmission, not included in the EBA benchmarking;
 - d. continue to monitor the data quality and pricing model modules in the annual validation;
 - e. further internal model investigations.
- 215. Currently, three banks have a due date for making improvements to their MR internal models, as already requested by CAs.
- 216. EBA reported 8 cases of substantial presence of outliers to CAs (5 on Var, 2 on SVAR and one on IRC). CAs, together with banks, assigned "low priority" to the cases highlighted, based on a plurality of explanations: low impact of portfolios highlighted as outliers, overestimation justified by the methodology applied for VaR (e.g. 500 days in place of 250, which would have had a closer result to the benchmarking) and SVaR methodology, and based on the facts overestimation are caused by model limitation known by the supervisor and on model that are on their way to be decommissioned.



6. Conclusion

- 217. This report has presented an analysis of the observed variability across results provided by EU banks that have been granted permission to adopt internal models for MR own funds requirements.
- 218. It must be remembered and emphasised that, as the quantitative analysis is based on hypothetical portfolios, this report focuses solely on potential rather than actual variations. The analysis shows the extent of the variability in these hypothetical portfolios, but this cannot automatically lead to conclusions regarding real under- or overestimations for the MR capital charge.
- 219. However, the analysis should help in determining possible supervisory activities to address uniformity and harmonisation across the Member States and in promoting in-depth future cross-investigations of this matter.
- 220. The objective of the benchmarking exercise was not to reach a definitive assessment of all key drivers of variation and the calculation of the implied capital charges but to provide supervisors with insights into how to increase comparability and reduce the variability between banks that is attributable to non-risk-driven behaviours.
- 221. In particular, the report provides inputs for CAs on areas that may require further investigation, such as IMV variability for some credit spread products. Supervisors should pay attention to the materiality of risk factors not in VaR and not encompassed in the IRC models.
- 222. Moreover, the conclusions reached in regular supervisory model monitoring activities will consider the outcome of the supervisory benchmarking exercises to achieve greater alignment between CAs' targeted internal model reviews and the EU's benchmarking analysis.
- 223. Overall, this exercise exhibits a slight increase in the IMV variability for IR and EQ asset class. CO IQDs remain subtidal, and marginally higher than 2023; for FX a significant increase of IQD in IMV may be due to a misunderstanding in the instruction that was not uniformly interpreted by the institutions; it should be highlighted that a high IQD is limited to a few instruments, slightly less vanilla compared to the average instruments required, had the effect to increase the average IQD. All considered, with the exception of a few cases, the booking of the instruments for the 2024 exercise was good in general.
- 224. The variability of risk measures, especially the VaR, is marginally lower than the previous exercise and overall, this exercise mark the lowest level of dispersion of the risk measures since the exercise has started. This reduction of the risk measure is due to a combination of factors, such as the improvement of the instruction, the relative stability of the set of portfolios, the good job done by competent authorities and banks in terms of resubmission during the exercise. The variability of the VaR aggregated portfolios is limited: the 'all-in portfolio' IQD is 10% (it was



18% in 2023, 11% in 2022, and 16% in 2021). Aggregated by asset class, the portfolio IQD of the others is 9% (vs 12% in 2023, 9% in 2022 and 15% in 2021) on average and never above 12%. The standard analysis carried out in the 2019-2023 exercise – relating to the considerations of the level of approval, size of banks, business model adopted and stress period – was repeated in the 2024 exercise as consolidated sample of information in the benchmarking report. The 2024 Market Risk benchmarking report also provides an analysis of the ASA OFR. Th SBM OFRs see an improvement overall in terms of data quality and exhibit, as expected, a lower level of dispersion with respect to the IMA Risk measures (Table 5). The granularity of the sensitivities data submitted, and their representation shed some light on where potential problems of ASA implementation could be at the bank-specific level, with focus on some problematic to treat the FX component of the ASA.

225. Hopefully, this report provides a framework that can be useful for the purpose of future benchmarking exercises under Article 78 of the CRD. The type of analysis conducted (i.e., the statistical tools provided to CAs, the graphs and tables created, and the methodology defined, etc.) offers a clear direction for future investigations into and activities relating to the benchmarking exercise.



7. Annex 1 – Additional tables

Table 18: Banks participating in the 2024 EBA MR benchmarking exercise

Country	Bank name
AT	Erste Group Bank AG
AT	Raiffeisen Bank International AG
BE	Belfius Bank
BE	KBC Groep
DE	COMMERZBANK Aktiengesellschaft
DE	Citigroup Global Markets Europe AG
DE	DEUTSCHE BANK AKTIENGESELLSCHAFT
DE	DZ BANK AG Deutsche Zentral-Genossenschaftsbank, Frankfurt am Main
DE	DekaBank Deutsche Girozentrale
DE	Goldman Sachs Bank Europe SE
DE	Landesbank Baden-Württemberg
DE	Landesbank Hessen-Thüringen Girozentrale
DE	Morgan Stanley Europe Holding SE
DE	Nomura Financial Products Europe GmbH
DE	Norddeutsche Landesbank - Girozentrale -
DK	Danske Bank A/S
DK	Nykredit Realkredit A/S
ES	Banco Bilbao Vizcaya Argentaria, S.A.
ES	Banco Santander, S.A.
ES	CaixaBank, S.A.
FI	Nordea Bank Abp
FR	BNP Paribas
FR	BofA Securities Europe SA
FR	Groupe BPCE
FR	Groupe Crédit Agricole
FR	HSBC Continental Europe
FR	Société générale S.A.
GR	ALPHA SERVICES AND HOLDINGS S.A.
GR	Eurobank Ergasias Services and Holdings S.A.
GR	National Bank of Greece, S.A.
IE	Barclays Bank Ireland plc
IE	Citibank Europe plc
т	BANCO BPM SOCIETA' PER AZIONI
т	Intesa Sanpaolo S.p.A.
ΙТ	UNICREDIT, SOCIETA' PER AZIONI
NL	ABN AMRO Bank N.V.
NL	Coöperatieve Rabobank U.A.
NL	ING Groep N.V.
NL	NIBC Holding N.V.
NL	RBS Holdings N.V.
РТ	Banco Comercial Português, SA
SE	Skandinaviska Enskilda Banken - gruppen
SE	Swedbank - Grupp

Country	AT	BE	DE	DK	ES	FI		GR	IE	IT	NL		SE
N.banks	2	2	11	2	3	1	6	3	2	3	5	1	2



Table 19: Instruments/portfolios underlying the HPE

Section 2: Instruments

EQUITY

101. Long EURO STOXX 50 index (Ticker: SX5E) Futures.
Notional: equivalent to the value of the index times 1 000 EUR
Exchange: Eurex
Expiry date: June Year T
Base currency: EUR

102. Long 10 000 BAYER (Ticker: BAYN GR) shares.Exchange: XetraBase currency: EUR

103. Short Futures BAYER (Ticker: BAYN GR).
Notional: equivalent to the value of 10 000 shares of the underlying asset
Exchange: Eurex
Expiry date: June Year T
Base currency: EUR

104. Short Futures, STELLANTIS (Ticker: STLA FP).
Notional: equivalent to the value of 10 000 shares of the underlying asset
Exchange: Euronext
Expiry date: June Year T
Base currency: EUR

105. Short Futures, ALLIANZ (Ticker: ALV GR).
Notional: equivalent to the value of 10 000 shares of the underlying asset
Exchange: Eurex
Expiry date: June Year T
Base currency: EUR

106. Short Futures BARCLAYS (Ticker: BARC LN).
Notional: equivalent to the value of 10 000 shares of the underlying asset
Exchange: Eurex
Expiry date: June Year T
Base currency: GBP

107. Short Futures DEUTSCHE BANK (Ticker: DBK GR).
Notional: equivalent to the value of 10 000 shares of the underlying asset
Exchange: Eurex
Expiry date: June Year T
Base currency: EUR



108. Short Futures CRÉDIT AGRICOLE (Ticker: ACA FP).
Notional: equivalent to the value of 10 000 shares of the underlying asset
Exchange: Euronext
Expiry date: June Year T
Base currency: EUR

Long Call Options. Underlying BAYER (Ticker: BAYN GR), ATM (1 contract = 100 shares).
 Notional: equivalent to the value of 10 000 shares of the underlying asset
 Expiry date: June Year T
 Base currency: EUR

Short Call Options. Underlying BAYER (Ticker: BAYN GR), ATM (1 contract = 100 shares).
Notional: equivalent to the value of 10 000 shares of the underlying asset
Expiry date: December Year T
Base currency: EUR

111. Long Call Options. Underlying PFIZER (Ticker PFE US) 10% OTM, (1 contract = 100 shares).
Notional: equivalent to the value of 10 000 shares of the underlying asset
Expiry date: June Year T
Base currency: USD

112. Long Put Options. Underlying PFIZER (Ticker PFE US) 10% OTM, (1 contract = 100 shares).
Notional: equivalent to value of 10 000 shares of the underlying asset
Expiry date: June Year T
Base currency: USD

113. Long Call Options. Underlying BAYER (Ticker: BAYN GR), 10% OTM (1 contract = 100 shares).
Notional: equivalent to the value of 10 000 shares of the underlying asset
Expiry date: December Year T
Base currency: EUR

Short Call Options. Underlying BAYER (Ticker: BAYN GR), 10% OTM (1 contract = 100 shares).
Notional: equivalent to the value of 10 000 shares of the underlying asset
Expiry date: June Year T
Base currency: EUR

115. Long Call Options. Underlying AVIVA (Ticker: AV/LN), 10% OTM (1 contract = 100 shares).
Notional: equivalent to the value of 10 000 shares of the underlying asset
Expiry date: December Year T
Base currency: GBP

116. Long Put Options. Underlying AVIVA (Ticker: AV/LN), 10% OTM (1 contract = 100 shares).
Notional: equivalent to the value of 10 000 shares of the underlying asset
Expiry date: December Year T
Base currency: GBP



117. Short Futures NIKKEI 225 (Ticker NKY).
Notional: equivalent to the value of the index times 20 000 JPY
Exchange: CME
Expiry date: 8 June Year T
Base currency: JPY

118. Auto-callable Equity product.
Long position
Booking on 'Booking date'
Notional amount ('Capital'): EUR 1 000 000
Underlying: Index EURO STOXX 50 (Ticker: SX5E)
Base currency: EUR
Maturity: 5 years
Annual Pay-out and annual observation ('Booking date + 1 year', 'Booking date + 2 years', 'Booking date + 3 years', 'Booking date + 4 years', 'Booking date + 5 years'). Pay-out occurs 10 days after reference date.
Coupon: 6%
Autocall level ('Initial value'): End of day Booking date + 1 month
Barrier coupon payment 60% of autocall level
Protection barrier: 55% of autocall level
additional details in the original ITS 2023)

119. Long Call Options. Underlying EURO STOXX 50 index (Ticker: SX5E), ATM.
Notional: equivalent to the value of the index times 1 000 EUR
Expiry date: June Year T
Base currency: EUR

Long Call Options. Underlying EURO STOXX 600 index (Ticker: SXXP), ATM.
 Notional: equivalent to the value of the index times 10 000 EUR
 Expiry date: June Year T
 Base currency: EUR

121. Long Call Options. Underlying VIX (CBOE), ATM.Notional: equivalent to the value of the index times 100 000 USDExpiry date: June Year TBase currency: USD

IR

201. 5-year IRS EUR – Receive fixed rate and pay floating rate.
Fixed leg: receive annually
Floating rate: 3-month EURIBOR, pay quarterly
Notional: EUR 10 000 000
Roll convention and calendar: standard
Effective date as booking date (i.e. the rates to be used shall be those at the market close as of the booking date)



Maturity: September Year T+4. Base currency: EUR

202. Two-year EUR swaption on 5-year IRS EUR – pay fixed rate and receive floating rate.

Notional: EUR 10 000 000.

The institution is the seller of the option on the swap. The counterparty of the institution buys the right to enter a swap with the institution; if the counterparty exercises its right, the counterparty shall receive the fixed rate while the institution shall receive the floating rate.

Swaption with maturity of two years (Booking date + 2 years) on IRS defined as follow:

Fixed leg - pay annually; Floating rate: 3-month EURIBOR, receive quarterly;

Notional: EUR 10 000 000; Roll convention and calendar: standard;

Effective date as booking date (i.e. the rates to be used shall be those at the market close as of the booking date)

Maturity of the underlying swap: Booking date + 7 years

Premium paid at the booking date (Booking date). Cash settled

The strike price is based on the IRS defined within this instrument

Base currency: EUR

203. 5-year IRS USD. Receive fixed rate and pay floating rate.

Fixed rate: receive annually

Floating rate: 3-month USD LIBOR rate, pay quarterly

Notional: USD 1 000 000

Roll convention and calendar: standard

Effective date as booking date (i.e. the rates to be used shall be those at the market close as of the booking date)

Maturity date: September Year T+4.

Base currency: USD

204. 2-year IRS GBP. Receive fixed rate and pay floating rate.

Fixed rate: receive annually

Floating rate: 3-month SONIA rate compounded and paid annually

Notional: GBP 10 000 000

Roll convention and calendar: standard

Effective date as booking date (i.e. the rates to be used shall be those at the market close as of the booking date) Maturity: Booking date + 2 years

Base currency GBP

205. Collared 10y floating rate note sold by UBS.Notional (Principal) Amount: USD 1 000 000.Floating Rate Notes (the 'Notes') are senior unsecured obligations of UBS AG ('UBS').Base currency USD

Interest Payment Amount Trade and Settlement Date Interest Payment Dates Maturity Date Currency Daycount Basis Business Day Convention Coupon Determination



Date

206. Long GERMANY GOVT EUR 1 000 000 (ISIN DE0001030583). Maturity: 15 April 2033 Base currency: EUR

207. Short GERMANY GOVT EUR 1 000 000 (ISIN DE0001135044). Maturity: 4 July 2027 Base currency: EUR

208. Long ITALY GOVT EUR 1 000 000 (ISIN IT0005138828). Maturity: 15 September 2032 Base currency: EUR

209. Long ITALY GOVT EUR 1 000 000 (ISIN IT0005210650). Maturity: 1 December 2026 Base currency: EUR

210. Long SPAIN GOVT EUR 1 000 000 (ISIN ES00000127A2).Maturity: 30 July 2030Base currency: EUR

211. Short FRANCE GOVT EUR 1 000 000 (ISIN FR0012993103). Maturity: 25 May 2031 Base currency: EUR

212. Short GERMANY GOVT EUR 1 000 000 (ISIN DE0001135176). Maturity: 4 January 2031 Base currency: EUR

213. Long UNITED KINGDOM GOVT GBP 1 000 000 (ISIN GB0004893086). Maturity: 7 June 2032 Base currency: GBP

214. Long PORTUGAL GOVT EUR 1 000 000 (ISIN PTOTEXOE0024). Maturity: 15 June 2029 Base currency: EUR

215. Short UNITED STATES GOVT USD 1 000 000 (ISIN US9128283F58). Maturity: 15 November 2027 Base currency USD

216. Long BRAZIL GOVT 1 000 000 USD (ISIN US105756BZ27). Maturity: 13 January 2028 Base currency: USD



217. Long MEXICO GOVT 1 000 000 USD (ISIN US91087BAC46).Maturity: 28 March 2027Base currency USD

218. 10-year IRS EURO – Receive floating rate and pay fixed rate.
Fixed leg: pay annually
Floating rate: 3-month EURIBOR, receive quarterly
Notional: EUR 10 000 000
Roll convention and calendar: standard
Effective date as the booking date (i.e. rates to be used are those at the market close on booking date)
Maturity: Booking date + 10 years
Base currency: EUR

219. 5-year IRS EURO – Receive floating rate and pay fixed rate.
Fixed leg: pay annually
Floating rate: 6-month EURIBOR, receive every 6 months
Notional: EUR 1 000 000
Roll convention and calendar: standard
Effective date as the booking date (i.e. rates to be used are those at the market close on booking date)
Maturity: Booking date + 5 years
Base currency: EUR

220. 5-year Mark to Market (MtM) Cross Currency EUR/USD SWAP. Receive USD and pay EUR.
EUR: 3-month ESTER, pay quarterly compounded with a payment lag of 2 days
USD: 3-month SOFR, receive quarterly compounded with a payment lag of 2 days
Leg 1 – USD: Notional EUR 10 000 000 equivalent adjusted on a quarterly basis
Leg 2 – EUR: Notional EUR 10 000 000
Roll convention and calendar: standard
Effective date as booking date + 6 months
Maturity: Booking date + 5,5 years
Base currency: EUR
See also Section 5 of this Annex – Instrument additional specifications

221. 10-year IRS EURO – Receive ESTER and pay EURIBOR.
ESTER leg: receive annually
EURIBOR leg: 3-month EURIBOR + Basis, pay quarterly
Notional: EUR 10 000 000
Roll convention and calendar: standard
Effective date as booking date (i.e. the rates to be used shall be those at the market close as of the booking date)
Maturity: September Year T + 9 years
Base currency: EUR

222. Long ITALY GOVT EUR 1 000 000 (ISIN IT0005387052). Maturity: 15 May 2030 Base currency: EUR



223. 5-year Zero Coupon Inflation swap EUR – Receive Inflation indexed return and pay fixed rate (r). Inflation Index: CPI (HICPxT) Fixed leg (Pay fixed): $[(1 + r)^5 - 1]$

Rec Inflation indexed return: $[(\frac{CPI \text{ at the end (maturity) date}}{CPI \text{ at the start date}}) - 1]$

Notional: EUR 10 000 000 Base fixing date: August Year T Final Fixing: August Year T+4 Maturity: September Year T+4 Base currency: EUR

224. Two-year EUR swaption on 5-year IRS EUR – receive fixed rate and pay floating rate.

Notional: EUR 10 000 000.

The institution is the seller of the option on the swap. The counterparty of the institution buys the right to enter a swap with the institution; if the counterparty exercises its right, the counterparty shall receive the fixed rate while the institution shall receive the floating rate.

Swaption with maturity of two years (Booking date + 2 years) on IRS defined as follow: Fixed leg- receive annually; Floating rate: 6-month EURIBOR, pay every 6 months; Notional: EUR 10 000 000; Roll convention and calendar: standard; Effective date as the booking date (i.e. rates to be used are those at the market close on booking date)

Maturity of the underlying swap: Booking date + 7 years

Premium paid at the booking date (Booking date). Cash settled

The strike price is based on the IRS defined within this instrument+ 100 bps

Base currency: EUR

FX

301. 6-month USD/EUR forward contract. Cash settled. Long USD – Short EUR; Notional USD 10 000 000; EUR/USD ECB reference spot rate as of end of the booking date.

Base currency: EUR

302. 6-month EUR/GBP forward contract. Cash settled. Long EUR – Short GBP; Notional 10 000 000 GBP;
 EUR/GBP ECB reference spot rate as of end of the booking date.
 Base currency: EUR

303. Long 10 000 000 USD Cash. Cash position Base currency: EUR

304. Long Call option. EUR 10 000 000. Equivalent amount based on EUR/USD ECB reference spot rate as of end of the booking date. Strike price: 110% of EUR/USD ECB reference rate as of end of the booking date

Expiry date: Booking date + 1 year

Base currency: EUR

305. Long Call option. EUR 10 000 000. Equivalent amount based on EUR/USD ECB reference spot rate as of end of the booking date.



Strike price: 90% of EUR/USD ECB reference rate as of end of the booking date Expiry date: Booking date + 1 year Base currency: EUR

306. Short Call option. EUR 10 000 000. Equivalent amount based on EUR/USD ECB reference spot rate as of end of the booking date.
 Strike price: 100% of EUR/USD ECB reference rate as of end of the booking date
 Expiry date: Booking date + 1 year
 Base currency: EUR

307. Short Call option. EUR 10 000 000. Equivalent amount based on EUR/GBP ECB reference spot rate as of end of the booking date.
 Strike price: 110% of EUR/GBP ECB reference rate as of end of the booking date
 Expiry date: Booking date + 1 year
 Base currency: EUR

308. Long Put option. EUR 10 000 000. Equivalent amount based on EUR/JPY ECB reference spot rate as of end of the booking date.
 Strike price: 110% of EUR/JPY ECB reference rate as of end of the booking date
 Expiry date: Booking date + 1 year
 Base currency: EUR

309. Short Put option. EUR 10 000 000. Equivalent amount based on EUR/AUD ECB reference spot rate as of end of the booking date.
Strike price: 110% of EUR/AUD ECB reference rate as of end of the booking date
Expiry date: Booking date + 1 year
Base currency: EUR

310. 6-month EUR/DKK forward contract. Cash settled. Long EUR – Short DKK; Notional EUR 10 000 000;
 EUR/DKK ECB reference spot rate as of end of the booking date.
 Base currency: EUR

311. 6-month EUR/BRL Non deliverable forward contract. Long EUR – Short BRL; Notional EUR 10 000 000;
 EUR/BRL ECB reference spot rate as of end of the booking date.
 Base currency: EUR

COMMODITIES

401. Long 3 500 000 6-month ATM London Gold Forwards contracts (1 contract = 0.001 troy ounces, notional: 3 500 troy ounces).
 Cash Settlement
 Base currency: USD

402. Short 3 500 000 12-month ATM London Gold Forwards contracts (1 contract = 0.001 troy ounces, notional: 3 500 troy ounces). Cash Settlement Base currency: USD

403. Long 30 contracts of 6-month WTI Crude Oil Call option with strike equals 12-month end-of-day forward price on the booking date (1 contract = 1 000 barrels. Total notional 30 000 barrels).



Cash Settlement Base currency USD

404. Short 30 contracts of 6-month WTI Crude Oil Put option with strike equals 12-month end-of-day forward price on the booking date (1 contract = 1 000 barrels. Total notional 30 000 barrels).
Cash Settlement
Base currency USD

405. Long Call option. 5 000 0zt of London Gold.
Strike price: ATM as of end of the booking date
Expiry date: Booking date + 18 months
Cash Settlement
Base currency: USD

CREDIT SPREAD

501. Long (i.e. Buy protection) USD 1 000 000 CDS on PORTUGAL. Restructuring clause: FULL Base currency: USD

502. Long (i.e. Buy protection) USD 1 000 000 CDS on ITALY. Restructuring clause: FULL Base currency: USD

503. Short (i.e. Sell protection) USD 1 000 000 CDS on SPAIN. Restructuring clause: FULL Base currency: USD

504. Long (i.e. Buy protection) USD 1 000 000 CDS on MEXICO. Restructuring clause: FULL Base currency: USD

505. Long (i.e. Buy protection) USD 1 000 000 CDS on BRAZIL. Restructuring clause: FULL Base currency: USD

506. Long (i.e. Buy protection) USD 1 000 000 CDS on UK. Restructuring clause: FULL Base currency: USD

507. Short (i.e. Sell protection) EUR 1 000 000 CDS on Telefonica (Ticker TEF SM). Base currency: EUR

508. Long (i.e. Buy protection) EUR 1 000 000 CDS on Telefonica (Ticker TEF SM).Maturity: December Year T+2Base currency: EUR



509. Short (i.e. Sell protection) EUR 1 000 000 CDS on Aviva (Ticker AV LN). ISDA Definitions year 2003 Base currency: EUR

510. Long (i.e. Buy protection) EUR 1 000 000 CDS on Aviva (Ticker AV LN).
ISDA Definitions year 2003
Maturity: December Year T+2
Base currency: EUR

511. Short (i.e. Sell protection) EUR 1 000 000 CDS on Vodafone (Ticker VOD LN). Base currency: EUR

512. Short (i.e. Sell protection) EUR 1 000 000 CDS on ENI SpA (Ticker ENI IM). Base currency: EUR

513. Short (i.e. Sell protection) USD 1 000 000 CDS on Eli Lilly (Ticker LLY US).Restructuring clause: No restructuring (XR14)Base currency: USD

514. Short (i.e. Sell protection) EUR 1 000 000 CDS on Unilever (Ticker UNA NA). Base currency: EUR

515. Long (i.e. Buy protection) EUR 1 000 000 CDS on Total SA (Ticker FP FP). Base currency: EUR

516. Long (i.e. Buy protection) EUR 1 000 000 CDS on Volkswagen Group (Ticker VOW GR). Base currency: EUR

517. Long position on TURKEY Govt. notes USD 1 000 000 (ISIN US900123CT57).Maturity: 26 April 2029Base currency: USD

518. Long (i.e. Buy protection) USD 1 000 000 CDS on TURKEY. Effective date as booking date.Restructuring clause: FULLBase currency: USD

519. Long position on Telefonica notes EUR 1 000 000 (ISIN XS1681521081).Maturity: 12 January 2028Base currency: EUR

520. Long position on Volkswagen Group notes EUR 1 000 000 (ISIN XS1944390597).Maturity: 31 July 2026Base currency: EUR

521. Short position Volkswagen Group notes EUR 1 000 000 (ISIN XS1944390241).



Maturity: 31 January 2024 Base currency: EUR

522. Long position on Total SA notes EUR 1 000 000 (ISIN XS1048519679). Maturity: 25 March 2026 Base currency: EUR

523. Long AUSTRIA GOVT EUR 1 000 000 (ISIN AT0000A04967). Maturity: 15 March 2037 Base currency: EUR

524. Long (i.e. Buy protection) USD 1 000 000 CDS on AUSTRIA. Maturity: June Year T+15 Base currency: USD

525. Long NETHERLANDS GOVT EUR 1 000 000 (ISIN NL0013552060). Maturity: 15 January 2040 Base currency: EUR

526. Long (i.e. Buy protection) USD 1 000 000 CDS on NETHERLANDS. Maturity: June Year T+20 Base currency: USD

527. Long BELGIUM GOVT EUR 1 000 000 (ISIN BE0000348574). Maturity: 22 June 2050 Base currency: EUR

528. Long (i.e. Buy protection) USD 1 000 000 CDS on BELGIUM. Maturity: June Year T+30 Base currency: USD

529. Long (Buy protection) EUR 10 000 000 CDS on iTraxx Europe index on-the-run series.Maturity: June Year T+5Base currency: EUR

530. Short Put option. EUR 10 000 000. Underlying iTraxx Europe index on-the-run series (same instrument of 529).
Strike price: ATM
Expiry date: Booking date + 1 year
Base currency: EUR

531. Long AXA SA (callable) EUR 1 000 000 (ISIN XS1799611642). Maturity: 28 May 2049 Base currency: EUR

532. Long AT&T Bond (callable) USD 1 000 000 (ISIN US00206RFW79). Maturity: 15 August 2037



Base currency: USD

533. Long BAYER AG (callable) EUR 1 000 000 (ISIN XS2199266268).Maturity: 06 January 2030Base currency: EUR

534. Long AT&T Bond (callable) EUR 1 000 000 (ISIN XS0993148856). Maturity: 17 December 2025 Base currency: EUR

СТР

601. Short (i.e. Sell protection) position in iTraxx Europe index on-the-run series.
Attachment point: 3%
Detachment point: 6%
Notional: EUR 5 000 000
Maturity: 5 years
Base currency: EUR

602. Long (i.e. Buy protection) EUR 5 000 000 CDS on iTraxx Europe index most recent on-the-run series.
Maturity: June Year T+5
Base currency: EUR
Notional adj. to fully hedge CS01 of 601 with no re-hedging required

603. Long (i.e. Buy protection) position in iTraxx Europe index on-the-run series.
Attachment point: 3%
Detachment point: 6%
Notional: EUR 5 000 000
Maturity: 5 years
Base currency: EUR

604. Short (i.e. Sell protection) EUR 5 000 000 CDS on iTraxx Europe index most recent on-the-run series.
Maturity: June Year T+5
Base currency: EUR
Notional adj. to fully hedge CS01 of 603 with no re-hedging required

605. Short (i.e. Sell protection) position in iTraxx Europe index on-the-run series. Attachment point: 12% Detachment point: 100% Notional: EUR 5 000 000 Maturity: 5 years Base currency: EUR

606. Long (i.e. Buy protection) EUR 5 000 000 CDS on iTraxx Europe index most recent on-the-run series. Maturity: June Year T+5



Base currency: EUR Notional adj. to fully hedge CS01 of 605 with no re-hedging required

607. Long (i.e. Buy protection) position in iTraxx Europe index on-the-run series. Attachment point: 12% Detachment point: 100% Notional: EUR 5 000 000 Maturity: 5 years Base currency: EUR

608. Short (i.e. Sell protection) EUR 5 000 000 CDS on iTraxx Europe index most recent on-the-run series.
Maturity: June Year T+5
Base currency: EUR
Notional adj. to fully hedge CS01 of 607 with no re-hedging required

609. Short (i.e. Sell protection) position in iTraxx Europe index on-the-run series.
Attachment point: 3%
Detachment point: 6%
Notional: EUR 5 000 000
Maturity: 5 years
Base currency: EUR
Recovery rate: 40% fixed.

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610. Long (i.e. Buy protection) EUR 5 000 000 CDS on iTraxx Europe index most recent on-the-run series.
Maturity: June Year T+5
Base currency: EUR
Notional adj. to fully hedge CS01 of 609 with no re-hedging required

1001 101 – 1 instrument EUR 4001 401 – 1 instrument USD 1002 103 – 1 instrument EUR 4002 103 – 1 instrument USD 104 – 1 instrument 4002 403 – 1 instrument USD 105 – 1 instrument 4002 404 – 1 instrument USD 1003 113 – 1 instrument EUR 4003 401 – 1 instrument USD 110 – 1 instrument EUR 4003 401 – 1 instrument USD	Portfolio	Portfol	Combination of instruments:	Currency	Portfolio	Combination of instruments:	Currency
104 – 1 instrument 4002 403 – 1 instrument USD 105 – 1 instrument 404 – 1 instrument USD 1003 113 – 1 instrument EUR 4003 401 – 1 instrument USD	1001	1001	101 – 1 instrument	EUR	4001	401 – 1 instrument	USD
105 – 1 instrument 404 – 1 instrument 1003 113 – 1 instrument EUR 4003 401 – 1 instrument USD	1002	1002	103 – 1 instrument	EUR		402 – 1 instrument	
1003 113 – 1 instrument EUR 4003 401 – 1 instrument USD			104 – 1 instrument		4002	403 – 1 instrument	USD
			105 – 1 instrument			404 – 1 instrument	
110 – 1 instrument 404 – 1 instrument	1003	1003	113 – 1 instrument	EUR	4003	401 – 1 instrument	USD
			110 – 1 instrument			404 – 1 instrument	
1004 115 – 1 instrument GBP 4004 405 – 1 instrument EUR	1004	1004	115 – 1 instrument	GBP	4004	405 – 1 instrument	EUR
116 – 1 instrument 5001 501 – 1 instrument USD			116 – 1 instrument		5001	501 – 1 instrument	USD
1005 117 – 1 instrument JPY 502 – 1 instrument	1005	1005	117 – 1 instrument	JPY		502 – 1 instrument	
1006 109 – 1 instrument EUR 503 – 1 instrument	1006	1006	109 – 1 instrument	EUR		503 – 1 instrument	
110 – 1 instrument 5002 504 – 1 instrument USD			110 – 1 instrument		5002	504 – 1 instrument	USD
1007 118 – 1 instrument EUR 505 – 1 instrument	1007	1007	118 – 1 instrument	EUR		505 – 1 instrument	
1008 111 – 1 instrument USD 5003 507 – 1 instrument EUR	1008	1008	111 – 1 instrument	USD	5003	507 – 1 instrument	EUR



	112 – 1 instrument			508 – 1 instrument	
1009	102 – 1 instrument	EUR	5004	503 – 1 instrument	USD
	114 – 1 instrument			504 – 1 instrument	
1010	106 – 1 instrument	EUR	5005	509 – 1 instrument	EUR
	107 – 1 instrument			510 – 1 instrument	
	108 – 1 instrument		5006	511 – 1 instrument	EUR
1011	101 – 1 instrument	EUR	5000	512 – 1 instrument	2011
1011	103 – 1 instrument	Lon		514 – 1 instrument	
1012	101 – 1 instrument	EUR		515 – 1 instrument	
1012	103 – 1 instrument	LON		516 – 1 instrument	
	104 – 1 instrument		5007	517 – 1 instrument	USD
1013	102– 1 instrument	EUR	5007	518 – 1 instrument	050
1015	104 – 1 instrument	LON	5008	519 – 1 instrument	EUR
1014	119 – 1 instrument	EUR	5008	520 – 1 instrument	LON
1014	120 – 1 instrument	EUR		520 - 1 instrument	
1015	120 – 1 instrument	EUR	5009	520 – 1 instrument	EUR
2001	201 – 1 instrument	EUR	3009		EUK
2001	201 – 1 instrument 202 – 1 instrument	EUR	5010	521 – 1 instrument 519 – 1 instrument	EUR
			5010		EUR
2003	203 – 1 instrument	USD	F011	508 – 1 instrument	
2004	204 – 1 instrument	GBP	5011	515 – 1 instrument	EUR
2005	205 – 1 instrument	USD	5012	522 – 1 instrument	
2006	206 – 1 instrument	EUR	5012	513 – 1 instrument	USD
2007	207 – 1 instrument	ELLB.	5013	520 – 1 instrument	EUR
2007	206 – 1 instrument	EUR		521 – 1 instrument	
	207 – 1 instrument		5044	516 – 1 instrument	
2000	208 – 1 instrument	5115	5014	506 – 1 instrument	USD
2008	206 – 1 instrument	EUR		503 – 1 instrument	
	207 – 1 instrument		5015	502 – 1 instrument	EUR
	208 – 1 instrument			209 – 1 instrument	
	209 – 1 instrument		5016	504 – 1 instrument	USD
	210 – 1 instrument			217 – 1 instrument	
	211 – 1 instrument		5017	505 – 1 instrument	USD
	212 – 1 instrument			216 – 1 instrument	
2009	201 – 1 instrument	EUR	5018	504 – 1 instrument	USD
	218 – 1 instrument			217 – 1 instrument	
2010	201 – 1 instrument	EUR		505 – 1 instrument	
	219 – 1 instrument			216 – 1 instrument	
2011	218 – 1 instrument	EUR	5019	502 – 1 instrument	EUR
	219 – 1 instrument			209 – 1 instrument	
2012	201 – 1 instrument	EUR		219 – 1 instrument	
	202 – 1 instrument		5020	523 – 1 instrument	EUR
2013	213 – 1 instrument	GBP		525 – 1 instrument	
2014	215 – 1 instrument	USD		527 – 1 instrument	
	216 – 1 instrument		5021	524 – 1 instrument	USD



12000	IR Cumulative	2001, 2	2002, 2008, 20	011	EUR	
11000	EQUITY Cumulative	1001,	1002, 1006, 10	007, 1009	EUR	
10000	ALL-IN no-CTP	2002,	2008, 2011, 3	007, 1009, 2001, 001, 3002, 3003, 003, 5006, 5008,	EUR	
Aggreg. Po	ortfolio Description	(indivio their	dual portfolic	vidual Portfolios os as stated by referred to in nex)	Base Currency	
3007	311 – 1 instrument	EUR				
3006	310 – 1 instrument	EUR				
3005	309 – 1 instrument	EUR				
	308 – 1 instrument					
3004	307 – 1 instrument	EUR				
	306 – 1 instrument			610 – 1 instru	iment	
	305 – 1 instrument		6005	609 – 1 instru		EU
3003	304 – 1 instrument	EUR		608 – 1 instru	iment	
	304 – 1 instrument		6004	607 – 1 instru	iment	EU
3002	303 – 1 instrument	EUR		606 – 1 instru	iment	
	302 – 1 instrument		6003	605 – 1 instru	iment	EU
3001	301 – 1 instrument	EUR		604 – 1 instru	iment	
2023	224 – 1 instrument	EUR	6002	603 – 1 instru	iment	EU
	223 – 1 instrument			602 – 1 instru	iment	
2022	201 – 1 instrument	EUR	6001	601 – 1 instru	iment	EU
2021	222 – 1 instrument	EUR	5027	534 – 1 instru	iment	EU
2020	221 – 1 instrument	EUR	5026	533 – 1 instru	iment	EU
	219 – 1 instrument		5025	532 – 1 instru	iment	US
2019	209 – 1 instrument	EUR	5024	531 – 1 instru	iment	EU
				530 – 1 instru	iment	
2018	209 – 1 instrument	EUR	5023	529 – 1 instru	iment	EU
2017	220 – 1 instrument	EUR		528 – 1 instru	iment	
	214 – 1 instrument			527 – 1 instru	iment	
	210 – 1 instrument			526 – 1 instru	iment	
	209 – 1 instrument			525 – 1 instru	iment	
2016	208 – 1 instrument	EUR		524 – 1 instru	iment	
	215 – 1 instrument		5022	523 – 1 instru	iment	EU
2015	203 – 1 instrument	USD		528 – 1 instru		
	217 – 1 instrument			526 – 1 instru	iment	



13000	FX Cumulative	3001, 3002, 3003, 3004	EUR
14000	Commodity Cumulative	4001, 4002	USD
15000	Credit Spread cumulative	5003, 5006, 5008, 5022	EUR
16000	CTP cumulative EUR	6001, 6002	EUR

For a detailed description of the portfolios, please refer to the EBA website:

https://www.eba.europa.eu/activities/single-rulebook/regulatory-activities/supervisorybenchmarking-exercises/its-package-benchmarking-exercises

Adopted as consolidated text: Commission Implementing Regulation (EU) 2016/2070 of 14 September 2016 laying down implementing technical standards for templates, definitions and IT-solutions to be used by institutions when reporting to the European Banking Authority and to competent authorities in accordance with Article 78(2) of Directive 2013/36/EU of the European Parliament and of the Council (Text with EEA relevance)Text with EEA relevance

https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02016R2070-20240328



Table 20: VaR cluster analysis – number of banks by range

2024 VaR cluster analysis: number of banks by range

	100	1						
	Port. ID	300% < X	300% ≥ X >200%	200% ≥ X >150%	150% ≥ X >100%	100% ≥ X >50%	50% ≥ X >0	Num ob
	1001				17	13		30
	1002 1003			3	10 9	15 11	2	25 25
	1003			3	10	11	1	23
	1005				11	14		25
	1006			1	11	12		24
	1007 1008			1	6 13	10 10	2	19 23
Equity	1008				13	10		25
	1010				12	13		25
	1011				15	13		28
	1012 1013			2	15 13	13 11		28 26
	1013			2	13	11		20
	1015				10	12		22
	1016			3	2	5	1	11
	2001				16	21		37
	2002 2003				16 19	19 16		35 35
	2003				16	21		37
	2005		1	1	5	7	2	16
	2006			2	11	18		31
	2007			2	10	18		30 33
	2008 2009			6	9 16	18 20		33
	2010				16	21		37
	2011				16	21		37
Interest Rate	2012		2	4	9	20		35
	2013 2014			2	14 9	19 14	1	33 26
	2014		1	4	8	14	1	32
	2016				13	18		31
	2017			3	11	18		32
	2018 2019			1	13 8	21 19		35 35
	2019 2020			0	8 18	19		33
	2021			2	11	18		31
	2022			3	9	16	1	29
	2023 3001		3		14	20		37 34
	3001 3002				18 17	16 14		34 31
	3002				14	17		31
	3004				16	16		32
	3005				12	17		29
	3006 3007				14 10	18 15		32 25
	4001		1	2	4	6	2	15
Commodities	4002				6	7		13
	4003				6	6		12
	4004 5001			2	6 10	6		12 25
	5001 5002			2	10	13		25
	5002			1	10	13		24
	5004				10	12		22
	5005				10	13		23
	5006 5007		1	3	8 6	13 12	1	23 21
	5008			3	7	15		25
	5009			4	6	15		25
	5010			1	9	14		24
	5011 5012			4	9 5	14 13		23 22
	5012 5013			4	11	13		22
Credit Spread	5014			4	6	13		23
	5015			1	8	14		23
	5016 5017				9	11		20
	5017 5018			2	6 9	11 11		19 20
	5019		1	2	7	14		24
	5020				11	15		26
	5021				10	12		22
	5022 5023				9 8	13 8		22 16
	5023 5024			7	2	12		21
	5025				8	12		20
	5026			2	6	13		21
	5027			2	5	13		20
	6001 6002							0
	6002 6003							0
	6004							0
	6005							0
ALL-IN no-CTP Equity Cumulative	10000 11000				6 8	7		13 20
Equity Cumulative IR Cumulative	11000 12000				8 15	12 15		20 30
	13000				14	13		31
FX Cumulative	10000							
ommodity Cumulative CS Cumulative	14000 15000			1	6	7		13 20



Table 21: VaR statistics

EU Statistics for VaR

	[Main st	atistics					Percentiles		
	Port. ID	Min	Max	Ave.	STDev	STDev_trunc ¹	MAD (median absolute	Coefficient of variation	Num obs. ²	25th	50th	75th	IQD
	1001	276,609	545,084	395,993	79,853	87,495	deviation) 66,977	(STDev/Mean) 20%	31	316,826	410,091	441,747	16%
	1002 1003	138,749 204	343,002 2,636	247,770 1,577	48,737 584	67,607 697	29,808 467	20% 37%	25 25	217,397 1,080	263,110 1,573	269,615 1,981	11% 29%
	1004	512	1,840	1,280	282	508	179	22%	23	1,088	1,282	1,518	17%
	1005 1006	51,728,788 1,633	70,540,542 4,445	58,577,127 2,914	6,390,309 732	7,394,419 1,022	2,672,361 424	11% 25%	25 24	53,644,457 2,551	56,263,042 2,830	63,946,467 3,395	9% 14%
	1007	2,132	24,389	14,181	5,582	8,685	2,975	39%	19	10,573	16,139	17,579	25%
Equity	1008 1009	12,507 42,816	26,168 84,955	19,451 59,022	3,229 10,765	5,081 15,628	948 5,272	17% 18%	23 25	17,056 53,385	20,009 56.865	21,444 61,566	11%
	1010	21,826	43,968	32,899	5,229	6,262	3,336	16%	25	29,838	32,312	35,781	9%
	1011 1012	257,866 246,258	506,663 481,566	374,044 356,928	74,667 71,991	77,199 75,097	59,472 57,343	20% 20%	28 28	305,491 290,998	394,348 377,678	418,596 400,200	16% 16%
	1012	36,106	93,216	61,557	13,176	17,880	5,646	20%	26	54,713	58,528	65,686	9%
	1014 1015	142,739 125,828	311,626 245,197	223,953 177,032	42,781 33,844	51,745 33,844	36,227 28,489	19% 19%	28 23	189,453 145,710	216,583 181,898	255,446 192,413	15% 14%
	1016	51,102	316,474	192,757	86,748	103,704	81,936	45%	11	141,491	176,545	288,828	34%
	2001 2002	144,168 136,316	258,202 239,967	198,038 179,482	28,857 27,770	38,700 30,522	12,358 20,310	15% 16%	38 36	182,640 158,452	195,897 179,177	217,941 199,643	9% 12%
	2003	23,181	31,062	27,497	2,223	2,448	1,622	8%	36	25,981	27,607	29,097	6%
	2004 2005	67,975 4,629	142,257 64,885	110,750 31,360	20,225 16,661	26,439 24,422	17,800 14,105	18% 53%	38 16	92,761 18,968	111,677 31,061	129,790 44,863	17% 41%
	2006	15,587	48,230	29,380	7,135	9,718	4,466	24%	31	24,578	29,807	33,592	15%
	2007 2008	57,406 46,268	126,190 131,950	80,900 82,643	18,201 26,217	24,994 28,419	8,900 16,160	23% 32%	30 33	68,516 63,192	79,315 81,113	85,425 101,139	11% 23%
	2009	160,752	240,874	199,217	17,284	20,895	10,477	9%	37	189,454	199,430	210,735	5%
	2010 2011	129,752 352,525	232,375 508,469	178,356 418,449	26,118 47,411	34,902 57,813	11,135 31,978	15% 11%	38 38	164,384 382,835	176,307 404,835	196,147 459,107	9% 9%
Interest Rate	2012	49,735	181,999	86,564	31,030	54,394	8,651	36%	36	67,688	78,474	88,255	13%
	2013 2014	28,039 15,534	53,227 71,063	42,167 42,068	4,526 14,062	9,175 15,362	1,933 9,004	11% 33%	34 26	39,580 31,693	42,063 41,982	44,608 47,778	6% 20%
	2015	6,199	23,132	11,137	4,364	7,296	2,841	39%	33	7,627	11,100	13,535	28%
	2016 2017	89,996 17,062	179,909 45,864	123,109 30,108	21,520 7,723	40,617 9,235	9,366 4,007	18% 26%	31 33	109,387 25,898	120,093 28,913	133,919 32,799	10% 12%
	2018	14,378	37,897	24,717	5,449	7,696	1,916	22%	36	22,291	24,116	26,146	8%
	2019 2020	6,079 28,149	18,782 56,843	11,835 43,374	3,628 7,602	4,287 9,406	1,871 4,897	31% 18%	36 35	8,876 38,800	10,555 42,957	14,944 48,331	25% 11%
	2021	28,455	63,040	39,473	8,687	13,360	4,198	22%	31	33,274	37,977	41,477	11%
	2022 2023	98,104 19,646	372,082 97,586	223,290 41,193	69,089 16,481	85,977 31,334	37,867 6,364	31% 40%	29 38	167,745 31,643	204,938 38,209	284,771 44,785	26% 17%
	3001	342,985	630,918	467,686	72,246	74,729	47,806	15%	35	410,135	485,590	515,245	11%
	3002 3003	239,141 74,228	488,006 190,625	332,304 127,398	48,617 31,167	82,435 37,359	20,082 20,624	15% 25%	32 32	306,991 102,206	327,204 129,489	347,693 139,624	6% 15%
	3004	374,887	539,863	453,769	42,040	45,697	27,254	9%	33	428,173	457,805	477,163	5%
	3005 3006	310,237 10,359	439,428 23,789	371,960 16,546	30,474 3,719	42,318 7,041	18,312 2,290	8% 23%	30 33	354,633 14,446	374,564 16,489	393,262 18,262	5% 12%
	3007	371,186	727,498	531,754	85,281	111,233	38,810	16%	25	492,564	529,779	560,675	6%
	4001 4002	1,319 293,232	55,740 479,620	24,162 367,485	13,520 49,025	20,710 58,472	7,350 25,128	56% 13%	15 13	14,774 334,002	23,530 366,008	31,507 388,837	36% 8%
Commodities	4003	382,949	709,464	549,841	90,591	113,229	31,293	17%	12	502,594	532,285	579,480	7%
	4004 5001	233,817 4,259	412,229 10,678	337,501 6,981	45,535 1,944	93,386 1,899	31,070 1,334	14% 28%	12 25	318,144 5,892	327,202 6,902	366,425 8,150	7%
	5002	14,807	31,316	22,090	4,701	4,520	3,058	21%	22	16,819	23,123	25,698	21%
	5003 5004	3,278 6,917	5,976 14,052	4,265 9,975	891 2,159	1,022 2,099	530 1,839	21% 22%	24 22	3,512 7,403	3,947 10,447	4,974 11,885	17% 23%
	5005	2,902	6,121	4,515	780	1,077	480	17%	23	4,090	4,531	4,946	9%
	5006 5007	2,322 21,691	14,499 71,614	7,018 39,851	2,488 14,395	3,724 44,820	1,694 7,160	36% 36%	23 21	5,074 28,818	7,245 37,586	8,671 53,435	26% 30%
	5008	54,021	117,512	74,035	17,954	29,766	10,543	24%	25	63,232	70,334	79,112	11%
	5009 5010	4,987 12,977	13,360 30,295	8,063 19,530	2,412 4,705	3,101 10,692	1,203 2,065	30% 24%	25 24	6,245 16,459	7,707 20,035	9,182 20,711	19% 11%
	5011	26,110	52,921	35,217	6,644	9,166	2,532	19%	23	31,463	35,412	36,543	7%
	5012 5013	1,654 10,066	5,763 21,007	3,054 15,413	1,145 2.939	1,571 3,125	592 1.488	38% 19%	22 25	2,171 14,324	3,014 15,232	3,554 16,673	24% 8%
Credit Spread	5014	2,231	6,357	4,255	1,202	1,212	604	28%	23	3,518	4,006	4,775	15%
	5015 5016	14,571 26,641	39,379 59,819	23,679 40,697	5,719 8,846	11,547 9,445	2,431 6,359	24% 22%	23 20	20,439 34,684	23,656 42,368	25,444 47,115	11% 15%
	5017	12,754	36,677	24,570	6,397	9,392	3,357	26%	19	20,341	23,368	30,454	20%
	5018 5019	32,985 7,123	89,229 20,848	59,765 11,372	15,894 3,646	17,586 10,522	11,552 1.082	27% 32%	20 24	49,071 9,077	61,911 10,154	70,268 12,975	18% 18%
	5020	118,540	207,875	165,388	21,787	25,024	10,322	13%	26	158,743	167,813	176,509	5%
	5021 5022	12,325 114,514	32,470 192,895	22,822 157,134	5,642 21,230	5,905 25,383	3,572 11,362	25% 14%	22 22	19,247 147,528	23,395 161,982	26,536 170,251	16% 7%
	5023	40,813	94,343	66,203	15,646	18,751	11,175	24%	16	54,742	62,965	77,294	17%
	5024 5025	19,679 39,838	69,802 66,740	39,257 50,939	16,883 6,419	20,543 7,673	10,970 2,810	43% 13%	21 20	24,082 48,229	35,890 52,466	54,613 54,019	39% 6%
	5026	15,580	43,473	28,877	7,673	9,295	3,542	27%	21	24,228	28,097	33,787	16%
	5027 6001	14,311	30,822	20,165	5,355	11,597	2,058	27%	20	16,406	20,098	22,362	15%
	6002								4				
	6003 6004								4 4				
	6005								3				
ALL-IN no-CTP ** Equity Cumulative **	10000 11000	509,460 157,349	1,125,408 311,963	792,591 226,262	159,483 42,562	159,483 51,761	72,353 18,512	20% 19%	13 20	696,529 203,385	815,993 215,708	857,171 258,481	10% 12%
IR Cumulative **	12000	157,349 280,584	447,514	365,772	43,860	59,576	22,519	12%	30	338,774	361,800	383,811	12%
FX Cumulative ** Commodity Cumulative **	13000 14000	552,348	929,263 502,693	760,653	80,840 71,323	108,524	45,511 51,190	11% 19%	31 13	707,402 330,492	756,418 371,080	827,610	8%
	14000 15000	291,100 157,424	338,003	378,215 220,839	42,702	71,323 59,477	51,190 20,198	19%	13	330,492 190,555	371,080 221,537	422,271 229,335	12% 9%
CS Cumulative ** CTP Cumulative **									2				

CTP Cumulative **
 16000
 STDe vrunc is the standard deviation computed excluding values below the 5th and above the 95th percentile
 Refers to the number of banks included in the computation of the statistics
 For the aggregated portfalios (60 to 66), banks that reported at least a missing portfalio IMV among the ones composing the aggregate are not included
 in the computation of the benchmarks for that particular aggregate portfalio.



Table 22: sVaR statistics

EU Statistics for SVaR

					Main st	atistics					Percentiles		
	Port. ID	Min	Max	Ave.	STDev	STDev_trunc ¹	MAD (median absolute	Coefficient of variation	Num obs. ²	25th	50th	75th	IQD
	1001	695,666	1,210,174	959,535	123,037	154,228	deviation) 85,378	(STDev/Mean) 13%	31	848,555	970,161	1,033,447	10%
	1002 1003	628,195 45	1,739,419 6,175	1,238,490 3,033	312,500 1,424	358,056 1,765	233,929 856	25% 47%	27 26	921,476 2,197	1,241,435 3,500	1,477,855 3,661	23% 25%
	1004 1005	56 85,198,895	4,645 207.722.826	2,371	1,299	1,489 44.937.914	951 24.518.591	55% 23%	25 26	1,678 143,983,465	2,318 168,617,643	3,511 192.416.426	35% 14%
	1005	85,198,895 2,034	207,722,826	159,777,985 5,543	37,266,629 2,117	44,937,914 2,641	24,518,591 1,739	23%	26 26	143,983,465 4,005	168,617,643 5,593	192,416,426 7,406	14% 30%
	1007	1,328	92,329	46,910	21,647	31,876	16,518	46%	19	30,204	49,131	59,594	33%
Equity	1008 1009	14,801 56,819	51,770 98,092	32,102 81,198	11,501 11,124	10,978 14,722	8,901 3,376	36% 14%	25 24	21,460 69,722	32,927 84,708	40,933 88,885	31% 12%
	1010 1011	70,135 724,334	157,766 1,130,107	126,833 909,934	23,381 105,791	31,025 128,401	13,220 70,515	18% 12%	25 27	112,776 817,430	131,434 913,823	142,914 961,886	12% 8%
	1011	699,121	1,130,107	909,934 874,683	105,791	128,401	83,287	12%	27	770,054	915,625 879,604	901,000	8% 10%
	1013	20,752	120,621	72,425	26,001	26,001	18,007	36%	28	60,621	71,607	92,282	21%
	1014 1015	247,745 204,266	663,630 522,090	453,718 362,825	126,926 101,617	126,926 97,994	67,974 95,079	28% 28%	30 24	318,478 265,612	490,483 370,768	548,392 448,338	27% 26%
	1016	143,776	604,922	365,648	134,946	134,946	86,229	37% 14%	12	283,473	354,874	458,336	24% 8%
	2001 2002	153,539 108,963	282,141 225,270	222,611 172,853	30,269 27,247	40,134 35,167	17,630 15,169	14%	36 34	206,788 160,889	218,910 171,569	240,813 192,551	8%
	2003 2004	18,949	44,997	33,273	6,442	7,560	3,937	19%	37 36	29,868	33,675	37,888	12% 16%
	2004	35,363 4,342	162,913 181,397	99,099 70,964	25,691 50,738	36,259 62,184	17,564 39,691	26% 72%	30	80,758 29,862	103,333 70,917	112,287 93,152	10%
	2006	19,197	67,301	44,526	13,239	15,461	9,385	30%	33	36,009	46,270	53,503	20%
	2007 2008	42,207 42,708	161,832 193,909	95,977 102,830	26,740 38,837	41,790 60,068	12,276 15,425	28% 38%	30 32	82,802 80,005	95,955 97,241	107,416 116,899	13% 19%
	2009	173,380	370,636	275,605	46,831	52,862	24,003	17%	37	252,273	269,721	300,302	9%
	2010 2011	138,186 289,116	253,927 584,888	200,493 438,841	27,260 77,011	36,160 81,206	15,837 50,919	14% 18%	36 38	186,113 407,869	197,043 437,008	216,731 505,218	8% 11%
Interest Rate		62,747	178,529	114,518	29,154	39,702	16,743	26%	37	93,837	113,000	133,394	17%
	2013 2014	21,582 35,443	83,274 269,420	45,426 115,249	14,626 65,266	21,276 81,001	7,197 56,283	32% 57%	35 27	35,860 52,527	43,954 125,622	52,351 166,380	19% 52%
	2015	5,952	62,222	28,090	14,545	17,064	9,819	52%	35	17,492	29,169	36,179	35%
	2016 2017	78,630 24,098	279,995 326,623	125,478 166,317	39,014 77,939	100,662 95,193	18,368 45,033	31% 47%	31 32	101,896 128,043	118,655 181,774	136,946 212,886	15% 25%
	2018	11,041	56,933	25,905	8,225	15,656	2,992	32%	37	22,102	25,936	27,610	11%
	2019 2020	12,450 1,117	47,897 276,819	20,607 121,125	6,503 74,403	14,495 87,397	2,545 46,538	32% 61%	37 38	17,299 71,527	20,081 106,071	21,780 177,831	11% 43%
	2021	26,118	71,746	43,755	10,306	29,528	5,828	24%	30	36,812	45,867	48,965	14%
	2022 2023	119,610 21,115	346,475 93,293	255,004 46,176	45,817 14,170	76,432 31,116	22,250 11,051	18% 31%	28 37	231,996 34,271	259,911 49,839	281,070 56,643	10% 25%
	3001	502,324	1,217,111	891,408	209,471	209,471	147,003	24%	36	756,591	878,919	1,059,365	17%
	3002 3003	229,691 80,700	926,123 374,845	636,376 262,009	185,588 70,927	225,332 107,681	116,888 38,620	29% 27%	32 33	534,500 228.071	645,179 270,117	757,803 305,200	17% 14%
	3004	578,384	1,315,742	1,001,136	179,238	224,982	70,324	18%	32	933,088	1,017,050	1,099,835	8%
	3005 3006	431,049 6,093	1,758,842 150,389	1,097,593 41,689	330,017 30,301	378,630 61,739	155,380 13,326	30% 73%	32 35	940,072 19,183	1,153,731 40,116	1,279,062 43,952	15% 39%
	3007	861,037	2,423,672	1,587,526	414,941	412,335	233,770	26%	27	1,220,055	1,647,393	1,811,889	20%
	4001 4002	400 489,389	85,809 917,919	44,975 677,575	19,322 137.895	30,189 212,563	8,990 104.943	43% 20%	15 13	36,546 543,367	46,034 693,577	54,931 792,558	20% 19%
Commodities	4003	651,717	1,814,706	1,433,187	327,181	405,446	165,307	23%	12	1,306,062	1,403,230	1,738,411	14%
	4004 5001	280,617 7,016	979,275 25,856	708,785	207,325 5,633	260,174 6,573	74,708	29%	12 24	647,035 10,039	777,385	837,207 19,890	13%
	5002	15,426	159,284	73,631	33,594	53,255	16,025	46%	19	53,627	78,110	91,961	26%
	5003 5004	6,933 7.676	15,363 76,513	10,922 32,903	2,426 18.808	2,681 26,265	2,223	22% 57%	24 20	9,062 21,797	10,388 33,159	12,838 37,133	17% 26%
	5005	4,646	32,798	15,516	7,600	9,401	2,463	49%	22	10,982	13,999	17,999	24%
	5006 5007	11,239 36,902	52,753 194,212	28,119 87,902	14,538 43,950	20,599 58,805	7,341 29,363	52% 50%	25 22	16,592 48,536	23,542 78,587	44,845 123,756	46% 44%
	5008	33,171	221,144	100,030	42,676	84,089	18,091	43%	25	77,615	100,021	111,324	18%
	5009 5010	5,058 11,566	27,894 54,369	12,133 28,469	5,750 12,246	8,168 23,890	3,633 6,507	47% 43%	26 24	7,638	11,768 26,474	15,210 33,279	33% 26%
	5011	16,553	106,101	54,739	26,223	48,314	12,292	48%	25	35,473	56,132	59,257	25%
	5012 5013	1,723 12,372	19,285 71,170	8,041 36,882	3,876 17,135	8,673 18,144	1,582 10,998	48% 47%	23 25	5,253 23,735	8,623 35,363	9,491 50,260	29% 36%
Credit Spread	5014	5,014	19,522	10,412	3,880	5,725	3,667	37%	23	7,084	10,355	13,461	31%
	5015 5016	13,479 34,070	76,958 169,297	30,413 84,855	11,902 37,430	24,737 46,626	4,645 18,505	39% 44%	23 19	24,305 59,279	29,094 88,694	33,663 101,052	16% 26%
	5017	21,369	126,118	66,511	35,003	34,309	26,504	53%	21	36,433	62,888	84,227	40%
	5018 5019	53,137 12,747	242,254 42,568	123,085 21,693	58,483 7,260	85,657 26,443	29,561 2,875	48% 34%	19 23	78,748 17,318	120,192 21,081	138,828 23,833	28% 16%
	5020	129,809	264,353	182,475	34,400	56,683	29,279	19%	25	160,472	184,122	205,161	12%
	5021 5022	17,600 144,339	185,369 335,507	92,187 218,847	52,059 64,987	55,634 69,112	44,168 39,768	57% 30%	22 22	46,604 164,528	94,659 211,771	133,580 272,715	48% 25%
	5022 5023	144,339 33,865	235,507	218,847 129,124	64,987	81,235	47,853	30% 47%	16	74,872	145,952	176,328	40%
	5024 5025	27,952 63,073	156,446 145,107	85,161 92,324	44,193 25,030	43,394 44,072	38,320 15,914	52% 27%	23 19	37,722 70,162	90,850 96,328	125,291 101,335	54% 18%
	5026	24,467	76,948	42,202	14,587	25,815	9,456	35%	19	31,220	43,386	50,191	23%
	5027	7,077	79,227	30,812	18,611	28,032	5,734	60%	22	20,803	26,073	34,018	24%
	6001 6002								4 4				
	6003								4				
	6004 6005								4				
ALL-IN no-CTP **	10000	796,321	2,353,012	1,716,828	493,185	612,233	459,194	29%	12	1,341,118	1,755,777	2,179,731	24%
Equity Cumulative ** IR Cumulative **	11000 12000	416,966 253,857	865,476 599,569	653,427 433,139	124,888 89,806	143,818 97,384	76,227 54,900	19% 21%	20 31	573,599 388,170	644,473 425,567	735,569 501,757	12% 13%
FX Cumulative **	13000	977,213	2,572,732	1,789,906	398,606	511,134	267,087	22%	29	1,473,708	1,883,385	2,015,043	16%
Commodity Cumulative ** CS Cumulative **	14000 15000	487,420 180,948	919,882 551,835	688,548 300,847	138,478 93,394	216,320 127,783	114,996 52,850	20% 31%	12 20	574,628 247,244	697,765 296,584	805,999 381,991	17% 21%
CTP Cumulative **	16000	n computed excludi		o 5th and above t					2				

CIP Commative ** 12600

570 er truns is the standard deviation computed excluding values below the 5th and above the 95th percentile

Flefers to the number of banks included in the computation of the statistics

F for the aggregated part/oliois (50 co6), banks that reported at least a missing partfolio MV among the ones composing the aggregate are not included
in the computation of the benchmarks for that particular aggregate partfolio.



Table 23: P&L VaR statistics

EU Statistics for PnL VaR

					Main st	atistics					Percentiles		
	Port. ID	Min	Max	Ave.	STDev	STDev_trunc ¹	MAD (median absolute deviation)	Coefficient of variation (STDev/Mean)	Num obs. ²	25th	50th	75th	IQD
	1001	288,150	509,838	417,502	52,589	246,455	11,979	13%	22	408,341	431,130	436,514	3%
	1002 1003	209,700 47	387,499 2,769	276,788 1,221	49,916 604	145,193 1,520	11,297 227	18% 50%	19 18	250,805 927	263,756 1,099	278,041 1,433	5% 21%
	1003	899	4,155	1,984	986	6,793	299	50%	19	1,415	1,655	2,323	24%
	1005	47,520,760	86,321,641	57,760,952	8,953,682	21,678,301	1,329,871	16%	18	53,576,849	54,454,847	56,973,065	3%
	1006 1007	480 1,798	4,962 44,009	2,414 17,642	1,020 11,351	2,074 36,291	667 5,452	42% 64%	18 16	1,630 11,199	2,606 14,985	2,925 22,275	28% 33%
Equity	1008	4,446	22,109	19,214	3,959	11,784	933	21%	18	18,928	20,550	21,008	5%
	1009 1010	21,366 24,622	53,394 115,303	45,829 36,504	6,342 19,450	25,863 66,474	1,266 1,561	14% 53%	19 19	45,741 29,881	47,017 32,250	48,618 32,691	3% 4%
		308,502	479,773	394,092	42,832	254,339	11,659	11%	19	378,593	396,184	400,088	3%
	1012 1013	295,915 21,783	450,046 81,537	379,725 51,594	40,528 12,211	243,418 26,956	11,191 2,903	11% 24%	19 19	367,833 45,698	383,746 56,336	392,683 56,865	3% 11%
	1013	147,174	405,442	288,497	60,605	175,552	2,903	24%	21	282,077	302,313	314,972	6%
	1015	139,038	784,833	253,782	143,016	770,309	26,728	56% 36%	17	208,234	226,556	252,968	10% 24%
	1016 2001	149,699 157,056	395,710 367,398	240,494 199,812	85,551 44,240	85,551 125,230	58,294 13,651	22%	7 27	171,325 175,225	235,160 185,757	277,683 213,575	24%
	2002	126,235	257,209	178,168	35,935	105,610	15,583	20%	27	157,756	171,383	188,041	9%
	2003 2004	23,150 75,733	37,394 176,885	27,529 122,288	3,293 20,803	13,810 54,907	1,699 9,044	12% 17%	27 27	25,054 111,610	27,539 127,473	28,932 132,333	7% 8%
	2005	8,801	58,963	32,462	15,926	20,842	11,327	49%	13	24,252	28,158	42,480	27%
	2006 2007	14,531 54,056	50,854 143,726	29,082 79,149	9,148 21,659	24,043 72,138	3,482 5,548	32% 27%	23 23	23,407 67,491	27,538 73,321	31,112 80,726	14% 9%
	2008	50,025	130,920	72,087	23,048	71,122	7,687	32%	23	57,416	65,702	70,876	10%
	2009 2010	173,781	234,840	196,042	14,321	20,632	8,705	7% 22%	25 27	186,366	196,336	203,995	5% 10%
	2010 2011	141,348 355,710	330,659 539,434	179,883 406,014	39,850 40,878	112,704 74,198	12,286 20,736	22%	27 24	157,703 376,455	167,182 402,210	192,261 438,442	10%
Interest Rate	2012	54,198	232,891	81,856	37,497	91,886	5,424	46%	24	64,768	70,815	83,034	12%
	2013 2014	7,008 16,184	60,966 100,964	42,335 47,233	9,926 20,260	22,859 111,750	3,261 11,961	23% 43%	26 18	39,061 33,486	42,846 43,198	45,583 60,096	8% 28%
	2015	6,118	30,627	12,535	7,263	10,960	2,454	58%	23	7,570	10,639	12,828	26%
	2016 2017	96,378 21,500	194,551 61.069	119,094 31,270	22,424 9,607	78,079 17,754	7,135 2,024	19% 31%	23 23	106,683 26,266	112,054 28,135	119,729 34,702	6% 14%
	2017	14,707	35,920	23,459	4,925	7,516	1,743	21%	24	20,200	22,668	24,608	8%
	2019	1,662	22,569	11,181	4,703	8,888	1,713	42%	26	8,029	9,520	15,960	33%
	2020 2021	35,290 27,502	77,159 65,785	44,352 37,636	8,773 9,949	24,484 32,212	3,823 5,136	20% 26%	25 23	39,550 30,308	43,652 34,896	45,957 41,092	7% 15%
	2022	48,146	456,412	218,453	86,065	189,127	20,641	39%	22	174,908	197,195	267,311	21%
	2023 3001	16,719 393,956	112,715 628,881	35,638 484,757	18,791 57,048	45,708 236,560	6,531 24,220	53%	26	25,988 453,271	30,664 487,208	39,187 509,367	20%
	3002	248,748	436,023	327,945	44,722	70,112	32,750	14%	23	294,479	320,647	354,652	9%
FX	3003 3004	91,167 389,276	286,334 677,711	127,644 453,035	39,025 56,527	88,936 214,555	13,114 26,930	31% 13%	25 25	110,739 422,114	120,995 442,010	137,058 469,822	11% 5%
10	3004	311,753	431,914	365,260	26,373	171,171	15,498	7%	23	347,362	367,703	381,890	5%
	3006 3007	12,351 475,012	29,004 751,698	17,505 552,168	3,883 81,511	13,060 440,436	1,613 24,082	22% 15%	25 18	15,136 502,794	17,081 532,590	18,074	9% 5%
	4001	475,012 849	51,698	27,480	14,786	440,436	7,764	54%	18	19,846	29,929	550,375 35,652	28%
Commodities	4002	340,868	388,737	372,622	18,074	382,423	5,764	5%	9	355,095	382,539	385,651	4%
	4003 4004	285,143 59,189	576,004 390,409	446,689 297,967	107,621 104,926	552,649 299,205	68,289 35,604	24% 35%	8	367,866 288,609	477,334 311,345	528,303 369,387	18% 12%
	5001	3,647	12,341	6,093	1,866	4,617	688	31%	18	5,375	5,933	6,751	11%
	5002 5003	15,150 2,697	58,109 6,011	23,838 4,206	10,030 974	88,373 1,096	2,469 675	42% 23%	16 19	18,711 3,361	22,581 4,228	24,102 4,982	13% 19%
	5004	6,308	33,837	10,810	6,566	34,052	987	61%	16	8,207	9,376	10,191	11%
	5005 5006	2,006 4,108	5,839 7,114	3,978 5,240	1,039 838	1,528 3,964	770 611	26% 16%	18 18	3,531 4,571	3,934 5,470	4,798 5,747	15% 11%
	5006	21,162	191,950	5,240	53,337	3,964 99,972	6,432	88%	18	4,571 27,260	33,471	5,747 66,344	42%
	5008	51,045	112,607	71,880	15,405	86,132	7,850	21%	20	61,712	71,344	77,706	11%
	5009 5010	5,074 13,852	14,574 23,880	8,254 17,957	3,082 3,030	4,490 3,886	1,450 2,095	37% 17%	19 19	5,951 15,179	7,685 17,637	11,213 20,605	31% 15%
	5011	26,380	45,310	34,598	4,568	5,039	2,953	13%	19	31,472	35,478	36,373	7%
	5012 5013	1,824 8,914	5,236 19,622	2,882 13,916	980 3,129	4,750 4,324	437 2,307	34% 23%	18 19	2,170 11,354	2,565 13,788	3,240 16,166	20% 17%
Credit Spread	5014	3,074	15,564	4,687	2,809	4,524	418	60%	18	3,706	3,901	4,476	9%
	5015 5016	18,746 25,991	35,299 116.010	24,023 45,771	4,720 21,926	6,541 137,901	1,563 6,719	20% 48%	18 15	20,932 32,887	22,621 41,325	24,622 47,795	8% 18%
	5016 5017	25,991 12,894	116,010 64,976	45,771 32,087	21,926 15,542	137,901 74,080	6,719 5,053	48% 48%	15	32,887 22,662	41,325 25,823	47,795 50,204	18%
	5018	34,297	167,523	71,851	35,429	198,781	15,515	49%	15	44,484	61,278	102,236	39%
	5019 5020	7,835 148,736	22,653 247,006	11,009 167,831	4,122 21,574	11,108 102,177	743 7,531	37% 13%	18 20	8,447 155,936	9,409 161,167	14,360 174,577	26% 6%
	5021	13,479	112,293	29,369	21,957	91,849	3,367	75%	18	19,980	23,347	29,710	20%
	5022 5023	139,187 14,951	598,394 107,682	180,904 63,479	104,587 21,615	547,903 34,294	7,702 9,178	58% 34%	18 12	150,067 54,333	159,039 63,899	165,471 72,644	5% 14%
	5024	22,104	82,906	39,627	22,063	57,884	5,862	56%	16	24,517	30,316	51,664	36%
	5025 5026	39,056 19,473	150,343 155,811	56,830 33,996	27,047 31,080	168,423 87,579	5,691 2,946	48% 91%	15 18	43,101 22,506	49,174 25.105	58,832 30,219	15% 15%
	5026	19,473	155,811 146,195	33,996 29,126	31,080	87,579 66,517	2,946 2,679	91% 109%	18	16,285	25,105 18,037	30,219 25,056	21%
	6001								3				
СТР	6002 6003								3 3				
	6004								3				
ALL-IN no-CTP **	6005 10000	529,808	947,858	781,116	131,157	509,918	74,740	17%	2 8	722,466	818,644	878,824	10%
Equity Cumulative **	11000	182,824	1,138,282	284,727	231,181	709,330	14,245	81%	16	203,126	214,879	260,230	12%
IR Cumulative ** FX Cumulative **	12000 13000	112,182	485,427	350,224	91,079	159,669	30,849	26% 16%	22 25	329,679	361,183	391,378	9% 7%
Commodity Cumulative **	13000 14000	545,250 330,477	1,158,574 397,631	791,808 364,768	128,602 19,534	250,570 386,228	52,008 12,060	16% 5%	25 9	729,153 355,056	806,721 366,994	832,510 377,376	7% 3%
CS Cumulative **	15000	185,313	262,944	219,660	18,180	154,724	10,795	8%	17	208,246	219,471	230,011	5%
CTP Cumulative **	16000												

CIP Considerive ** 16000
The trunc is the standard deviation computed excluding values below the 5th and above the 95th percentile
sters to the number of banks included in the computation of the statistics
** For the aggregated portfalios (60 to 66), banks that reported at least a missing portfalio IMV among the ones composing the aggregate are not included
in the computation of the benchmarks for that particular aggregate portfalio.



Table 24: Empirical expected shortfall statistics

EU Statistics for empirical expected shortfall

					Main st	atistics					Percentiles		
	Port. ID	Min	Max	Ave.	STDev	STDev_trunc ¹	MAD (median absolute deviation)	Coefficient of variation (STDev/Mean)	Num obs. ²	25th	50th	75th	IQD
	1001	274,074	497,137	365,475	54,093	247,195	8,700	15%	22	343,408	354,986	360,869	2%
	1002 1003	211,746 45	376,242 2,793	253,321 1,292	53,304 571	167,736 1,501	12,062 214	21% 44%	19 18	222,307 988	236,261 1,238	243,810 1,567	5% 23%
	1004 1005	883 46,304,325	3,931	1,916 56,258,961	908 9,252,938	5,706 21,304,291	404 1,083,407	47% 16%	19 18	1,262 51,603,958	1,738 51,774,579	2,389 58,814,372	31% 7%
	1005	46,504,525 461	84,596,628 4,794	2,517	9,252,938 948	21,504,291 2,123	1,085,407	38%	18	1,905	2,697	2,973	22%
	1007 1008	1,698 4,326	45,266 21,182	17,167 19,010	11,046 3,840	38,173 12,102	4,500 1,013	64% 20%	16 18	11,566 18,968	14,107 20,290	20,225 21,027	27% 5%
Equity	1009	18,853	72,091	61,982	11,017	25,380	1,626	18%	19	62,099	64,975	66,385	3%
	1010 1011	23,122 294,335	118,943 472,358	35,961 351,783	20,628 51,783	57,883 254,821	794 8,592	57% 15%	19 19	29,706 327,645	30,518 336,707	31,039 345,466	2% 3%
	1012	279,343	443,167	333,110	48,119	240,223	7,668	14%	19	308,646	320,920	326,544	3%
	1013 1014	20,614 130,799	104,304 381,094	64,212 255,172	15,959 56,430	29,299 174,499	2,846 10,545	25% 22%	19 21	63,002 240,514	68,549 250,714	68,815 261,029	4% 4%
		142,592	790,423	235,979	148,150	654,981	23,611	63%	17	182,296	195,422	228,738	11%
	1016 2001	146,833 156,448	371,227 388,380	234,474 197,467	80,733 46,987	80,733 122,865	59,811 8,497	34% 24%	7 27	168,355 177,624	228,332 182,457	288,143 199,550	26% 6%
	2002	113,295	263,663	182,454	34,356	102,203	11,309	19%	27	162,116	182,106	190,228	8%
	2003 2004	22,647 80,809	37,006 178,670	26,208 114,442	2,925 20,529	12,383 58,019	1,275 4,889	11% 18%	27 27	24,671 102,537	26,112 107,535	27,310 121,354	5% 8%
	2005	8,165	74,803	35,461	18,702	21,552	13,959	53%	13	25,777	35,777	45,605	28%
	2006 2007	15,420 50,703	54,268 140,042	29,247 73,376	10,260 21,821	24,847 66,552	3,209 7,307	35% 30%	23 23	22,965 59,547	25,909 67,394	30,731 78,127	14% 13%
	2008	48,835	133,492	70,574	23,407	69,041	8,437	33% 9%	23	54,363	63,839	71,840	14%
	2009 2010	176,571 140,803	240,757 349,542	201,902 177,820	17,866 42,343	20,725 110,577	11,801 7,646	24%	27 27	187,736 159,862	203,185 164,211	210,091 179,544	6% 6%
Interest Rate	2011 2012	375,624 53,537	561,946 246,231	430,957 83,377	52,509 41,829	69,932 89,576	31,241 8,174	12% 50%	27 24	390,956 61,639	432,383 70,067	440,335 80,920	6% 14%
marest Kate	2012 2013	53,537 7,115	246,231 65,446	83,377 41,612	41,829 11,253	89,576 24,148	8,174 2,998	50% 27%	24 26	61,639 37,785	40,412	80,920 43,801	7%
	2014 2015	18,215 6,697	104,543 33,103	46,807 12,583	20,378 7,819	109,173 11,261	12,826 2,263	44% 62%	18 23	34,048 7,450	47,937 10,653	59,064 13,623	27% 29%
	2015	91,457	214,089	116,531	28,649	91,921	2,203	25%	23	102,178	105,053	114,192	6%
	2017 2018	23,057 13,862	54,736 35,180	31,856 22,866	8,062 5,234	31,011 7,483	1,195 1,592	25% 23%	23 25	27,668 19,775	28,977 21,529	33,198 22,917	9% 7%
	2019	1,867	23,789	11,290	4,976	9,148	1,656	44%	26	7,965	9,365	16,240	34%
	2020 2021	36,344 25,132	92,414 71,576	47,968 36,502	11,163 11.066	24,049 34.012	3,072 4,195	23% 30%	26 23	42,370 29,280	46,851 34,253	48,684 38,296	7% 13%
	2022	49,904	421,641	217,346	87,146	187,375	16,254	40%	22	171,165	181,949	252,160	19%
	2023 3001	17,537 372,295	112,377 627,103	36,724 458,671	17,884 76,887	48,804 246,644	3,671 20,316	49% 17%	26	29,443 416,609	32,318 427,481	36,693 515,344	11% 11%
	3002	264,919	413,907	329,910	33,606	64,468	10,635	10%	23	311,325	319,607	350,586	6%
FX	3003 3004	94,097 402,358	259,331 565,744	121,777 452,440	34,429 40,694	82,785 198,053	12,331 21.892	28% 9%	25 25	101,675 421,585	111,570 443,391	128,807 473,203	12% 6%
	3005	308,310	421,081	365,265	28,284	172,793	19,855	8%	24	341,824	367,041	383,576	6%
	3006 3007	12,635 458,852	42,056 746,480	18,559 547,818	7,119 93,899	13,818 444,367	1,684 15,424	38% 17%	25 18	14,556 497,710	16,201 515,725	18,301 556,361	11% 6%
	4001	1,040	74,785	33,256	21,810	29,566	15,344	66%	11	18,319	31,295	44,393	42%
Commodities	4002 4003	313,082 265,359	400,573 528,885	361,772 442,213	27,295 104,776	406,816 594,407	18,664 30,981	8% 24%	9 8	351,517 379,122	364,244 482,254	382,910 511,795	4% 15%
	4004 5001	49,501 3,684	391,907	300,008	105,497	290,129	21,402	35% 18%	8	305,250 5,351	332,146 6,014	351,850	7% 8%
	5002	3,084	7,182 56,136	5,789 23,216	1,026 9,667	6,655 82,166	2,742	42%	16	18,181	22,263	6,284 22,795	8% 11%
	5003 5004	2,787 6.124	5,673 32.650	3,959 10.343	906 6.305	1,032 30.747	683 1.410	23% 61%	19 16	3,106 7,363	3,808 9,286	4,748 10.140	21% 16%
	5004	2,078	5,662	4,036	968	1,437	728	24%	18	3,582	4,082	4,855	15%
	5006 5007	4,195 21,191	7,257 232,389	5,338 64,450	862 61,615	4,888 100,741	716 7,508	16% 96%	18 17	4,593 27,023	5,524 33,506	6,025 65,041	13% 41%
	5008	53,323	114,531	72,696	14,358	81,480	6,179	20%	20	63,702	70,852	77,268	10%
	5009 5010	5,160 14,242	14,285 23,843	8,089 18,406	2,694 2,826	4,334 4,056	1,311 1,436	33% 15%	19 19	6,074 16,014	7,732 18,646	10,252 19,850	26% 11%
	5011	28,871	42,109	34,655	3,761	5,329	2,265	11%	17	31,384	35,201	37,056	8%
	5012 5013	1,774 8,963	5,506 20,220	2,701 13,917	954 3,327	5,028 4,472	170 2,482	35% 24%	18 19	2,173 11,149	2,336 14,372	2,977 16,435	16% 19%
Credit Spread	5014	2,734	20,975	5,203	4,474	11,965	407	86%	18	3,320	3,639	4,735	18%
	5015 5016	18,480 24,485	34,128 115,586	23,371 45,200	4,746 21,670	6,521 132,159	1,405 5,165	20% 48%	18 15	20,118 33,006	21,841 41,402	23,478 45,979	8% 16%
	5017	12,202	65,078	31,005	14,966	74,732	4,743	48%	15	22,213	24,366	46,463	35%
	5018 5019	33,949 7,786	171,139 26,259	71,102 11,301	35,018 4,967	185,268 11,210	14,166 641	49% 44%	15 18	47,598 8,338	63,604 9,005	97,993 14,257	35% 26%
	5020 5021	143,058	247,684	163,158	22,836	99,392	5,900	14% 73%	20 18	150,459	155,266	167,424	5% 19%
	5021	13,238 134,571	108,077 579,293	28,670 176,943	20,998 100,985	82,435 504,176	3,311 9,241	73% 57%	18 18	19,517 146,143	22,413 154,837	28,601 162,886	5%
	5023 5024	14,552 20,916	106,081 249.801	63,745 51,109	22,381 54,740	32,623 125.464	11,231 9,679	35% 107%	12 17	52,062 24.603	67,122 32,520	73,290 62,656	17% 44%
	5025	40,353	152,578	56,882	27,737	157,463	3,758	49%	15	43,601	48,178	56,145	13%
	5026 5027	19,540 13,526	149,342 141,403	33,724 29,213	29,655 29,989	90,143 67,548	3,558 2,225	88% 103%	18 17	22,379 17,093	25,356 19,610	30,545 25,432	15% 20%
	6001	13,320	141,405	23,213	23,369	07,546	2,223	10370	3	17,055	15,010	23,432	2070
СТР	6002								3				
CIP	6003 6004								3				
	6005								2				
ALL-IN no-CTP ** Equity Cumulative **	10000 11000	507,363 172,417	924,047 1,140,955	784,995 277,863	132,209 233,261	526,939 704,409	77,918 7,082	17% 84%	8 16	752,455 200,190	781,685 204,976	892,671 256,565	9% 12%
IR Cumulative **	12000	113,985	473,841	352,413	87,411	166,433	19,917	25%	22	340,744	365,503	380,578	6%
FX Cumulative ** Commodity Cumulative **	13000 14000	527,286 312,413	1,063,354 438,613	775,752 363,904	116,109 36,733	244,344 406,248	39,966 21,210	15% 10%	25 9	728,287 350,784	783,915 358,804	790,423 384,736	4% 5%
CS Cumulative **	15000	179,493	253,111	212,758	17,124	153,258	7,047	8%	17	204,287	210,677	225,148	5%
CTP Cumulative **	16000								3				

CIT Communitive ** 24000 Tor trunc is the standard deviation computed excluding values below the 5th and above the 95th percentile first to the number of banks included in the computation of the statistics *F or the aggregated participies (50 co6), banks that reported at least a missing partfolio IMV among the ones compasing the aggregate are not included in the computation of the benchmarks for that particular aggregate partfolio.



Percentiles

Table 25: sVaR/VaR statistics

nt of

Main statistics MAD (r dian Coeffi

EU Statistics for sVaR/VaR

	Port. ID	Min	Max	Ave.	STDev	STDev_trunc ¹	absolute deviation)	variation (STDev/Mean)	Num obs. ²	25th	50th	75th	IQD
	1001	0.63	6.53	2.61	1.02			39%	28	2.20	2.41	2.90	14%
	1002 1003	1.89 0.87	5.90 5.60	4.44 2.31	1.20 0.98			27% 42%	22 23	3.92 1.82	4.71 2.19	5.43 2.55	16% 17%
	1004	0.43	6.09	2.03	1.45			71%	21	1.21	1.44	2.55	36%
	1005	1.21	5.34	2.71	0.91			34%	27	2.09	2.71	3.26	22%
	1006 1007	0.90	3.75 15.60	2.08 3.87	0.73			35% 76%	24 20	1.68 2.74	2.02 3.19	2.47 3.82	19% 16%
	1007	0.80	3.81	1.95	0.69			35%	20	1.60	3.19 1.84	2.06	10%
Equity	1009	1.00	3.67	1.73	0.64			37%	25	1.43	1.51	1.68	8%
	1010	1.26	5.06	3.79	0.95			25%	25	3.26	3.76	4.55	16%
	1011 1012	1.14	4.00 6.46	2.43	0.54			22% 37%	27 27	2.17 2.21	2.36 2.39	2.81 2.82	13% 12%
	1013	0.46	5.63	1.63	1.10			68%	29	0.93	1.44	1.65	28%
	1014	1.21	3.73	2.24	0.61			27%	28	1.83	2.26	2.53	16%
	1015 1016	1.33 0.94	3.56 5.64	2.29 2.11	0.59 1.38			26% 65%	19 11	1.98 1.23	2.34 1.42	2.59 2.75	13% 38%
	2001	0.60	1.54	1.09	0.19			17%	34	0.97	1.42	1.19	10%
	2002	0.36	2.07	0.96	0.32			33%	38	0.73	1.00	1.16	23%
	2003 2004	0.20	1.79 3.35	1.13 0.94	0.39 0.53			34% 56%	33 36	0.96 0.65	1.18 0.82	1.33 1.17	16% 29%
	2004	0.88	5.97	2.22	1.50			68%	14	1.22	1.66	2.36	32%
	2006	0.57	2.39	1.46	0.48			33%	27	1.07	1.44	1.81	25%
	2007	0.60	2.32	1.27	0.42			33%	30	0.97	1.24	1.45	20%
	2008 2009	0.71 0.48	5.12 1.91	1.49 1.33	0.81 0.32			54% 24%	27 37	1.11 1.22	1.30 1.33	1.57 1.58	17% 13%
	2005	0.32	1.75	1.04	0.32			26%	33	0.91	1.05	1.18	13%
	2011	0.47	2.30	1.06	0.34			32%	38	0.86	1.06	1.17	16%
Interest Rate	2012 2013	0.48 0.49	2.57 4.09	1.32 1.20	0.50			38% 54%	33 37	1.05 0.89	1.27 1.05	1.61 1.26	21% 17%
	2013	0.42	10.56	3.26	2.32			71%	25	1.39	2.68	4.18	50%
	2015	0.62	5.28	2.47	1.11			45%	35	1.77	2.34	3.05	27%
	2016 2017	0.59	2.97 13.20	1.07 5.53	0.44 2.97			41% 54%	28 29	0.81 3.48	0.97 5.60	1.18 6.83	19% 32%
	2017	0.47	1.75	1.03	0.26			25%	35	0.90	1.06	1.19	14%
	2019	0.77	7.52	2.17	1.32			61%	34	1.37	1.95	2.39	27%
	2020	0.15	12.26	3.68	2.70			73%	38	1.83	2.71	5.35	49%
	2021 2022	0.49 0.55	3.58 2.59	1.32 1.32	0.57 0.45			43% 34%	31 29	0.95	1.22 1.27	1.49 1.53	22% 21%
	2023	0.55	2.20	1.23	0.36			29%	37	0.97	1.19	1.45	20%
	3001	0.78	3.49	2.02	0.52			26%	32	1.79	2.13	2.27	12%
	3002 3003	0.12	2.94 4.98	1.86 2.35	0.65 0.91			35% 39%	30 28	1.37 1.92	2.09 2.11	2.24 2.33	24% 10%
	3004	0.85	10.63	2.41	1.61			67%	30	1.95	2.26	2.48	12%
	3005	1.03	8.75	3.12	1.32			42%	33	2.61	3.08	3.39	13%
	3006 3007	0.16 0.99	34.50 3.84	3.94 2.73	6.53 0.71			166% 26%	36 28	1.37 2.51	2.13 2.88	2.69 3.19	33% 12%
	4001	0.30	5.42	2.13	1.26			60%	15	1.11	1.83	2.83	43%
Commodities	4002	1.31	3.13	1.82	0.44			24%	13	1.58	1.67	2.05	13%
	4003 4004	1.70 1.20	3.40 2.68	2.55	0.49			19% 18%	11 12	2.43 2.11	2.56	2.71 2.47	5% 8%
	4004 5001	0.99	5.06	2.20	0.40			41%	22	1.68	1.95	2.47	26%
	5002	1.04	7.79	3.72	1.65			44%	16	2.94	3.35	4.20	18%
	5003	1.02	3.67	2.58	0.69			27%	23	2.19	2.62	3.05	16%
	5004 5005	1.04 1.06	9.65 9.47	4.29 4.32	2.74			64% 52%	19 22	2.36 2.38	3.15 3.73	6.50 6.07	47% 44%
	5006	1.10	13.83	4.13	2.83			69%	23	2.43	2.95	5.24	37%
	5007	0.22	4.62	2.10	1.11			53%	22	1.41	1.98	2.79	33%
	5008 5009	0.29 0.51	3.31 3.14	1.34 1.53	0.59 0.66			44% 43%	24 26	1.03 1.02	1.21 1.45	1.63 1.75	22% 26%
	5010	0.38	3.35	1.53	0.64			42%	23	1.04	1.52	1.87	28%
	5011	0.33	10.21	1.91	1.86			97%	24	1.08	1.54	1.93	28%
	5012 5013	0.54	6.00 4.57	2.96 2.30	1.53 1.01			52% 44%	21 22	1.70 1.69	3.09 1.89	3.28 2.87	32% 26%
Credit Spread	5013	0.59	10.08	3.14	2.24			71%	22	1.57	2.74	3.52	38%
	5015	0.93	1.87	1.31	0.28			21%	22	1.10	1.26	1.43	13%
	5016 5017	1.15 1.13	8.70 3.72	2.34 2.29	1.67 0.86			71% 37%	19 19	1.38 1.65	1.81 2.40	2.57 2.94	30% 28%
	5018	1.12	5.44	2.43	1.25			51%	19	1.47	2.09	2.83	31%
	5019	0.83	9.38	2.36	1.72			73%	22	1.68	1.93	2.27	15%
	5020 5021	0.52	2.64 11.30	1.23 4.30	0.42 2.65			34% 62%	27 21	0.99 2.28	1.11 3.71	1.36 6.17	16% 46%
	5021 5022	0.91	2.57	4.30	2.65			62%	19	2.28	3.71	6.17	46%
	5023	1.09	4.19	2.27	0.81			36%	13	1.67	2.07	2.72	24%
	5024	1.13	6.61	2.19	1.38			63%	19	1.49	1.63	2.08	17%
	5025 5026	1.25	4.99 2.95	2.12 1.63	0.91			43% 36%	23 25	1.42 1.24	1.98 1.55	2.36 2.10	25% 26%
	5027	0.23	2.77	1.47	0.61			42%	25	1.05	1.33	1.82	27%
	6001								4				
	6002								4				
	6003 6004								3				
	6004 6005								3				
ALL-IN no-CTP **	10000	1.77	3.03	2.31	0.37			16%	11	2.05	2.46	2.53	10%
Equity Cumulative **	11000	1.35	7.70	2.79	1.29			46%	22	1.95	2.57	3.08	22%
IR Cumulative ** FX Cumulative **	12000 13000	0.62	1.81 4.40	1.15 2.27	0.26			22% 33%	31 34	0.97	1.19 2.21	1.28 2.61	14% 15%
Commodity Cumulative **									13	1.92	1.71		
control control control control	14000	1.45	4.08	2.01	0.74			37%	15	1.57	1.71	2.06	13%
CS Cumulative **	14000 15000	1.45 0.92	4.08	2.01	0.74			37%	23	1.57	1.71	2.06	23%

The comparison of the banchmarks for that particular aggregate portfolio.



Table 26: P&L VaR/VaR statistics

EU Statistics for P&L VaR/VaR

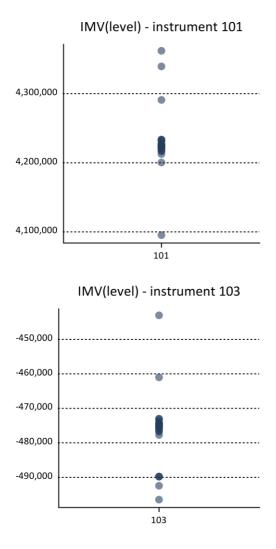
					Main st	atistics					Percentiles	
	Port. ID	Min	Max	Ave.	STDev	STDev_trunc ¹	MAD (median absolute	Coefficient of variation	Num obs. ²	25th	50th	75th
	1001	0.05	1.29	0.96	0.27		deviation)	(STDev/Mean) 28%	21	0.99	1.01	1.07
	1002 1003	0.07	1.31 2.55	0.91	0.30			33% 43%	16 19	0.96	1.01 1.14	1.01 1.30
	1004	0.01	1.41	0.77	0.38			50%	18	0.50	0.90	1.06
	1005 1006	0.32 0.11	179.68 1.87	26.89 1.08	60.02 0.39			223% 36%	20 19	1.01 1.00	1.04 1.14	1.34 1.28
	1007 1008	0.11 0.05	1.89 1.20	1.02 0.89	0.44			44% 32%	14 19	0.79 0.81	1.06 0.97	1.18 1.06
Equity	1009	0.09	1.73	1.19	0.38			32%	20	1.09	1.27	1.33
	1010 1011	0.07	1.47	0.95	0.30			31%	19 19	0.98	1.01	1.06
		0.05	1.29	0.96	0.29			30%	19	0.99	1.01	1.09
	1013 1014	0.09	1.85 1.40	1.16 0.82	0.42			36% 36%	20 19	1.08 0.78	1.15 0.84	1.39 0.90
	1015	0.04 0.33	1.19	0.76 0.94	0.28			37% 33%	17 6	0.61 0.85	0.84	0.88 1.16
	1016 2001	0.33	1.25	0.94	0.31			27%	24	0.85	1.03	1.16
	2002 2003	0.09	1.28	1.01	0.27			26% 25%	25 26	1.00	1.07	1.16 1.04
	2003	0.08	1.22	0.96	0.24			25%	26	0.99	1.01	1.04
	2005	0.32	1.62	0.97	0.35			36%	12	0.86	1.05	1.12
	2006 2007	0.06	1.83 1.87	1.09	0.35			32%	22 22	1.02	1.09 1.07	1.24
	2008	0.09	2.36	1.15	0.42			36%	25	1.02	1.07	1.23
	2009 2010	0.37	1.20 1.34	0.99	0.16			16% 27%	26 24	1.00	1.01 1.03	1.06
Interest Rate	2011 2012	0.32	1.20	1.01 1.08	0.19			18% 41%	24 25	1.01	1.06 1.05	1.12 1.20
merest note		0.05	1.14	0.93	0.24			26%	23	0.92	1.00	1.03
	2014 2015	0.05	1.65 1.40	0.95	0.36			38% 34%	17 22	0.85	1.01	1.17
	2015	0.11	1.36	1.00	0.27			27%	23	0.99	1.03	1.05
	2017	0.06	1.74	1.04	0.36			35%	23	0.98	1.04	1.22
	2018 2019	0.11 0.01	2.00	1.02	0.34			33%	25 25	1.00	1.03 1.05	1.07
	2020	0.06	1.38	1.01	0.28			28%	26	0.99	1.07	1.17
	2021 2022	0.10	1.97 3.16	1.07	0.38			35%	23 20	1.00	1.04	1.13 1.12
	2023	0.10	3.19	1.29	0.53			41%	27	1.05	1.23	1.40
	3001 3002	0.08 0.06	1.58 1.62	0.96 1.01	0.29			30% 26%	25 24	0.99 0.96	1.01 1.03	1.04 1.11
FX	3003 3004	0.10	1.61 1.30	1.01 0.98	0.29			29% 18%	26 25	0.99	1.03	1.12 1.06
10	3005	0.06	1.20	0.96	0.24			26%	24	1.00	1.02	1.07
	3006 3007	0.07	1.32 1.30	0.92	0.27			30%	25 18	0.84	1.03 1.02	1.07 1.03
	4001	0.34	2.00	0.98	0.48			49%	11	0.62	1.03	1.13
Commodities	4002 4003	0.30	1.07 1.34	0.90 1.05	0.22 0.29			25% 28%	9 8	0.89	0.98 1.12	1.02 1.22
	4004 5001	0.33	1.31	0.93	0.29			32%	8	0.79	1.02	1.12
	5002	0.08	1.30	0.97	0.33			32%	16	1.00	1.09	1.20
	5003 5004	0.37	1.35	1.00	0.23			23%	19 16	1.02	1.05 1.11	1.09 1.19
	5005	0.33	2.83	1.23	0.51			41%	18	1.04	1.14	1.20
	5006 5007	0.48	2.17 1.50	1.23 0.95	0.33			27% 34%	18 15	1.09 0.98	1.15 1.04	1.34 1.07
	5008 5009	0.08	1.52 1.42	0.99 1.01	0.26			27% 26%	20 18	1.01 0.97	1.05 1.05	1.08 1.12
		0.32	1.62	1.05	0.26			25%	20	1.01	1.02	1.20
	5011 5012	0.33	1.20	0.98	0.18			19% 35%	20 17	0.98	1.01	1.05
Credit Spread		0.37	1.78	1.15	0.30			26%	20	1.01	1.12	1.27
	5014 5015	0.07 0.10	1.46 1.28	1.02 0.93	0.29			28% 30%	17 19	1.01 0.92	1.05 1.01	1.14 1.03
	5016 5017	0.08	1.35 1.45	0.94 0.88	0.34			36% 40%	14 13	0.89 0.79	1.07 0.98	1.12 1.08
	5018 5019	0.08	1.49 1.74	0.93	0.36			39% 35%	14 20	0.81	1.02	1.07 1.04
	5020 5021	0.07	1.13	0.93	0.26			28%	21 16	1.00	1.02	1.06
		0.07	1.13	0.91	0.28			31%	18	0.89	1.03	1.05
	5023 5024	0.33	1.22	0.95 1.16	0.25			26% 25%	11 14	0.88	1.05	1.12 1.16
	5025 5026	0.07 0.07	1.25 1.49	0.94 1.01	0.32			34% 27%	14 17	0.98 1.01	1.02 1.04	1.11 1.12
	5027 6001	0.08	1.27	1.01	0.27			27%	15 3	1.01	1.04	1.12
СТР	6002 6003 6004 6005								3 3 3 2			
ALL-IN no-CTP ** Equity Cumulative **	10000 11000	0.33 0.08	1.25 1.39	0.94 0.96	0.24 0.29			25% 30%	9 14	0.95	0.96 0.99	1.03 1.05
IR Cumulative **	12000	0.33	2.68	1.07	0.42			39%	19	1.00	1.03	1.11
FX Cumulative ** Commodity Cumulative **	13000 14000	0.33 0.30	1.20 1.36	0.96 0.95	0.18 0.28			19% 29%	23 9	0.90 0.84	1.01 1.00	1.05 1.07
CS Cumulative ** CTP Cumulative **	15000 16000	0.39	1.18	0.95	0.19			20%	16 1	0.96	1.01	1.03
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CP Canadiante ** 1000
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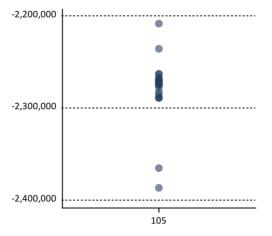


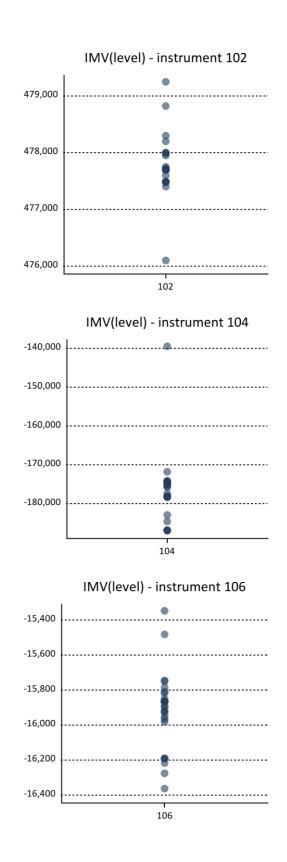


Figure 18: IMV scatter plots (all)

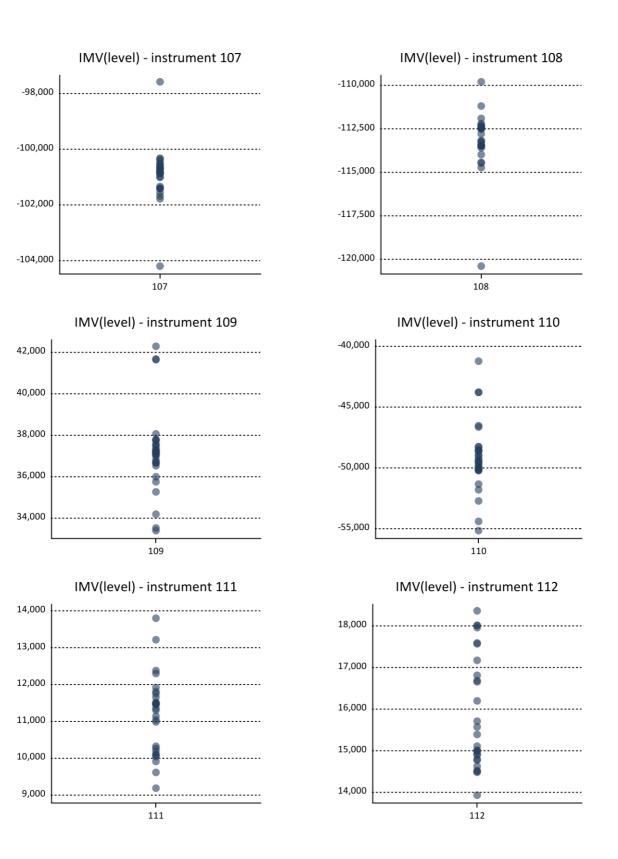




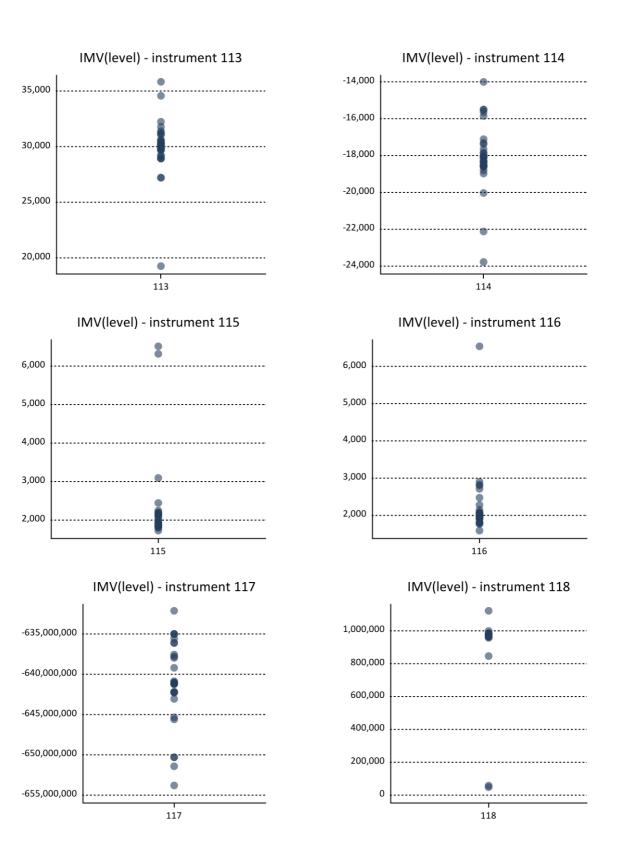




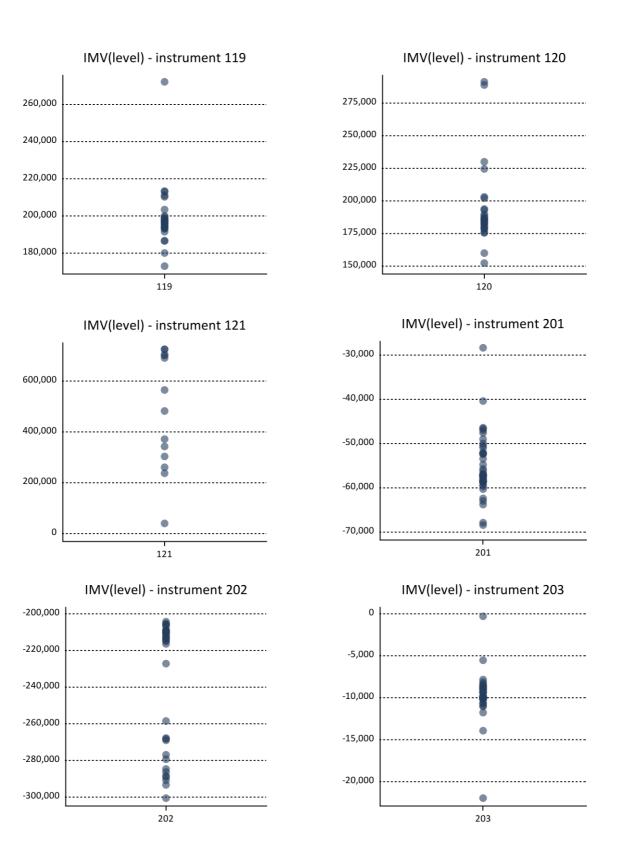




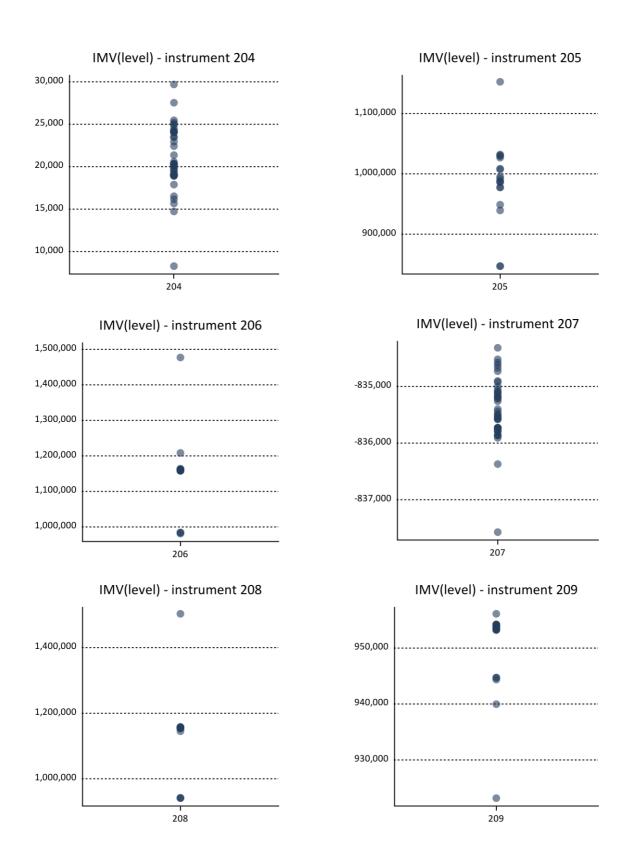




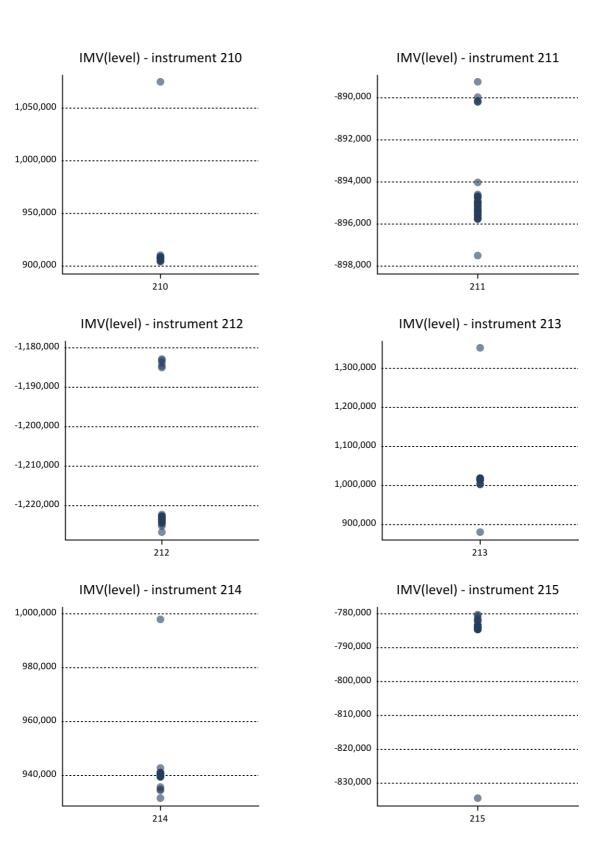




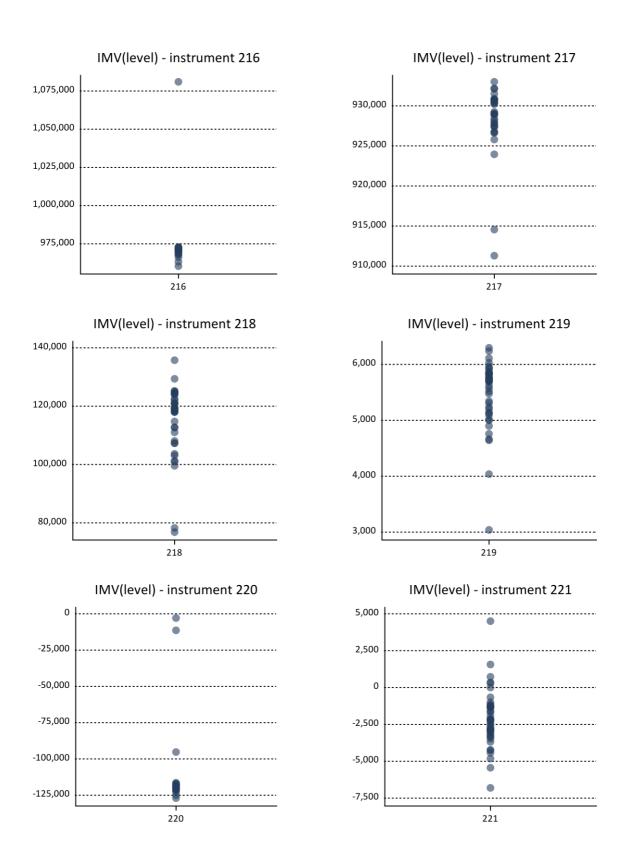




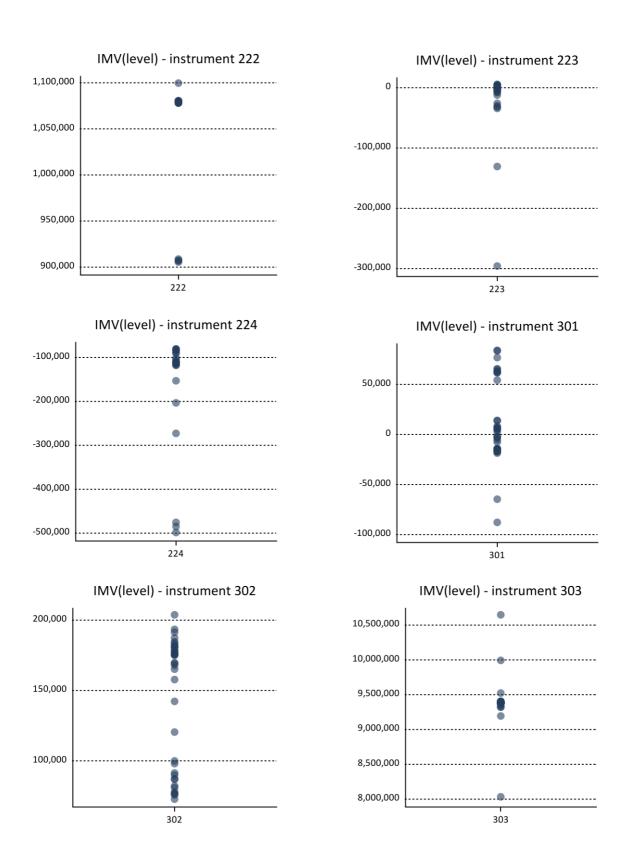




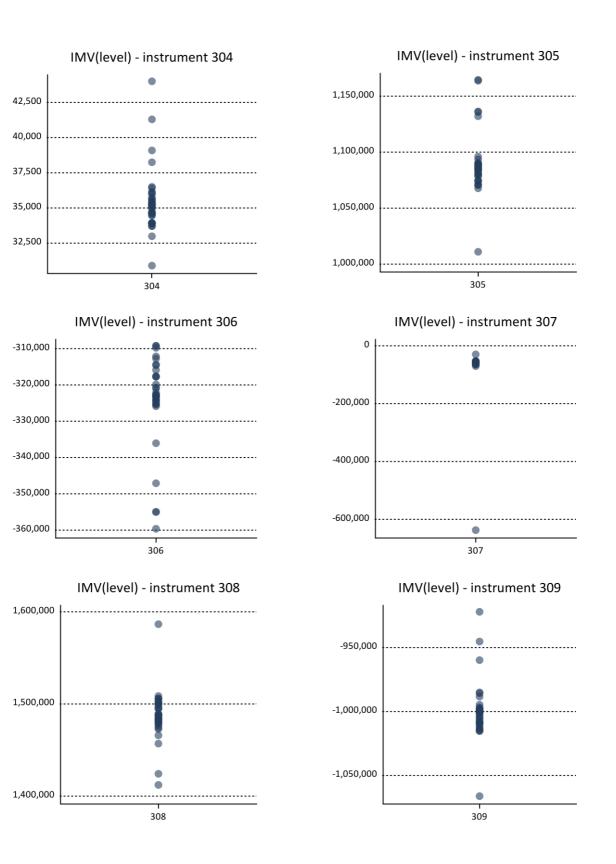




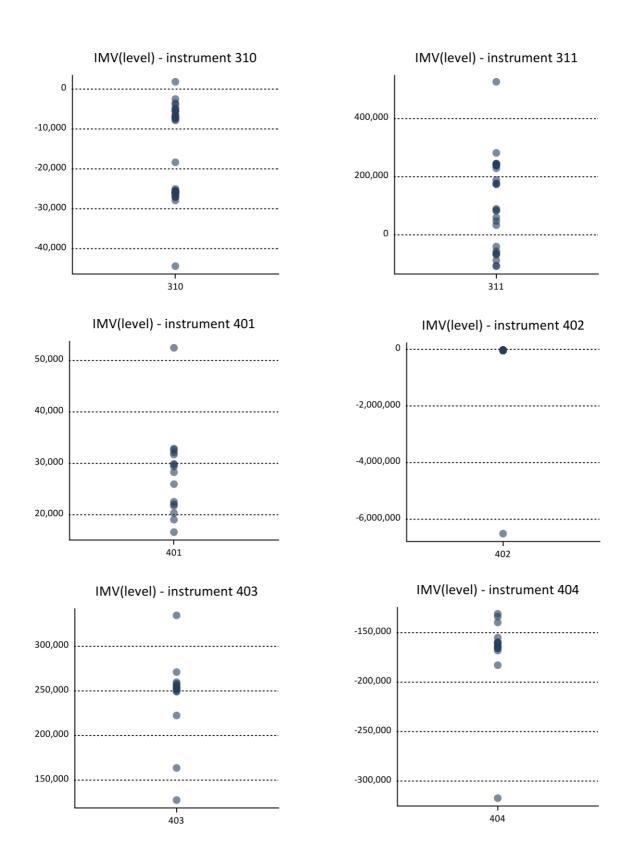




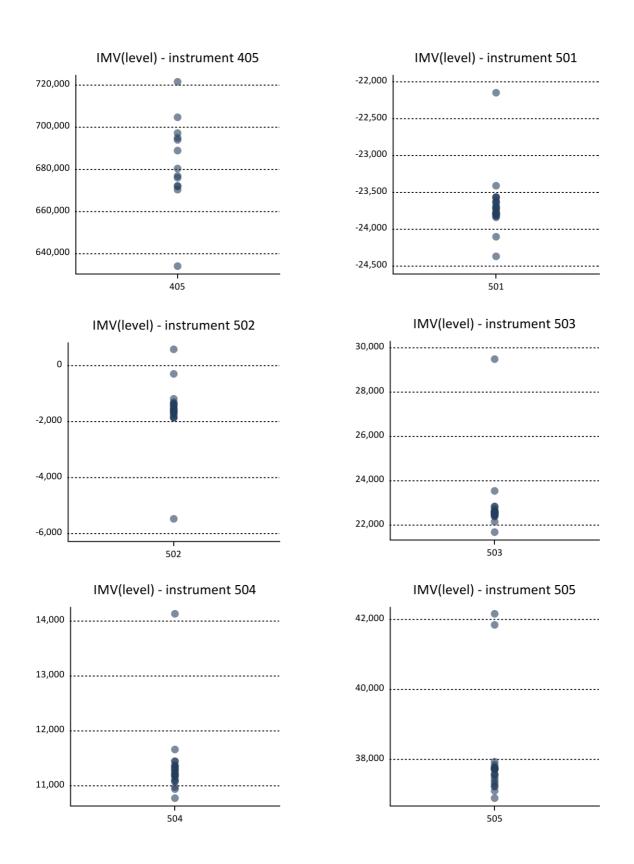




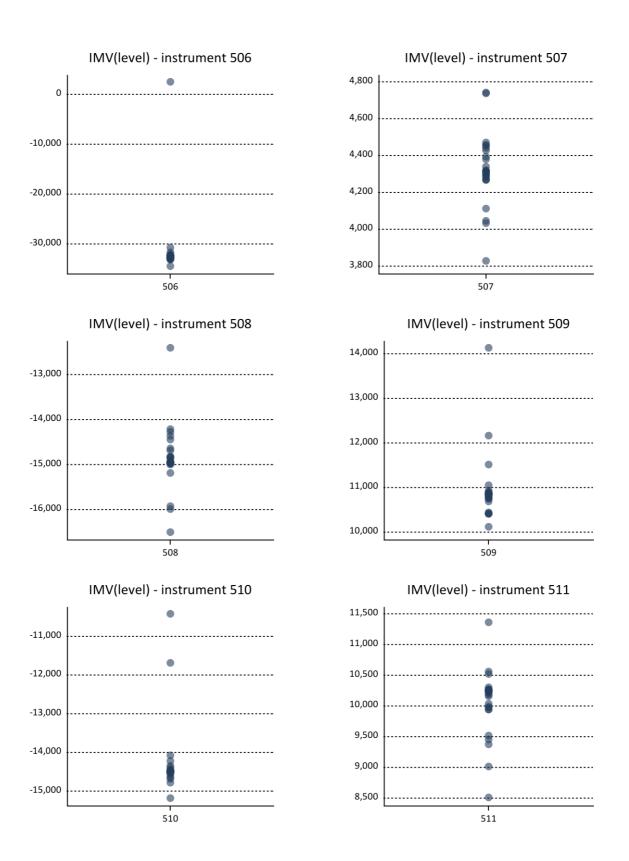




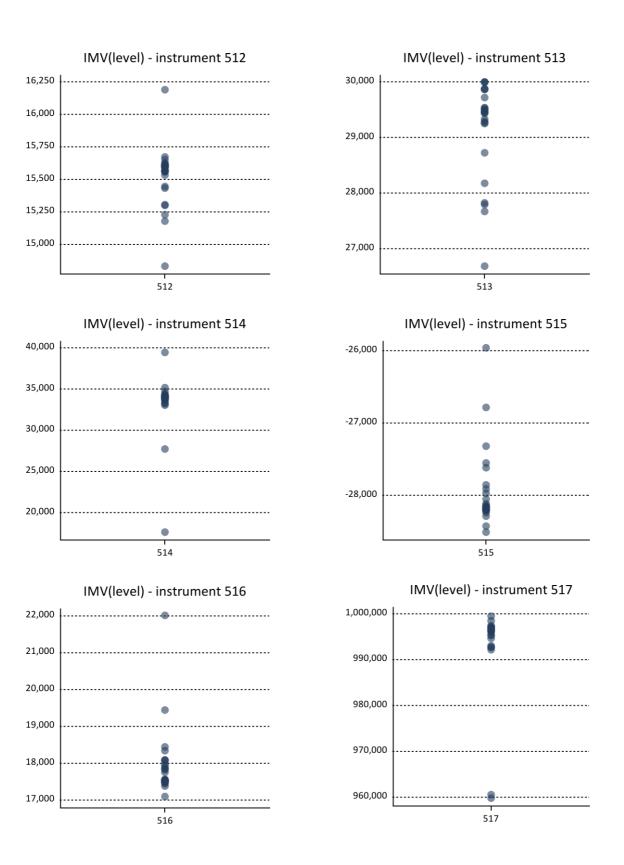




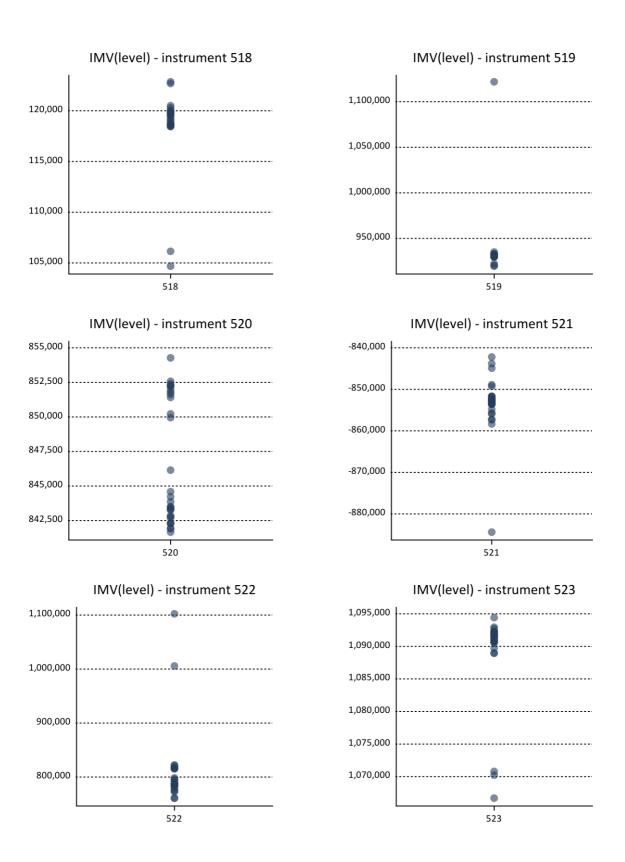




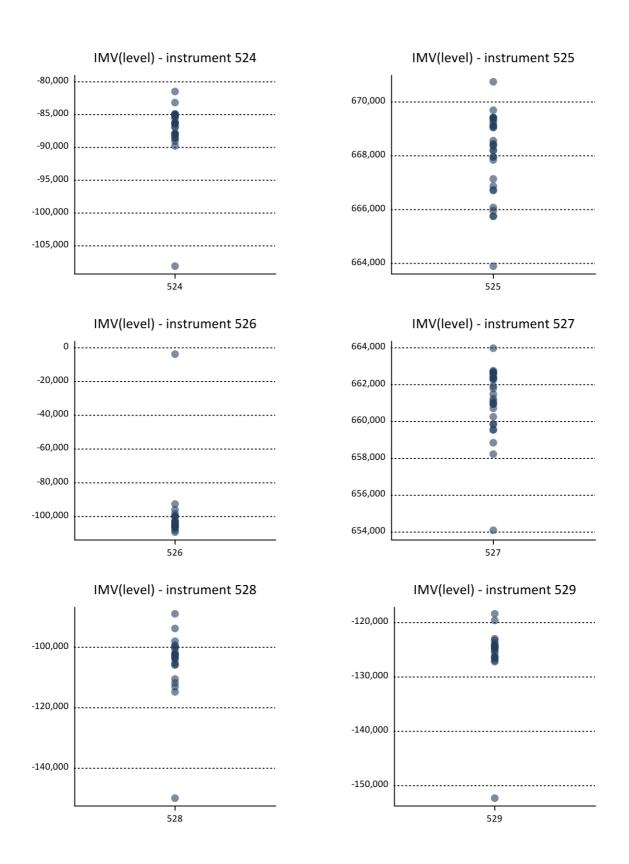




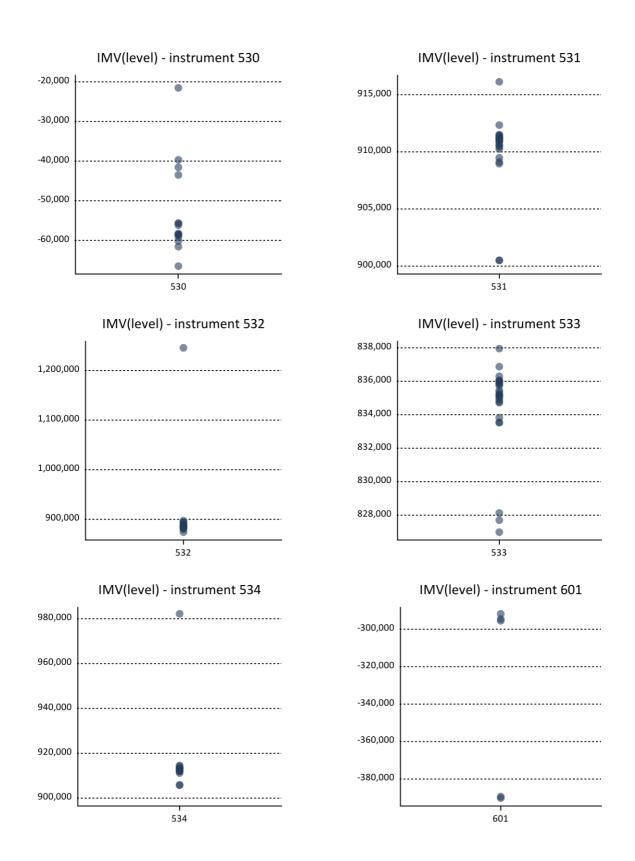




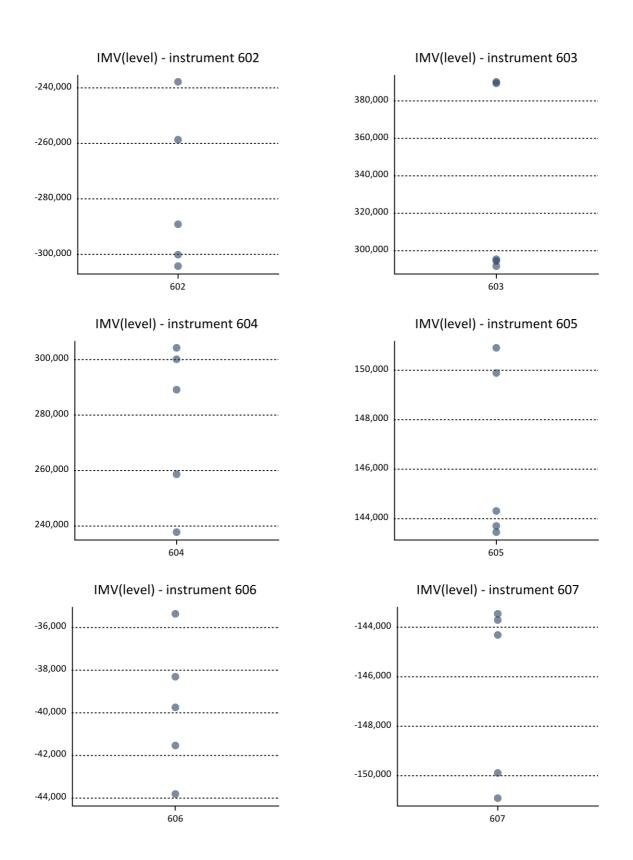




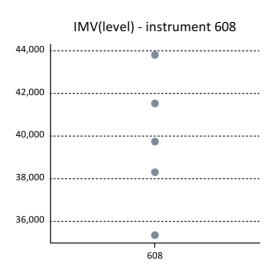












IMV(level) - instrument 610

-240,000	•
-260,000	•••••
-280,000	
-300,000	•
220.000	•
-320,000	
-340,000	•
	610

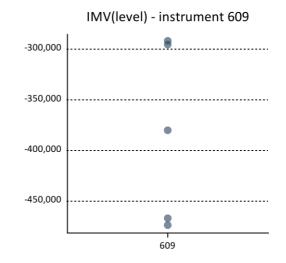
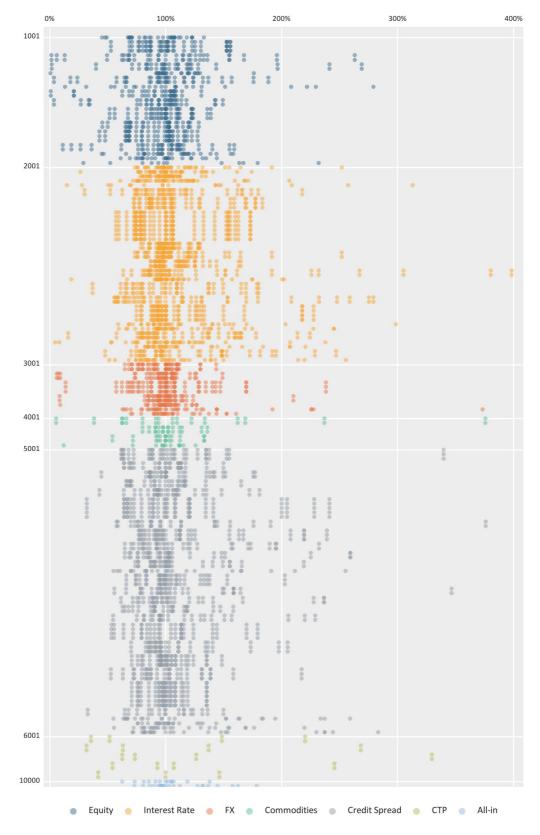


Figure 19: VaR submissions normalised by the median of each portfolio (by asset class)

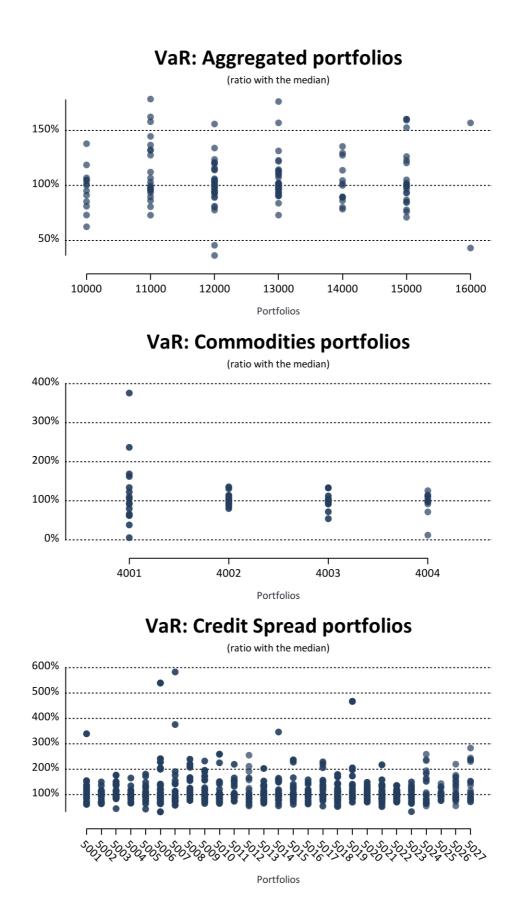


VaR: All portfolios

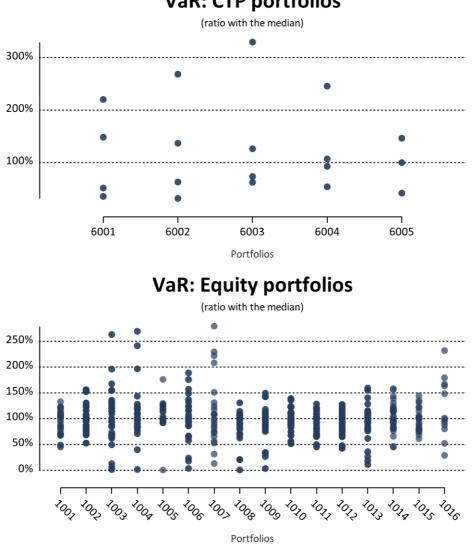
(ratio with the median)





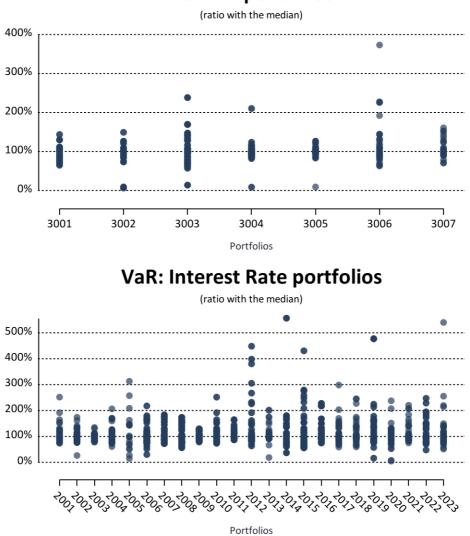






VaR: CTP portfolios





VaR: FX portfolios

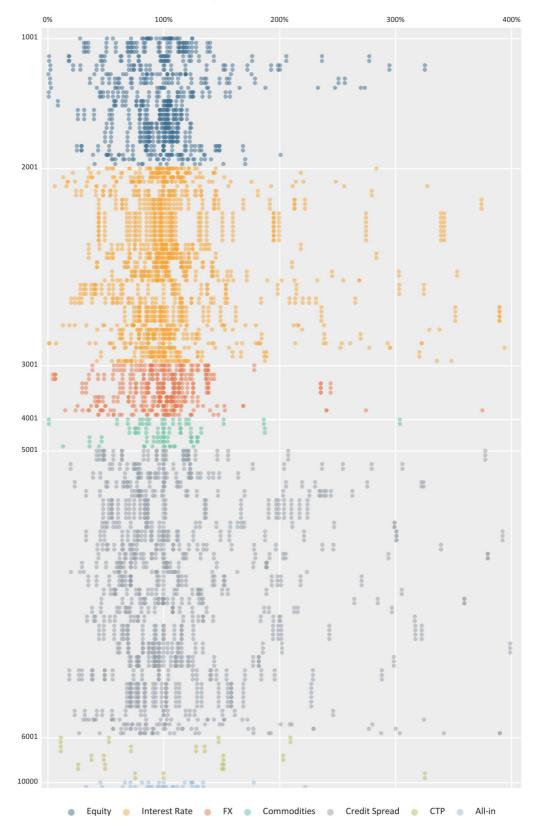


Figure 20: sVaR submissions normalised by the median of each portfolio (by asset class)

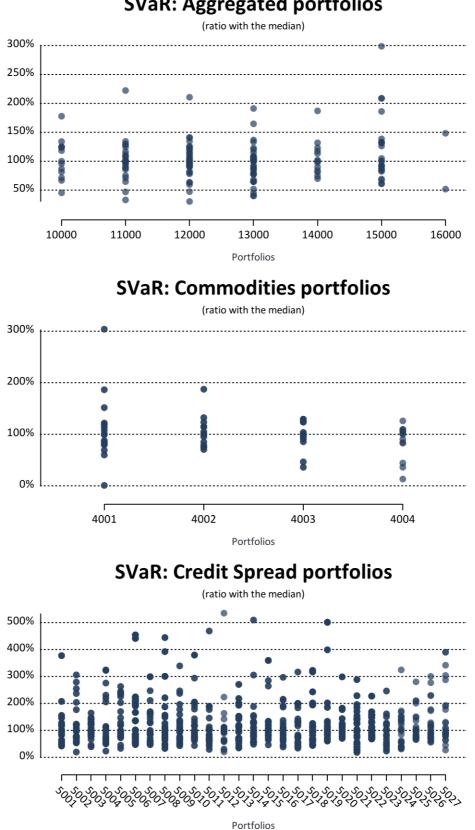


SVaR: All portfolios

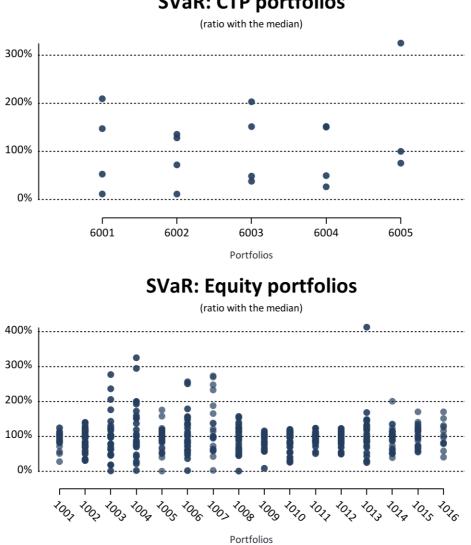
(ratio with the median)





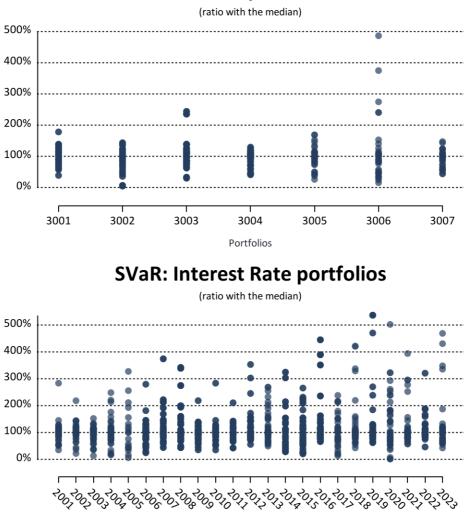






SVaR: CTP portfolios

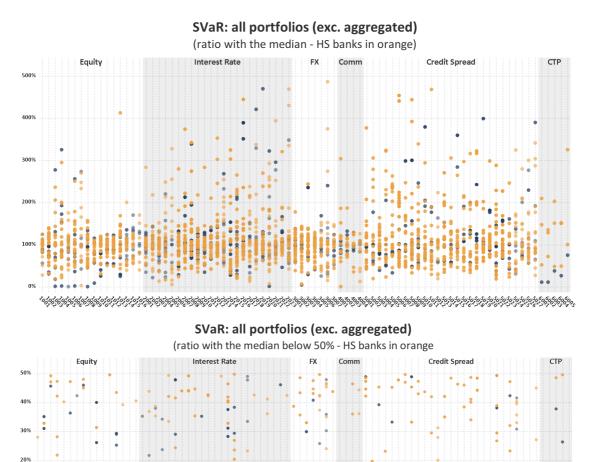




SVaR: FX portfolios

Portfolios





1

10%

0%

Figure 21: sVaR submissions normalised by the median of each portfolio (by methodological approach)



Table 27: VaR statistics (small banks only)

				Ot	her stats						Percentiles				
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	Sth	10th	25th	50th (Median)	75th	90th	95th	Interquantile range
	1001 1002	281,100 138,749	430,914 279,429	347,378 215.064	70,565 54,060	20%	7	281,880 151,214	282,660 163,679	285,357 201,075	316,826 203,630	416,048 252.438	430,911 268,633	430,913 274,031	19% 11%
	1003	204	1,331	838	577	69%	3	282	359	592	980	1,156	1,261	1,296	32%
	1004 1005	1,180 51,771,147	1,531 70,540,542	1,378 56,275,642	180 7.113.769	13% 13%	3	1,204 51,965,728	1,229 52,160,308	1,302 52,611,387	1,423 53,889,836	1,477 55,005,399	1,509 62,776,782	1,520 66,658,662	6% 2%
	1006	1,863	3,278	2,571	1,001	39%	2	1,934	2,005	2,217	2,571	2,924	3,137	3,207	14%
	1007 1008	20.875	21,737	21,306	610	3%	1	20.918	20,961	21.091	21,306	21.522	21.651	21,694	1%
Equity	1009	44,640	59,851	54,064	8,232	15%	3	45,946	47,252	51,171	57,701	58,776	59,421	59,636	7%
	1010 1011	28,054 267,886	32,282 397,995	30,473 320,975	2,179 60.004	7% 19%	3	28,357 268,658	28,660 269,429	29,569 271,744	31,083 295,495	31,683 371,753	32,042 387,498	32,162 392,747	3% 16%
	1012	253,093	382,089	305,518	58,502	19%	5	254,009	254,925	257,674	281,951	352,783	370,367	376,228	16%
	1013 1014	47,145 176,623	63,960 254,343	56,024 221,994	8,447 29,567	15% 13%	3	48,127 182,678	49,109 188,732	52,056 206,256	56,967 225,058	60,464 244,435	62,561 252,192	63,261 253,268	7% 8%
	1015 1016	135,207 261,908	222,500 316,474	174,168 289,191	36,892 38,584	21% 13%	4	138,905 264,636	142,603 267,365	153,697 275,550	169,483 289,191	189,955 302,833	209,482 311.017	215,991 313,746	11% 5%
	2001	161,343	204,535	185,889	15,859	9%	8	162,619	163,896	178,228	188,419	197,140	201,970	203,252	5%
	2002 2003	138,700 23,600	202,703 31,021	173,186 27,475	18,584 2,333	11% 8%	9 10	145,712 24,428	152,725 25,256	163,090 25,907	176,580 27,476	180,813 29,291	190,770 29,566	196,737 30,293	5% 6%
	2004	67,975	138,801	98,969	24,311	25%	8	72,231	76,488	82,959	93,949	111,506	130,227	134,514	15%
	2005 2006	22,323	48,230	29,744	12,419	42%	1	22,377	22,432	22,595	24,211	31,360	41,482	44,856	16%
	2007	57,406	123,613	86,128	31,023	36%	5	58,145	58,883	61,099	73,514	115,009	120,171	121,892	31%
	2008 2009	46,268 186,798	126,175 221,026	89,200 197,398	36,691 10,656	41% 5%	6 11	49,438	52,608 187,348	60,122 191,076	89,483 195,784	122,461 197,629	125,508 213,528	125,842 217,277	34% 2%
	2010 2011	145,208 352,795	184,088 463,312	167,289 396,539	14,269 33.885	9% 9%	8 11	146,356	147,504 371.620	160,410 377,445	169,528 388,204	177,426	181,775 455.622	182,931 459,467	5% 3%
Interest Rate		49,735	181,999	96,705	51,869	54%	8	56,029	62,322	71,341	74,155	101,383	178,663	180,331	17%
	2013 2014	28,039 27,961	42,762 69,278	37,806 46,283	5,064 17,164	13% 37%	6	30,547 30,051	33,054 32,142	38,252 38,413	38,859 43,947	39,917 51,817	41,506 62,294	42,134 65,786	2% 15%
		6,458	18,818	11,824	3,859	33%	8	7,088	7,719	9,312	11,919	13,658	15,463	17,140	19%
	2016 2017	111,489 27.046	150,917 45.864	119,879 36,133	17,358	14% 21%	5	111,558 27,538	111,626 28.031	111,832 29,797	112,266 36,387	112,893 41.733	135,707 43.982	143,312 44,923	0% 17%
	2018	21,647	37,897	26,705	5,375	20%		22,179	22,710	24,116	24,800	25,662	34,438	36,167	3%
	2019 2020	8,000 28,149	17,448 56,843	12,270 44,765	3,601 9,549	29% 21%	10 8	8,133 31,877	8,266 35,605	8,691 39,453	12,546 44,601	14,487 51,055	17,077 56,301	17,263 56,572	25% 13%
		28,455	53,338	37,954	9,349	25%	5	29,419	30,383	33,274	37,156	37,548	47,022	50,180	6%
	2022 2023	157,060 19,646	262,420 97,586	186,822 50,148	50,599 32,016	27% 64%	4	157,510 20,309	157,961 20,973	159,312 26,646	163,904 34,116	191,414 82,418	234,018 88,016	248,219 92,801	9% 51%
	3001 3002	366,905 281,869	510,435 357,896	420,500 321,073	48,899 28,238	12%	10	369,806 283,921	372,706 285,974	378,385 294,477	413,411 328,261	438,369 343,771	489,840 353,329	500,138 355,612	7% 8%
	3003	281,869 91,527	357,890	138,352	28,238 34,452	25%	9	94,971	285,974 98,415	124,674	328,261 129,600	166,823	353,329 183,623	355,612 187,124	8% 14%
FX	3004 3005	406,964 353,786	479,814 439,428	443,335 391,866	26,188 27,886	6% 7%	9	411,566 357,244	416,168 360,702	424,339	434,100 393,262	466,574 407,197	470,461 421,762	475,138 430,595	5% 4%
	3006	10,359	21,852	15,207	3,297	22%	9	11,427	12,495	13,162	14,720	16,420	18,721	20,286	11%
	3007 4001	474,144 1,319	686,574 14,774	528,917 8,047	83,494 9,514	16% 118%	2	474,913	475,682 2,665	478,223 4,683	488,201 8,047	543,165 11,410	622,869 13,429	654,721 14,101	6% 42%
Commodities	4002 4003						1								
	4004	317,572	323,049	320,311	3,873	1%	2	317,846	318,120	318,941	320,311	321,680	322,501	322,775	0%
	5001 5002	4,259 14,807	6,582 27,093	5,409 19,224	1,106 6,832	20% 36%	4	4,325	4,391 15,000	4,589 15,289	5,397 15,771	6,216 21,432	6,436 24,829	6,509 25,961	15% 17%
	5003	3,664	5,328	4,537	835	18%	3	3,760	3,855	4,142	4,619	4,974	5,186	5,257	9%
	5004 5005	7,261 3,552	12,134 5,996	8,933 5,066	2,773 1,085	31%	3	7,275	7,289 3,999	7,332 4,670	7,403 5,359	9,769 5,755	11,188 5,900	11,661 5,948	14% 10%
	5006	5,074	10,222	7,349	2,230	30%	4	5,249	5,424	5,950	7,051	8,450	9,513	9,868	17%
	5007 5008	32,655 67,237	42,545 117,512	36,094 82,185	5,591 20,522	15% 25%	3	32,698 67,456	32,740 67,675	32,869 68,333	33,082 78,876	37,814 78,969	40,652 102,095	41,599 109,803	7% 7%
	5009 5010	4,987 15,277	13,360 29,715	7,947 21,658	3,204	40%	5	5,280 15,598	5,573 15,919	6,453 16.882	7,075 20.820	7,862 25,595	11,161 28.067	12,260 28,891	10% 21%
	5010	32,075	52,921	21,658 38,785	9,564	25%	4	32,375	32,676	33,577	20,820 35,072	25,595 40,281	47,865	28,891 50,393	9%
	5012 5013	1,654 11,359	5,763 19,802	3,854 15,510	1,868 3,074	48% 20%	4	1,858 12,007	2,062 12,655	2,674 14,598	4,000 15,185	5,180 16,608	5,530 18,524	5,646 19,163	32% 6%
Credit Spread		2,639	4,775	3,973	969	24%	4	2,825	3,012	3,571	4,239	4,640	4,721	4,748	13%
	5015 5016	21,050 30,289	30,341 49,930	25,206 41,543	3,881 10,129	15% 24%	4	21,491 31,701	21,931 33,113	23,254 37,349	24,716 44,409	26,668 47,170	28,872 48,826	29,606 49,378	7% 12%
		22,309	32,626	27,355	5,162	19%	3	22,791	23,273	24,720	27,130	29,878	31,527	32,076	9%
	5018 5019	44,512 9,187	70,145 13,859	61,584 11,188	14,785 1,997	24% 18%	3	47,070 9,210	49,629 9,234	57,304 9,304	70,096 11,284	70,121 12,305	70,135 13,237	70,140 13,548	10% 14%
	5020 5021	135,022 17.066	207,875	170,976 21,572	23,934 4,308	14%	6	141,756 17,502	148,490 17.938	163,493 19,247	169,525 19.608	179,201 24,242	194,913 26,316	201,394 27.007	5% 11%
	5021	17,000	186,894	164,415	4,308 23,367	20%	5	17,502	17,938	19,247	19,608	24,242	182,371	184,633	6%
	5023 5024	42,894 23,602	47,502 66,064	45,198 44,833	3,258 30,025	7% 67%	2	43,124 25,725	43,355 27,848	44,046 34,218	45,198 44,833	46,350 55,449	47,041 61,818	47,272 63,941	3% 24%
		41,811	53,985	47,898	8,608	18%	2	42,420	43,028	44,855	47,898	50,942	52,768	53,376	6%
	5026 5027	24,786 18,143	33,787 20,098	29,287 19,121	6,365 1,382	22% 7%	2	25,236 18,241	25,686 18,339	27,036 18,632	29,287 19,121	31,537 19,609	32,887 19,903	33,337 20,000	8% 3%
	6001														
СТР	6002 6003														
	6004 6005														
ALL-IN no-CTP	10000	185.924	201.214	193,569	10.812			100.000	187,453	189,747	193,569	407.05	199,685	200.477	24
Equity Cumulative IR Cumulative	11000 12000	185,924 338,774	201,214 381,107	193,569 353,887	10,812 15,994	6% 5%	6	186,689 339,653	187,453 340,532	189,747 342,993	193,569 348,740	197,392 360,847	199,685 372,389	200,450 376,748	2% 3%
FX Cumulative Commodity Cumulative	13000 14000	699,245	835,799	754,483	39,876	5%	8	710,661	722,078	736,051	745,855	769,027	790,890	813,344	2%
CS Cumulative	15000	188,625	271,967	233,619	42,043	18%	4	191,391	194,156	202,453	236,942	268,108	270,424	271,195	14%
CTP Cumulative	16000														



Figure 22: VaR ratio with median (focus on small banks)

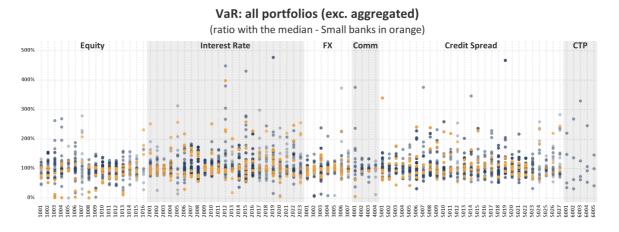




Table 28: VaR statistics (medium-sized banks only)

				Other sta	ts						Percentiles				
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range
	1001 1002	281,050 180,915	545,084 343,002	398,262 256,390	78,097 54,120	20% 21%	15 12	287,813 184,337	291,049 190,163	346,284 219,772	418,995 251,387	448,174 292,571	476,229 329,042	502,679 335,660	139 149
	1003	779	2,636	1,612	494	31%	12	944	1,086	1,311	1,647	1,837	2,027	2,308	179
	1004 1005	512 51,728,788	1,840 70,284,083	1,281 59,672,891	321 6,656,048	25% 11%	12	818 52,495,056	1,074 53,261,323	1,210 54,550,506	1,274 56,747,584	1,423 63,946,467	1,564 67,617,710	1,691 68,950,897	89 89
	1006	1,633	4,213	2,898	718	25%	13	1,782	2,000	2,647	2,808	3,288	3,798	4,008	119
	1007 1008	2,132 13,709	21,160	12,465 19,033	5,601 3.116	45% 16%	10 11	4,999 14.018	7,867 14.326	9,417 16,773	11,866 20,166	16,349 21.192	19,235 21,744	20,197 22,291	279
Equity	1009	42,816	84,955	59,995	12,546	21%	12	45,279	47,550	52,556	58,243	63,119	79,647	82,956	99
	1010 1011	24,254 257,866	43,968 506,663	33,109 375,588	5,354 74,616	16% 20%	13 14	25,849 268,757	27,331 274,939	29,838 322,707	32,187 402,042	35,781 424,122	38,903 447,883	41,320 472,034	99 149
		246,258	481,566	358,332	72,109	20%	14	254,643	259,270	305,310	384,827	399,211	431,322	452,794	139
	1013 1014	36,106 165,926	93,216 300.638	62,039 218,713	16,301 42,507	26% 19%	13 14	42,342 171.363	47,084 175.000	54,713 181.486	60,088 207,268	65,275 259.047	87,663 266.049	91,747 279.716	99 189
	1014	142,315	239,711	174,683	33,234	19%	14	143,609	175,000	146,143	165,606	189,362	200,049	279,718 230,643	187
	1016 2001	155,110 144,168	288,828 246,875	195,831 201,815	62,486 27,715	32% 14%	4	156,621 147,783	158,132 176,560	162,664 191,744	169,694 197,412	202,861 220,277	254,441 237,732	271,635 246,875	119
	2001	136,316	234,325	177,789	27,963	16%	18	137,142	139,708	156,200	179,309	201,114	204,192	209,791	139
	2003 2004	23,181 83,694	30,910 142,257	27,517 112,780	2,299 17,504	8% 16%	17 20	23,827 85,296	24,086 92,023	25,981 101.605	27,790 110,204	29,039 127,920	30,354 137,243	30,529 138,400	69 119
	2004	8,632	64,885	39,011	17,504	41%	20	17,274	25,915	30,376	44,412	45,895	53,385	59,135	209
	2006	15,587 58,076	36,440 102,764	28,635 76,858	5,751 12,151	20% 16%	17	18,054 60,873	20,576 63,887	26,530 68,445	29,420 76,313	32,049 83,284	34,781	35,386 98,508	99 109
	2007 2008	48,382	102,764	76,636	21,353	28%	16 17	52,820	57,292	63,512	76,866	86,115	91,257 103,754	112,531	109
	2009 2010	160,752 129,752	223,656 222,188	195,300 181,647	16,690 24,939	9% 14%	17 20	169,326 133,005	172,326 158,903	188,130 172,631	197,825 177,673	207,446 198,250	211,649 213,958	215,147 222,188	59 79
	2010 2011	129,752 352,525	222,188 506,035	181,647 425,009	24,939 51,442	12%	19	133,005 363,386	158,903 367,082	172,631 382,230	439,217	198,250 464,823	213,958 488,573	222,188 506,035	109
Interest Rate	2012 2013	64,158 38,728	150,338	85,380 43,135	24,706	29% 9%	19 18	65,071 39.394	66,541 39,559	67,576 40,154	77,624	85,731 44.967	120,469 48,560	129,075	129
	2013	15,534	71,063	40,493	15,354	38%	10	22,159	26,236	30,371	39,023	44,987	48,500	49,410	219
	2015	6,260 94,258	23,132 179,909	11,931 122,767	5,139 22,126	43% 18%	17 16	6,442 95,062	6,540 100,131	7,226 110,991	10,385 118,426	14,573 130,222	18,203 149,776	20,579 160,891	349 89
	2016 2017	94,258	44,847	28,711	8,263	29%	17	95,062	20,318	22,789	25,961	32,799	40,706	43,937	189
	2018 2019	14,378 6.079	33,415 18,782	24,335 11.895	5,122 3.910	21% 33%	17 17	17,129 7.919	18,692 8,431	22,325 9.056	22,962 9,849	26,517 15,399	31,667 17.069	33,012 17.659	99 269
	2019	31,857	51,795	42,193	5,910	14%	19	32,617	35,635	38,608	9,849 41,459	47,424	48,995	51,666	109
	2021	31,103	54,940	38,289	6,143	16% 31%	16	31,316	31,793	34,070 192,520	37,244	40,791 294,361	44,341	48,826	99 219
	2022 2023	98,104 26,065	372,082 54,535	232,698 38,806	72,351 8,862	31%	15 20	135,910 28,393	166,191 29,755	192,520 32,010	200,525 37,537	294,361 44,154	309,107 53,080	330,406 53,153	169
	3001 3002	389,937 241,935	630,918 413,924	495,179	57,431 44,507	12%	16	419,348 264,045	434,974 286,030	450,934	488,936 343,459	533,113	539,472	564,059 410,973	89 69
	3002 3003	241,935 74,228	413,924 185,141	333,300 121,100	44,507 32,254	13% 27%	15 14	264,045 82,338	286,030 87,448	306,991 94,886	343,459 118,577	347,694 138,847	387,333 161,681	410,973 172,894	199
	3004 3005	374,887 315,860	525,578	458,322 363.121	50,311 32,123	11% 9%	15	383,010 316,559	389,608 318,984	422,486 339.880	460,071 364,699	497,417	522,104 404.047	525,578	89 69
	3005 3006	315,860 10,571	411,007 23,789	363,121 17,358	32,123 4,101	9% 24%	12 15	316,559 10,841	318,984 12,138	339,880 14,708	364,699 17,350	385,333 20,205	404,047 22,888	407,731 23,783	69 169
	3007 4001	371,186	660,805 39,720	523,437 24,640	78,038 10,661	15%	11	394,648 11,295	418,109 13,597	507,405 17,994	521,865 23,530	562,372 31,140	584,002 38,641	622,404 39,181	59
Commodities	4001 4002	293,232	39,720 418,042	358,678	44,279	43%	8	303,357	313,482	336,271	23,530 359,112	31,140 385,211	403,440	39,181 410,741	79
commoarties	4003 4004	382,949 233,817	708,495 412,229	536,514 343,605	95,374 66 543	18% 19%	7	420,450 255,317	457,951 276 817	519,688 341,318	532,285 365,300	546,247 365,359	619,291 393,481	663,893 402,855	29 39
	5001	4,371	10,534	7,215	2,128	29%	11	4,396	4,420	5,571	6,815	9,053	9,303	9,919	249
	5002 5003	14,822 3,278	31,316 5,908	23,653 4,068	4,908 717	21% 18%	10 11	15,506 3,347	16,191 3,416	22,394 3,690	24,867 3,943	26,178 4,193	26,724 4,537	29,020 5,223	89 69
	5003	5,278	14,052	4,068	2,368	22%	10	5,547 6,924	6,931	3,690 9,459	5,943 11,463	4,193	4,537	5,225	129
	5005 5006	2,902	4,946 8,741	4,362	599 1.573	14% 23%	10 10	3,436 4,742	3,969 4.825	4,240	4,407 6.968	4,766 8,337	4,946 8,741	4,946 8.741	69 209
	5005	21,691	71,614	43,249	1,373	40%	9	21,837	4,823	29,969	42,546	53,435	61,133	66,374	207
	5008 5009	55,529 5,573	114,856 12,075	74,752 8,069	21,090 1,879	28% 23%	11	56,066 5,748	56,602 5,923	59,239 7,142	64,108 7,577	85,033 9,249	109,069 9,796	111,963 10,936	189 139
	5010	5,573	30,295	19,511	5,626	23%	11 10	13,863	13,988	16,335	18,043	20,210	28,573	29,434	137
	5011 5012	27,058 2.110	49,744 4,745	35,685 2,731	7,248 873	20% 32%	10 8	28,702 2.110	30,347 2.110	31,037 2,156	33,966 2,511	36,337 2,750	47,076 3,547	48,410 4,146	89 129
	5012 5013	2,110 10,066	4,745 20,246	2,731 14,602	8/3 2,954	32%	11	2,110 10,677	2,110 11,288	2,156 12,679	2,511 14,552	2,750 16,054	3,547 17,714	4,146 18,980	129
Credit Spread	5014 5015	3,137 16,919	6,356 39,379	4,499 24,109	1,256 7,028	28% 29%	10	3,169 17,457	3,200 17,996	3,827 20,439	4,039 21,984	5,562 24,128	6,356 32,879	6,356 36,129	189 89
	5016	28,816	59,819	41,308	9,846	24%	9 8	30,076	31,337	36,853	38,425	46,126	52,312	56,065	119
	5017 5018	12,754 34,311	36,677 87,007	26,342 61,453	7,943 17,114	30% 28%	8	16,009 39,477	19,265 44,643	22,055 49,071	25,758 61,911	31,646 72,873	35,658 79,843	36,167 83,425	189 209
	5018 5019	34,311 7,123	87,007 20,848	61,453 10,881	17,114 4,216	28% 39%	8 9	39,477 7,725	44,643 8,326	49,071 8,714	61,911 9,554	72,873 10,154	79,843 15,590	83,425 18,219	89
	5020 5021	118,540 12,325	200,472 32.470	162,817 23,432	26,652 7.351	16% 31%	10	122,536 13.291	126,532 14,257	147,420	165,783 23.106	180,964 30,715	191,773 32,470	196,122 32,470	109
	5022	114,514	183,792	150,382	23,230	31% 15%	9 8	117,829	121,143	134,849	155,962	163,584	32,470 173,010	178,401	109
	5023	59,536	94,343	74,644	11,751	16%	9	60,736	61,935	62,965	72,975	82,819	87,424	90,883	149
	5024 5025	19,679 39,882	58,757 55,844	37,682 50,759	13,690 5,496	36% 11%	10 9	21,629 41,710	23,580 43,539	28,876 48,432	34,659 53,432	50,219 54,052	55,027 55,844	56,892 55,844	279 59
	5026	22,264	40,129	27,802	6,479	23%	10	22,497	22,730	23,239	25,701	28,492	38,901	39,515	109
	5027 6001	15,981	30,822	22,579	6,442	29%	10	16,123	16,265	16,677	20,609	29,141	30,467	30,645	279
СТР	6002 6003						1								
	6004						1								
ALL-IN no-CTP	6005 10000	509,460	1,125,408	782,184	208,148	27%	1	535,525	561,590	629,049	852,997	864,661	973,454	1,049,431	169
Equity Cumulative	11000	157,349	311,963	233,000	49,552	21%	11	165,678	174,006	208,138	215,708	279,820	285,214	298,589	159
IR Cumulative FX Cumulative	12000 13000	289,899 552,348	437,127 922,028	363,921 752,363	44,630 95,375	12% 13%	15 14	292,663 637,576	305,102 683,831	336,239 693,861	366,000 737,751	380,928 827,480	427,826 862,866	437,127 885,200	69 99
	14000	291,100	502,693	369,569	73,422	20%	7	299,697	308,293 166,425	325,124	332,870	405,038	454,440	478,566	119
Commodity Cumulative CS Cumulative	15000	157,424	279,736	207,927	40,558	20%		161.925		182,456	206,301	223,560	251.601	265,669	109



Figure 23: VaR ratio with median (focus on medium-sized banks)

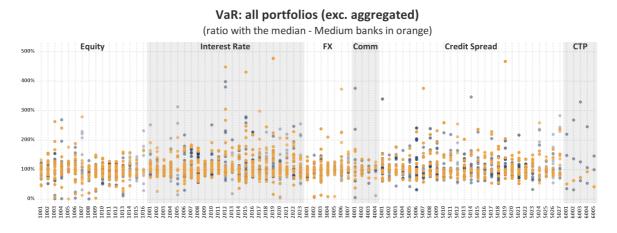




Table 29: VaR statistics (large banks only)

J002 211,065 304,678 255,281 30,252 12% 8 216,828 222,591 229,207 265,684 268,574 J003 1,004 2,441 1,759 562 32% 10 1,028 1,052 1,180 1,933 2,126 J004 911 1,643 1,214 227 22% 8 938 966 1,048 1,178 1,448	h 95th 03,416 503,593 180,134 292,406 2,434 2,437 1,578 1,610 15,540 67,607,813 3,880 4,163 19,622 22,006	Interquantile range 8% 8% 29% 16%
1002 211,065 304,678 255,281 30,252 1278 8 216,828 2225,291 229,207 265,684 266,574 1003 1,004 2,441 1,759 562 32% 10 1,028 1,052 1,180 1,933 2,126 1004 911 1,643 1,241 271 228 8 938 566 1,048 1,78 1,448 1005 52,837,497 67,700,086 58,971,811 6,401,226 100 10,965,513 53,135,114 54,882,299 56,673,043 64,914,015 67, 1,006 1,821 4,448 30,013 776 266 9 2,050 2,309 2,676 2,887 3,599	80,134 292,406 2,434 2,437 1,578 1,610 i15,540 67,607,813 3,880 4,163	8% 29%
1003 1,004 2,441 1,759 562 32% 10 1,028 1,052 1,180 1,933 2,126 1004 911 1,643 1,241 2216 8 938 966 1,048 1,178 1,448 1005 52,837,947 67,700,086 58,971,831 6,412,26 10% 10 52,986,531 53,135,114 54,882,929 56,263,043 6,49,14,015 67, 1006 1,8,21 4,445 3,013 776 26% 9 2,065 2,309 2,676 2,882 3,09	2,434 2,437 1,578 1,610 15,540 67,607,813 3,880 4,163	29%
1005 52,837,947 67,700,086 58,971,831 6,041,226 10% 10 52,986,531 53,135,114 54,882,929 56,263,043 64,914,015 67, 1006 1,821 4,445 3,013 776 26% 9 2,065 2,309 2,626 2,852 3,509	15,540 67,607,813 3,880 4,163	
1006 1,821 4,445 3,013 776 26% 9 2,065 2,309 2,626 2,852 3,509	3,880 4,163	8%
1007 5.075 24.280 15.604 5.241 249 8 9.451 11.237 14.400 45.051 47.532	19,622 22,006	14%
1007 5,075 24,389 15,604 5,341 34% 8 8,151 11,227 14,499 15,854 17,522 1008 12,507 26,168 19,560 3,698 195 10 14,667 15,677 18,054 20,116 21,442	21.952 24.060	9%
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	68,492 74,749	
1010 21,826 39,997 33,403 5,940 18% 9 24,462 27,098 32,312 32,656 39,528 1011 261,378 477,757 401,126 73,342 18% 9 283,021 304,664 390,701 407,236 472,121	39,749 39,873 73,291 475,524	10%
	50,187 456,380	8%
1013 44,653 82,195 62,590 10,020 16% 10 48,186 51,720 57,634 64,579 66,048	69,045 75,620	7%
	90,802 301,214 19,366 232,282	12% 6%
	48,480 271,678	
	42,141 250,171 37,147 238,557	16%
2003 23,462 31,062 27,485 2,217 8% 9 24,144 24,825 26,904 27,742 28,644	29,527 30,294	3%
2004 86,326 138,396 116,117 20,262 17% 10 87,692 88,058 96,693 122,163 133,269 2005 4,629 45,314 20,899 13,479 64% 6 7,399 110,168 15,001 18,898 22,1721	35,771 137,083 33,562 39,438	16% 15%
2006 22,262 45,679 30,502 7,548 25% 10 22,870 23,478 24,674 29,333 34,075	39,889 42,784	16%
	.07,044 116,617 25,416 127,542	15%
2009 170,747 240,874 208,841 22,447 11% 9 177,107 183,468 199,430 210,988 216,140	38,815 239,844	4%
	18,842 225,608 87,932 498,201	16%
Interest Rate 2012 55,388 113,415 80,048 18,199 23% 9 58,375 61,362 69,262 78,789 89,453	.01,793 107,604	13%
2013 38,557 50,408 43,044 3,923 9% 10 38,880 39,022 40,320 41,701 45,918 2014 30,368 59,359 42,716 11,249 26% 8 31,404 32,439 33,617 39,877 50,190	47,485 48,946 58,007 58,683	6% 20%
2015 6,199 11,886 8,764 1,817 21% 8 6,609 7,019 7,563 8,693 9,426	10,997 11,442	11%
2016 89,996 159,855 125,270 24,139 19% 10 97,106 104,215 108,879 118,409 147,210 2017 19,701 40,501 128,868 5,773 18% 10 22,400 25,278 26,802 28,802 28,802 29,706	57,555 158,705 33,020 36,761	15%
2017 15,905 35,185 22,580 6,121 20% 10 16,004 6,16,19 20,937 24,470	32,442 33,813	8%
2019 8,190 17,269 11,237 3,429 31% 9 8,454 8,719 8,901 9,700 11,341 2020 30,832 55,392 44,788 9,539 21% 8 31,275 31,719 40,263 44,674 53,632	16,924 17,097 54,561 54,977	12%
<u>2021</u> 32,035 63,040 42,127 11,756 28% 10 32,134 32,234 32,872 36,979 50,059	59,274 61,157	21%
2022 144,138 353,823 223,767 71,519 32% 10 152,295 160,452 171,063 201,372 281,498 2023 30,241 57,227 38,801 7,963 21% 10 31,119 31,997 34,389 36,157 40,818	09,833 331,828 47,090 52,159	24%
	52,980 591,849	14%
	23,555 455,780 46.473 160.361	6% 10%
	00,561 520,212	4%
3005 310,237 389,130 363,838 23,080 6% 9 327,995 345,754 360,097 367,093 376,267 3006 11,510 23,760 16,531 3,429 21% 9 12,867 14,224 15,196 15,370 17,707	86,013 387,572 20.148 21,954	2%
	74,354 700,926	5%
4007 14,629 55,740 29,843 15,725 53% 5 16,007 17,385 21,519 25,821 31,507 4002 31,3613 479,620 381,874 55,038 15% 6 32,374 335,316 357,209 356,008 400,291	46,047 50,893 44,478 462.049	19%
Commodities 4003 488,404 709,464 586,316 93,746 16% 4 497,382 506,360 533,293 573,698 626,720	676,367 692,915	8%
4004 300,636 377,326 338,274 32,789 10% 5 304,252 307,868 318,715 327,202 367,491 5001 4,278 10.678 7,352 1,821 25% 10 5,004 5,731 6,247 7,293 7,975	73,392 375,359 9,612 10,145	7%
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	25,583 25,640	11%
5003 3,387 5,976 4,400 1,099 25% 10 3,386 3,404 3,426 3,863 5,537 5004 7,157 11,642 9,519 1,647 17% 9 7,204 7,251 8,541 9,469 10,742	5,650 5,813 11,539 11,590	24%
5005 3,321 6,121 4,440 800 18% 9 3,531 3,742 4,090 4,198 4,848	5,199 5,660	8%
5006 2,322 14,499 7,037 3,506 50% 9 3,254 4,186 4,875 6,431 7,814 5007 26,322 66,095 37,706 13,719 36% 9 26,837 27,352 28,535 32,805 39,191	10,701 12,600 56,645 61,370	23%
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	80,916 84,525	9%
5007 5,414 13,193 8,119 2,809 35% 9 5,698 5,983 6,239 6,658 8,889 5070 12,977 21193 18,699 2,771 15% 10 13,953 14,979 12,460 20,039 20,993	12,363 12,778 20.828 21.010	18%
5010 12,3777 24,155 16,059 27,71 15% 10 15,553 17,329 17,400 20,056 20,355 5011 26,110 37,353 33,112 4,043 12% 9 26,476 26,482 31,946 34,821 35,412	36,732 37,043	
5012 1,750 4,967 2,993 961 32% 10 1,784 1,818 2,479 2,952 3,462 5013 11,823 21,007 16,348 2,896 18% 9 12,873 13,924 15,232 15,780 16,673	3,885 4,426 20,741 20,874	17%
Credit Spread 5014 2,231 6,357 4,111 1,309 32% 9 2,591 2,950 3,518 3,747 4,333	6,046 6,201	10%
5075 14,571 33,266 22,682 5,357 24% 10 16,046 17,520 19,586 22,072 24,460 5076 26,641 50,472 39,873 8,601 22% 9 25,771 27,301 35,951 41,509 44,916	28,958 31,127 49.936 50,204	11%
Stute Zayori Stutic Zayori Zayori <thzayori< th=""> Zayori <thzayori< th=""> <thzayori< th=""> <thzayori< th=""></thzayori<></thzayori<></thzayori<></thzayori<>	49,936 50,204 26,080 28,630	9%
507.8 32,985 89,229 57,658 16,733 29% 9 35,573 38,161 51,991 55,905 67,155 5070 8,461 50,071 11,965 3770 3767 10 8,573 48,754 0,451 10,451 11,461	74,159 81,694	
	17,845 18,958 78,547 187,720	16% 3%
5021 16,864 30,659 22,917 4,639 20% 8 17,474 18,084 19,885 22,304 25,948	27,773 29,216	13%
5022 122,630 192,895 159,090 18,838 12% 9 132,589 142,548 152,230 160,519 165,795 5022 40,813 76,638 59,411 14,164 24% 5 43,427 46,041 53,884 55,600 70,121	74,780 183,837 74,031 75,335	4%
5024 22,892 69,802 39,768 19,440 49% 9 23,035 23,178 24,082 28,793 58,382 5025 39,838 66,740 51,795 7,432 14% 9 43,113 46,388 49,182 49,938 52,466	66,485 68,144 60,193 63,466	42%
5025 39,838 66,740 51,795 7,432 14% 9 43,113 46,388 49,182 49,938 52,466 5026 15,580 43,473 29,979 9,593 32% 9 17,484 19,388 25,010 28,097 36,596	60,193 63,466 43,296 43,385	3% 19%
5027 14,311 21,436 17,408 2,621 15% 8 14,372 14,434 15,918 17,035 18,474	21,059 21,247	7%
6001 7,758 47,902 29,308 20,235 69% 3 10,209 12,659 20,011 32,264 40,088 6002 6,964 56,958 32,000 26,050 81% 3 9,276 11,587 18,552 30,079 44,519	44,774 46,338 53,182 56,070	33% 41%
CTP 6003 1,962 10,352 5,428 4,381 81% 3 2,163 2,364 2,966 3,970 7,161	9,076 9,714	41%
6004 1.921 8,738 4,822 3,520 73% 3 2,110 2,298 2,865 3,808 6,273 6005 32,716 47,902 40.309 10,738 27% 2 33,475 34,225 36,513 40,309 44,106	7,752 8,245 46,383 47,143	37%
ALL-IN no-CTP 10000 696,529 968,126 804,733 93,405 12% 6 708,307 720,085 751,765 796,067 824,977	98,049 933,087	5%
	63,077 278,978 36.060 441.787	6% 10%
FX Cumulative 13000 633,988 929,263 779,034 88,290 11% 9 663,354 692,719 720,250 764,234 827,610	71,977 900,620	7%
	478,855 48,260 293,131	12% 1%
CPC annulative 15000 10,5/5 358,003 225,001 46,746 21% 9 155,500 185,525 218,768 220,820 225,135 CPC annulative 15000 1 5 3 3 94% 2 1 1 2 3 4	-10,200 293,131 5 5	1%



Figure 24: VaR ratio with median (focus on large banks)

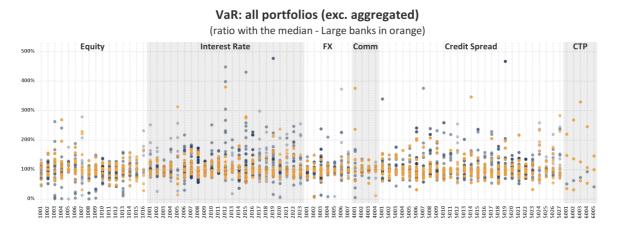




Table 30: VaR statistics (small TB banks only)

				Other sta	ats					Percentiles						Extreme Values ra	nge (Full Sample)
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation Num obs.		10th	25th	50th (Median)	75th	90th	95th	Interquantile range	STDev_trunc ¹	-2*STDev_trunc	+2*STDev_trunc
	1001	281,100	545,084	403,127	101,875	(STDev/Mean) 25% 7	282,874	284,648	320,118	418,995	468,236	520,296	532,690	19%	87,495	235,100	585,082
	1002 1003	138,749 204	323,546 2,441	227,003 1,614	68,220 861	30% 5 53% 5	151,214 457	163,679 711	201,075 1,471	217,397 1,912	254,248 2,040	295,827 2,281	309,686 2,361	12% 16%	67,607 697	127,896 179	398,325 2,967
	1004 1005	1,068 51,728,788	1,569 67,700,086	1,337 57,262,581	202 7,006,932	15% 6 12% 7	1,096 51,741,496	1,124 51,754,203	1,202 52,284,144	1,329 54,550,506	1,510 61,145,199	1,560 67,250,705	1,564 67,475,395	11% 8%	508 7,394,419	266 41,474,204	2,299 71,051,881
	1005	51,710,700	01,100,000	57,202,502	1,000,752	3	51,741,450	51,154,105	51,104,144	34,330,300	01,145,155	01,230,103	01,410,000	0.4	1,004,410	-1,-1,-0,-04	1,001,001
Equity						2 4											
	1009 1010	44,640 28,054	84,955 39,997	59,211 32,717	15,348 4,877	26% 5 15% 5	46,389 28,411	48,138 28,768	53,385 29,838	53,456 30,390	59,620 35,305	74,821 38,120	79,888 39,059	6% 8%	15,628 6,262	25,609 19,789	88,120 44,835
	1011 1012	267,886 253,093	506,663 481,566	380,293 361,062	93,196 87,730	25% 7 24% 7	269,043 254,467	270,201 255,842	303,094 289,391	403,722 381,296	438,798 416,349	485,970 457,088	496,317 469,327	18% 18%	77,199 75,097	239,951 227,484	548,745 527,872
	1013 1014	47,145 200.841	93,216 268,450	62,306 237,376	18,416	30% 5 12% 6	47,600 203,220	48,055	49,421 214,670	60,088 242.083	61,658 259,473	80,593 264,449	86,904 266,449	11% 9%	17,880	22,768 113.094	94,287 320.072
		145,710	208,450 221,575	178,512	28,894	16% 5	148,540	151,370	159,860	179,106	186,311	207,469	214,522	976 896	33,844	113,094 114,209	249,587
	1016 2001	147,973	240,356	196,250	29,253	15% 7	158,373	168,773	183,739	195,285	211,329	226,907	233,632	7%	38,700	118,497	273,297
	2002 2003	136,316 24,151	239,967 30,434	176,256 26,950	33,937 2,132	19% 7 8% 7	142,291 24,663	148,265 25,175	158,452 25,958	163,090 26,285	188,758 27,934	214,008 29,659	226,988 30,047	9% 4%	30,522 2,448	118,133 22,711	240,220 32,502
	2004 2005	80,136	138,396	109,495	22,660	21% 7	81,767	83,397	94,308	110,572	124,374	137,641	138,018	14%	26,439	58,799	164,555
	2006 2007	18,671 57,406	48,230 102,764	29,186 77,195	8,775 18,180	30% 9 24% 8	20,132 58,699	21,593 59,991	22,685 61,629	28,858 73,403	32,049 89,633	36,520 102,409	42,375 102,587	17% 19%	9,718 24,994	10,372 29,327	49,242 129,303
	2008 2009	46,268 172,897	126,175 240,874	82,532 198,308	29,666 22,387	36% 9 11% 7	47,114 177,067	47,959 181,238	63,645 187,464	81,003 189,454	101,139 205.001	124,005 224,466	125,090 232,670	23% 4%	28,419 20.895	24,275 157,639	137,951 241,220
	2010 2011	133,176	217,338	176,775	26,586	15% 7	142,538	151,901	165,370	175,759	190,208	204,623	210,981	7%	34,902	106,503	246,111 520,462
Interest Rate		49,735	150,338	84,861	30,260	36% 8	55,737	61,739	67,509	79,137	90,015	114,322	132,330	14%	54,394	-30,315	187,263
	2013 2014	38,069 15,534	48,481 45,997	42,607 34,404	3,903 12,521	9% 7 36% 5	38,522 18,019	38,976 20,505	39,858 27,961	42,063 40,544	44,961 41,982	47,688 44,391	48,085 45,194	6% 20%	9,175 15,362	23,712 11,258	60,413 72,706
	2015 2016	7,030 95,330	19,941 179,909	12,117 130,872	4,728 29,711	39% 6 23% 8	7,337 101,106	7,645 106,881	8,747 112,628	11,478 116,304	14,075 155,877	17,230 165,872	18,585 172,890	23% 16%	7,296 40,617	-3,493 38,858	25,693 201,327
	2017 2018	24,657	43,709	33,444 23,830	6,839 6,948	20% 8	25,493 15,410	26,329 16.441	28,893	31,649	39,186 26,886	41,554	42,631	15%	9,235	10,444	47,382
		8,295	17,378	12,140	3,760	31% 7	8,540	8,786	9,443	10,378	15,023	17,173	17,275	23%	4,287	1,981	19,129
	2020 2021	28,149 28,455	51,795 52,920	43,852 39,537	8,409 7,624	19% 7 19% 8	31,197 30,365	34,246 32,275	40,606 35,762	46,273 37,976	49,767 43,117	51,709 48,628	51,752 50,774	10% 9%	9,406 13,360	24,144 11,257	61,769 64,697
	2022 2023	152,112 21,541	312,545 97,586	211,625 42,326	68,357 23,047	32% 7 54% 9	153,596 24,263	155,081 26,986	162,403 31,643	189,037 32,441	251,437 43,148	307,985 65,299	310,265 81,442	22% 15%	85,977 31,334	32,985 -24,459	376,891 100,878
	3001 3002	366,905	630,918 413,924	461,820 328,952	92,953 55,321	20% 7 17% 7	368,839	370,773	391,743 288,173	447,998	501,718 361,569	561,514 403,129	596,216 408,527	12% 11%	74,729	336,133 162,334	635,047 492,074
		74,228	185,141	126,256	43,922	35% 8	78,595	82,962	90,322	119,833	158,649	182,853	183,997	27%	37,359	54,770	204,208
FX	3004 3005	386,491 353,786	498,130 439,428	448,478 381,098	36,978 34,064	8% 8 9% 6	399,738 354,573	412,985 355,360	427,440 358,308	448,250 365,694	470,053 396,027	492,954 422,239	495,542 430,834	5% 5%	45,697 42,318	366,411 289,928	549,199 459,200
	3006 3007	10,957 418,109	21,852 727,498	16,232 525,442	3,771 107,627	23% 8 20% 6	11,682 432,118	12,407 446,127	13,129 474,913	16,535 493,849	18,577 536,522	20,221 636,351	21,037 681,924	17% 6%	7,041 111,233	2,407 307,313	30,572 752,246
Commodities	4001 4002					4											
	4003 4004					3											
	5001 5002	4,259	8,802	6,223	2,018	32% 6 3	4,287	4,315	4,453	5,956	7,797	8,397	8,600	27%	1,899	3,104	10,700
	5003 5004					4											
	5005 5006	4,660	14,499	7,578	4,001	3 53% 5	4,743	4,826	5,074	6,490	7,168	11,567	13,033	17%	3,724	-204	14,693
	5007 5008	60.401	109.059	79.930	18.961	24% 5	61.768	63,135	67,237	76.902	86.042	99.858	104.464	12%	29.766	10.802	129,865
	5009	6,125	9,315	7,878	1,226	16% 6 27% 5	6,363	6,600	7,233	7,785	8,852	9,249	9,282	10%	3,101	1,506	13,909
	5010 5011	13,737 32,075	28,382 46,780	19,853 36,428	5,414 6,019	17% 5	14,473 32,121	15,209 32,166	17,417 32,303	19,096 35,352	20,634 35,628	25,283 42,319	44,550	8% 5%	10,692 9,166	-1,349 17,081	41,419 53,743
	5012 5013	1,654 11,359	4,986 17,138	3,264 14,385	1,322	41% 6 14% 6	1,868 11,676	2,083 11,993	2,547 13,108	2,845 14,869	4,317 15.382	4,866 16,293	4,926 16,715	26% 8%	1,571 3,125	-128 8,981	6,157 21,483
Credit Spread	5014 5015	2,639 16,919	6,027 39,379	4,131 27,065	1,333 9,099	32% 5 34% 5	2,753 17,884	2,866 18,849	3,207 21,743	4,006 23.988	4,775 33,296	5,526 36,946	5,777 38,162	20% 21%	1,212 11,547	1,581 561	6,430 46,750
	5016 5017				.,	4		10,010		20,700							
	5019 5019	9,554	20,848	14,465	4,897	3 34% 6	9,704	9,854	10,692	13,082	18,518	20,460	20,654	27%	10,522	-10,889	31.197
	5020 5021	118,540	207,875	164,095	33,980	21% 6	122,661	126,781	140,220	166,162	187,232	199,341	203,608	14%	25,024	117,764	217,862
		114,514	186,894	156,540	33,452	21% 5	117,061	119,609	127,251	170,251	183,792	185,653	186,274	18%	25,383	111,216	212,747
	5023 5024	23,602	69,802	45,757	20,783	45% 3	25,796	27,990	34,573	34,744	66,064	68,307	69,054	31%	20,543	-5,196	76,976
	5025 5026					3											
	5027 6001					3											
СТР	6002 6003					1											
	6004 6005					1											
ALL-IN no-CTP Equity Cumulative	10000 11000					3											
IR Cumulative FX Cumulative	12000 13000	289,899 552,348	433,197 768,155	360,591 697,620	46,627 64,981	13% 8 9% 8	306,658 598,664	323,417 644,980	338,526 688,904	343,697 705,956	391,327 734,319	419,671 749,628	426,434 758,892	7% 3%	59,576 108,524	242,648 539,370	480,951 973,466
Commodity Cumulative CS Cumulative	14000 15000					3											
CTP Cumulative	16000																



Table 31: VaR statistics (medium TB banks only)

			Other stats						Percentiles									Extreme values range	
		Port. ID	Min	Max	Ave.	STDev	Coefficient of variation M (STDev/Mean)	lum obs.		10th	25th	50th (Median)	75th	90th	95th	Interquantile range	STDev_trunc ¹	-2*STDev_trunc	+2*STDev_trunc
Equ	uity	1001 1002	281,050 211,065	503,328 329,653	413,032 265,650	70,907 32,828	17% 12%	13	282,640 219,708	294,829 228,351	382,605 250,482	440,783 266,247	441,747 275,931	480,368 304,678	492,035 317,166	7%	87,495 67,607	235,100 127,896	585,082 398,325
		1003	980	2,636	1,575	505	32%	12	993	1,012	1,131	1,526	1,830	2,113	2,362	24%	697	179	2,967
		1004 1005	512 53,168,133	1,840 70,284,083	1,224 58,872,334	373 6,522,594	30% 11%	10 9	692 53,358,663	871 53,549,192	1,014 54,687,404	1,264 55,469,502	1,468 63,863,734	1,562 68,052,845	1,701 69,168,464	18% 8%	508 7,394,419	266 41,474,204	2,299 71,051,881
		1006 1007	1,821 5,075	4,213 24,389	2,953 14,462	755 5,643	26% 39%	13 10	1,846 6,856	1,977 8,636	2,475 10,929	2,808 14,287	3,509 17,546	3,845 20,400	4,008 22,395	17% 23%	1,022 8,685	786 -1,232	4,873 33,510
		1008 1009	12,507 47,294	21,744 81,006	18,640 59,543	3,261 8,163	17% 14%	12	13,168 48,831	13,936 50,625	16,360 56,313	19,781 59,851	21,328 61,566	21,708 64,188	21,740 71,149	13% 4%	5,081 15,628	9,847 25,609	30,171 88,120
		1010	21,826	39,687	32,945	5,071	15%	12	24,624	27,330	31,234	32,538	35,910	39,229	39,614	7%	6,262	19,789	44,835
		1011 1012	257,866 246,258	477,757 462,573	393,691 378,464	59,286 58,746	15% 16%	12 12	291,377 275,840	322,424 304,134	387,267 371,802	406,496 388,866	414,405 403,413	451,552 435,309	464,354 448,674	3% 4%	77,199 75,097	239,951 227,484	548,745 527,872
		1013 1014	52,505 174,291	82,195 300,638	63,493 228,347	8,286 40,295	13% 18%	13 13	53,830 176,087	54,771 178,791	56,959 202,889	63,960 222,500	65,686 251,277	73,430 277,478	78,025 289,382	7% 11%	17,880 51,745	22,768 113,094	94,287 320,072
		1015 1016	125,828	239,711	177,423	35,299	20%	12	132,551	138,477	145,510	182,399	196,384	221,080	230,245	15%	33,844	114,209	249,587
Interes	st Rate	2001 2002	148,895 137,288	258,202 236,442	196,826 181,823	27,926 28,472	14% 16%	18 16	158,951 138,347	161,158 139,723	184,076 169,616	192,195 179,773	204,097 196,686	234,372 215,042	239,939 227,576	5% 7%	38,700 30,522	118,497 118,133	273,297 240,220
		2003 2004	23,462 67,975	31,062 142,257	27,853 114,404	2,396 20,211	9% 18%	16 18	23,566 81,511	23,794 90,103	27,330 99,425	28,154 119,208	29,492 129,167	30,606 134,272	30,948 136,496	496 1396	2,448 26,439	22,711 58,799	32,502 164,555
		2005 2006	4,629	64,885 45,679	32,205 29,646	21,408	66% 24%	6 14	7,399	10,168 22,666	19,374 25,716	31,061 29,426	42,358	55,390 36.045	60,138 39,674	37%	24,422 9,718	-17,784 10.372	79,905
		2007	58,076	115,009	79,438	14,392	18%	13	64,170	68,431	70,082	78,616	83,623	94,429	104,257	9%	24,994	29,327	129,303
		2008 2009	53,929 160,752	131,950 238,300	83,213 199,984	27,193 18,379	33% 9%	15 18	57,853 169,248	59,910 179,352	62,026 190,954	72,854 200,880	96,896 210,925	127,737 216,214	130,353 225,853	2296 596	28,419 20,895	24,275 157,639	137,951 241,220
		2010 2011	134,005 352,525	232,375 508,469	177,150 424,837	25,132 50,141	14% 12%	18 18	143,036 352,755	145,035 363,231	165,668	172,926 441,776	183,688 464,673	210,938 480,654	215,944 487,847	5% 10%	34,902 57,813	106,503 289,208	246,111 520,462
		2012	62,856	126,712	79,813	18,315	23%	14	64,361	65,918	68,265	75,384	80,828	104,712	118,069	8%	54,394	-30,315	187,263
		2013 2014	38,728 27,423	53,227 71,063	43,624 42,002	4,203 15,930	10% 38%	17 10	38,786 28,748	39,227 30,074	40,368 31,955	42,666 33,520	45,110 53,895	49,409 63,652	50,972 67,358	6% 26%	9,175 15,362	23,712 11,258	60,413 72,706
		2015 2016	6,199 89,996	23,132 157,299	10,367 118,833	4,621 17,010	45% 14%	14 14	6,239 100,265	6,328 106,249	7,262	9,194 115,377	12,242 120,715	14,262 141,676	17,569 149,305	26% 5%	7,296 40,617	-3,493 38,858	25,693 201,327
		2017	17,062	45,864	31,556	8,523	27%	14	21,816	24,844	26,366	28,802	38,423	44,023	45,203	19%	9,235	10,444	47,382
		2018 2019	15,905 6,079	33,415 18,782	24,001 11,360	4,766 3,911	20% 34%	17	16,159 7,616	19,744 8,114	22,296 8,466	22,687 9,700	24,800 14,324	31,667 16,848	33,012 17,247	5% 26%	7,696 4,287	8,724 1,981	39,508 19,129
		2020 2021	36,368 31,103	55,392 63,040	44,582 39,080	6,342 9,207	14% 24%	15 14	36,703 31,288	37,628 31,581	39,398 32.814	43,693	48,266	53,899 50,864	54,561 57,775	10% 10%	9,406 13,360	24,144 11,257	61,769 64,697
		2022	98,104	372,082	225,679	75,210	33%	14	128,026	157,090	189,556	199,165	265,400	333,107	360,214	17%	85,977	32,985	376,891
E	x	2023 3001	29,800 342,985	54,535 541,772	40,161 468,529	6,762 61,813	17%	16	30,885 366,996	32,037 382,469	36,713 426,036	39,328 488,272	44,154 509,760	48,530 532,653	51,956 535,602	9% 9%	31,334 74,729	-24,459 336,133	100,878 635,047
		3002 3003	239,141 80,610	409,708	328,919 124.667	38,186 25,007	12%	15	272,642	294,118	306,991 111,511	343,648	347,207	351,470	370,552	6% 9%	82,435 37,359	162,334 54,770	492,074 204,208
		3004 3005	391,769 310,237	516,894 411,007	451,583 363,567	36,992 28,598	8% 8%	14	393,403 315,063	398,561 324,542	429,655 346,684	456,898 372,463	472,931 379,353	490,842 394,314	503,771 399,813	5% 4%	45,697 42,318	366,411 289,928	549,199 459,200
		3006	11,510	23,789	17,573	4,088	23%	15	13,190	13,986	14,708	16,420	21,219	23,772	23,783	18%	7,041	2,407	30,572
Comme	odities	3007 4001	378,329 14,629	660,805 39,720	529,103 24,895	69,669 9,637	13%	11	429,780 14,865	481,231 15,100	510,711 17,209	521,865 23,973	562,372 30,086	584,002 35,614	622,404 37,667	5% 27%	111,233 20,710	307,313 -17,891	752,246
		4002 4003	293,232 507,953	479,620 709,464	373,661 571,383	62,041 79,616	17% 14%	7	299,346 512,647	305,461 517,341	335,136 531,422	374,334 548,256	399,087 559,822	437,450 649,607	458,535 679,536	9% 3%	58,472 113,229	249,065 305,828	482,951 758,742
		4004	300,636	412,229	360,727	37,371	10%	6	310,807	320,977	347,328	366,425	374,867	394,778	403,503	4%	93,386	140,430	513,974
Credit	Spread	5001 5002	4,278 14,822	10,678 31,316	6,912 21,879	2,433 5,222	35% 24%	10 10	4,342 15,506	4,406 16,191	5,221 17,265	6,072 22,465	8,790 25,284	10,548 26,724	10,613 29,020	25% 19%	1,899 4,520	3,104 14,083	10,700 32,163
		5003 5004	3,278 6,917	5,565 14,052	3,901 9,863	693 2,462	18% 25%	11 10	3,342 6,924	3,406 6.931	3,415 7,592	3,664 9,936	4,193 11,610	4,537	5,051 13,077	10% 21%	1,022 2,099	1,903 6,250	5,991 14,644
		5005 5006	2,902 4,652	4,968 9,751	4,130 6.636	572 1,761	14% 27%	11	3,227 4,738	3,552 4,824	3,968 4,972	4,196 6,600	4,390 7,706	4,811 8,779	4,890 9,265	5% 22%	1,077	2,377	6,685 14,693
		5007	22,055	58,513	36,699	11,858	32%	10	23,975	25,895	29,106	34,250	40,905	54,706	56,610	17%	44,820	-52,053	127,225
		5008 5009	54,596 5.573	114,856 13,193	69,973 8.162	16,585	24% 34%	12	55,109 5.713	55,784 5.853	61,943 6,239	64,938 7.329	72,493 8,889	83,518 12,299	97,898 12,746	8% 18%	29,766 3.101	10,802	129,865 13,909
		5010	12,977 27,025	30,295 49,744	19,617 34,525	4,437 5,619	23% 16%	12	14,756 29,053	16,261 30,730	16,973 31,321	19,465 33,747	20,734	23,919	26,955	10% 7%	10,692	-1,349	41,419 53,743
		5011 5012	1,825	5,763	2,978	1,213	41%	12 8	1,946	2,067	2,394	2,658	3,118	37,272 3,958	42,929 4,861	13%	1,571	17,081 -128	6,157
		5013 5014	10,066 3,130	21,007 6,357	16,272 4,068	3,907 914	24% 22%	11 9	10,677 3,285	11,288 3,440	13,590 3,705	15,780 3,837	20,024 4,087	20,674 4,603	20,841 5,480	19% 5%	3,125 1,212	8,981 1,581	21,483 6,430
		5015 5016	14,571 26.641	31,254	22,151 38,443	4,241	19% 26%	11	16,210 26,889	17,848	20,709	21,984	23,521	25,444	28,349	6% 22%	11,547	561 23.479	46,750
		5017	17,540	35,221	24,926	6,610	27%	7	17,969	18,397	19,875	22,842	29,564	32,361	33,791	20%	9,392	4,585	42,151
		5018 5019	32,985 8,627	89,229 17,598	62,875 10,435	20,749 2,848	33% 27%	8	35,250 8,671	37,514 8,714	8,897	61,911 9,306	79,331 9,752	87,674 14,276	88,451 15,937	23% 5%	17,586 10,522	26,738 -10,889	97,083 31,197
		5020 5021	132,699 12,325	200,472 30,715	168,058 22,097	19,479 5,622	12% 25%	12 9	139,257 14,141	146,100 15,956	159,986 19,745	165,783 21,629	177,961 25,752	195,450 28,301	198,504 29,508	5% 13%	25,024 5,905	117,764 11,586	217,862 35,205
		5022 5023	122,630	192,895 85.694	158,961 69.372	19,382 13,214	12%	10	129,758 54,399	136,887	152,485	160,329	167,741	177,058 83,969	184,976 84,832	5% 17%	25,383 18,751	111,216 25,463	212,747
		5024	22,892	65,656	35,290	15,943	45%	9	23,340	23,789	24,082	28,358	37,036	60,137	62,896	21%	20,543	-5,196	76,976
		5025 5026	39,838 15,580	66,740 40,129	50,495 27,455	7,606 6,737	15% 25%	11 12	39,860 19,256	39,882 22,316	46,240 23,867	51,817 25,889	53,808 30,356	54,052 36,315	60,396 38,186	8% 12%	7,673 9,295	37,119 9,506	67,813 46,687
G	тр	5027 6001	14,311	30,822	20,715	5,838	28%	12	15,230	16,022	16,651	17,798	24,336	30,133	30,605	19%	11,597	-3,097	43,292
		6002 6003						1											
		6004 6005						1		_									
ALL-IN Equity Cu		10000 11000	696,529 185,924	968,126 284,552	827,523 215,192	108,208 28,781	13% 13%	5	705,951 188.802	715,373	743,640 205,556	857,171 208.463	872,151 212.699	929,736 241.024	948,931 262.788	8% 2%	159,483 51,761	497,027 112.185	1,134,959 319,230
IR Cum FX Cum	ulative	12000	293,848	447,514	376,384	39,002	10%	12	321,058	344,383	362,987	375,497	388,963	418,056	431,650	3%	59,576	242,648	480,951
Commodity	Cumulative	14000	633,988 291,100	865,370 480,351	787,100 377,045	84,467	9% 22%	12 6	681,432 292,642	721,701 294,185	306,169	360,337	451,606	857,592 476,612	861,127 478,482	19%	108,524 71,323	539,370 228,435	973,466 513,726
CS Cum CTP Cum		15000 16000	168,575	338,003	228,766	49,009	21%	9	178,139	187,703	206,301	218,768	232,845	281,058	309,531	6%	59,477	102,582	340,491



Table 32: VaR statistics (large TB banks only)

				Other sta	ats					Percentiles						Extreme Values ra	nge (Full Sample)
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation Num obs. (STDev/Mean)		10th	25th	50th (Median)	75th	90th	95th	Interquantile range	STDev_trunc ¹	-2*STDev_trunc	+2*STDev_trunc
	1001 1002 1003	276,609 187,137 1,057	502,231 279,429 2,433	375,427 230,941 1,618	78,240 35,477 563	21% 8 15% 0 35% 0	281,840 191,260 1,063	287,071 195,384 1,068	310,508 207,864 1,142	379,873 225,165 1,526	426,881 256,282 1,997	452,309 272,275 2,261	477,270 275,852 2,347	16% 10% 27%	87,495 67,607 697	235,100 127,896 179	585,082 398,325 2,967
	1004	1,057	1,643 70,540,542	1,305 60,112,644	234 6,329,609	18% 5	1,003	1,000	1,142 1,123 55,970,967	1,267	1,423 64,687,594	1,555 67,999,844	1,599 69,270,193	12%	508 7,394,419	266 41,474,204	2,299 71,051,881
	1006 1007	1,633	4,445	2,981	916	31% 6	1,881	2,130	2,683	2,951	3,221	3,862	4,153	996	1,022	786	4,873
Equity	1008 1009 1010	14,326 42,816 24,254	26,168 81,321 39,528	20,728 59,622 30,966	4,216 13,454 5,143	20% 5 23% 6 17% 6	15,628 44,628 25,295	16,930 46,439 26.335	20,835 51,972 28,563	20,875 58,215 30,644	21,435 65,008 32,305	24,275 74,211 35.920	25,221 77,766 37,724	1% 11% 6%	5,081 15,628 6,262	9,847 25,609 19,789	30,171 88,120 44,835
	1011 1012	261,378 248,179	472,121 447,090	344,521 327,266	81,500 77,582	24% 6	264,953 251,017	268,528 253,855	280,632 265,135	333,624 317,367	385,964 368,741	431,411 410,575	451,766 428,833	16% 16%	77,199	239,951 227,484	548,745 527,872
	1013 1014 1015	46,500 142,739	90,767 311,626	63,798 216,085	15,130 64,646	24% 6 30% 6	48,948 148,536	51,397 154,333	56,462 168,600	60,822 210,938	66,857 252,070	79,176 282,985	84,971 297,305	8% 20%	17,880 51,745	22,768 113,094	94,287 320,072
	1016 2001 2002	144,168 148,754	235,799 234.325	191,367 178.084	31,750 27.968	17% 8	151,456 151,027	158,743 153,299	166,478 160,460	194,299 172,433	208,086	231,344 212,190	233,571 223,257	11% 7%	38,700 30,522	118,497 118.133	273,297 240.220
	2003 2004 2005	23,181 85,380	31,021 138,801	27,745	2,464 23,149	9% 8 21% 8	23,972 85,711	24,762 86,042	26,729 88,602	28,375 106,081	29,122 133,407	29,866 138,378	30,444 138,590	4% 20%	2,448 26,439	22,711 58,799	32,502 164,555
	2006 2007	22,262 68,565	39,246 126,190	30,007 91,811	6,376 23,981	21% 0 26% 7	23,131 70,050	24,000 71,534	25,935 73,925	28,825 83,171	34,138 108,450	37,195 124,644	38,221 125,417	14% 19%	9,718 24,994	10,372 29,327	49,242 129,303
	2008 2009	58,948 171,470	124,943 216,140	87,057 195,880	24,855 13,285	29% 7 7% 9	60,221 177,821	61,494 184,172	70,029 190,651 149,830	84,399 193,012 174,869	100,526 203,421	119,169 211,802	122,056 213,971	18% 3%	28,419 20,895	24,275 157,639	137,951 241,220
Interest Rate	2010 2011 2012	129,752 368,225 55,388	212,222 470,539 181,999	172,659 403,290 96,664	29,182 35,058 48,074	17% 8 9% 9 50% 9	136,310 374,286 58,896	142,867 380,347 62,404	149,830 384,891 67,493	174,869 390,187 78,474	188,135 397,730 89,453	210,611 458,605 178,186	211,416 464,572 180.093	11% 2% 14%	34,902 57,813 54,394	106,503 289,208 -30,315	246,111 520,462 187,263
milerest rule	2012	38,917	46,354 69,278	41,004	2,534	6% 7 31% 7	39,024	39,131 31,936	39,670 38,986	40,291 43.679	41,063	43,635	44,994	2% 19%	9,175	23,712	60,413 72,706
	2015 2016	6,458 94,258	18,818 152,000	10,440 125,808	4,055 21,697	39% 8 17% 7	6,499 98,797	6,539 103,335	8,064 110,827	9,244 128,990	12,099 141,878	14,561 151,350	16,690 151,675	20% 12%	7,296 40,617	-3,493 38,858	25,693 201,327
	2017 2018	19,701 19,275	37,926 37,897	27,149 26,930	7,102 6,369	26% 6 24% 5	19,726 19,757	19,751 20,239	21,325 21,647	26,661 25,662	30,963 32,137	35,035 34,438	36,480 36,167	18% 20%	9,235 7,696	10,444 8,724	47,382 39,508
	2019 2020 2021	8,451 31,857 33,274	17,448 56,843 58,855	12,780 44,764 42,255	3,494 9,467 9,947	27% 2 21% 8 24% 7	8,693 31,942 33,597	8,935 32,026 33,921	9,490 40,263 35,398	12,083 44,440 38,044	15,399 51,055 47,408	17,305 56,301 55,545	17,376 56,572 57,200	24% 12% 15%	4,287 9,406 13,360	1,981 24,144 11,257	19,129 61,769 64,697
	2022 2023	26,065	83,915	43,953	24,220	55% 8	26,923	27,780	29,810	33,077	46,591	82,518	83,216	22%	31,334	-24,459	100,878
	3001 3002 3003	388,539 241,935 89,182	630,718 488,006 190,625	466,579 343,570 137,578	78,385 74,249 32,831	17% 8 22% 7 24% 7	388,980 262,743 99,134	389,422 283,551 109,085	425,841 318,255 123,514	445,226 328,458 130,161	491,234 355,042 153,025	546,520 409,940 176,344	588,619 448,973 183,484	7% 5% 11%	74,729 82,435 37,359	336,133 162,334 54,770	635,047 492,074 204,208
FX	3004 3005	374,887 315,860	539,863 417,345	450,076 375,615	52,126 33,702	12% 7	387,962 329,131	401,036	426,179 363,595	437,036	473,194 398,164	503,834 411,256	521,848 414,301	5%	45,697 42,318	366,411 289,928	549,199 459,200
	3006 3007 4001	10,359 371,186	19,245 686,574	14,614 537,495	2,910 115,586	20% 8 22% 6	10,433 401,531	10,507 431,875	13,683 493,216	15,288 511,533	15,685 620,657	16,829 669,076	18,037 677,825	7% 11%	7,041 111,233	2,407 307,313	30,572 752,246
Commodities	4002 4003 4004																
	5001 5002 5003	6,094 14,807 3,387	8,150 27,093 5,451	7,014 22,569 4,382	715 4,336 888	10% 6 19% 6 20% 6	6,216 16,356 3,431	6,338 17,906 3,474	6,640 21,534 3,658	6,902 23,479 4,283	7,336 25,124 5,151	7,801 26,324 5,390	7,975 26,708 5,420	5% 8% 17%	1,899 4,520 1,022	3,104 14,083 1,903	10,700 32,163 5,991
	5004 5005	7,403 3,321	12,134 6,121	9,897 4,848	1,608 1,087	16% 6 22% 6	7,912	8,421 3,779	9,447 4,270	9,682 4,705	10,755 5,758	11,588 6,059	11,861 6,090	6% 15%	2,099	6,250 2,377	14,644 6,685
	5006 5007	2,322 21,691	10,222 66,095	6,613 34,945	2,619 15,809	40% 6 45% 6	3,178 23,171	4,034 24,650	5,870 27,841	6,788 30,595	7,694 32,975	9,018 49,589	9,620 57,842	13% 8%	3,724 44,820	-204 -52,053	14,693 127,225
	5008 5009	54,021 4,987	117,512 13,360	74,774 7,772	21,207 2,968	28% 7 38% 7	54,795 5,115	55,570 5,243	62,468 5,830	68,959 6,453	78,994 8,972	94,472 11,222	105,992 12,291	12% 21%	29,766 3,101	10,802 1,506	129,865 13,909
	5010 5011	14,016 26,110	29,715 52,921	18,930 35,592	5,859 9,642	31% 0 27% 0	14,299 26,347	14,581 26,584	15,179 28,999	16,959 35,444	20,251 36,450	25,251 44,749	27,483 48,835	14% 11%	10,692 9,166	-1,349 17,081	41,419 53,743
Credit Soread	5012 5013 5014	1,750 11,823 2,231	3,765 16,673 5,968	2,920 15,012 3.927	815 1,854 1,276	28% 5 12% 6	1,903 12,448 2,458	2,056 13,074 2,684	2,515 14,393 3,290	3,014 15,323 3,815	3,554 16,468 4,417	3,681 16,641 5,282	3,723 16,657 5.625	17% 7% 15%	1,571 3,125 1,212	-128 8,981 1.581	6,157 21,483 6,430
Creast Spread	5014 5015 5016	2,231 18,265 28,816	5,968 30,341 49,930	3,927 23,664 39,836	1,276 5,010 9,313	21% 0	2,458 18,479 29,184	2,684 18,694 29,553	3,290 19,604 31,955	3,815 22,889 40,090	4,417 27,539 48,159	5,282 29,409 49,866	5,625 29,875 49,898	15% 17% 20%	1,212 11,547 9,445	1,581 561 23,479	6,430 46,750 61,257
	5017 5018	12,754 34,311	49,930 31,180 70,391	22,935	6,281 14,222	25% 6	14,651 36,861	16,548 39,412	20,833 47,360	23,102 56,995	26,321 67,093	29,155 70,244	49,898 30,168 70,317	12% 17%	9,392 17,586	4,585 26,738	42,151 97,083
	5019 5020	7,123	13,645 181,951	10,150 161,578	2,361 16,914	23% 0	7,443	7,762	8,598 160,350	10,224 162,146	11,278 169,414	12,465 175,217	13,055 178,584	13% 3%	10,522 25,024	-10,889 117,764	31,197 217,862
	5021 5022	14,740 123,984	30,659 175,587	22,259 154,018	6,001 17,336	27% 6 11% 6	15,322 129,870	15,903 135,756	17,877 149,907	22,277 157,241	25,963 161,255	28,598 169,057	29,628 172,322	18% 4%	5,905 25,383	11,586 111,216	35,205 212,747
	5023 5024					3											
	5025 5026 5027																
	6001 6002					1											
CTP	6003 6004 6005					1											
ALL-IN no-CTP Equity Cumulative	10000 11000	174,006	222,233	204,431	18,714	9%	179,448	184,889	201,214	208,992	215,708	219,623	220,928	3%	51,761	112,185	319,230
IR Cumulative FX Cumulative Commodity Cumulative	12000 13000 14000	280,584 683,468	363,670 929,263	335,540 765,369	31,223 79,843	9% 6 10%	290,934 688,201	301,283 692,934	325,160 724,633	343,536 759,712	358,041 767,939	361,800 834,691	362,735 881,977	5% 3%	59,576 108,524	242,648 539,370	480,951 973,466
Commodity Cumulative CS Cumulative CTP Cumulative	14000 15000 16000	172,426	271,967	213,523	34,563	16% 6	176,073	179,720	192,025	213,738	221,794	247,111	259,539	7%	59,477	102,582	340,491
		-					•										



Table 33: VaR statistics (same business model – cross-border universal bank)

					Other st	ats							Percentiles				
	Port. ID	Min	Max	Ave.	STDev	STDev_trunc ¹	MAD (median absolute deviation)	Coefficient of variation Nur (STDev/Mean)	m obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range
	1001 1002	283,700 180,915	503,770 329,653	387,024 245,841	72,891 44,970			19% 18%	16 15	288,958 185,270	291,133 193,734	330,466 214,231	400,800 248,526	436,771 268,921	471,989 307,026	502,616 325,378	14% 11%
	1003	779	2,441	1,538	505			33%	15	920	990	1,068	1,573	1,933	2,069	2,195	29%
	1004 1005	512 51,728,788	1,840 67,700,086	1,304 57,858,830	350 5,826,559			27% 10%	12 14	774 52,262,231	997 52,636,012	1,109 53,547,951	1,355 55,782,461	1,536 62,084,697	1,634 66,939,074	1,732 67,213,256	16% 7%
	1006 1007	1,633 5.075	3,872 21.160	2,675 15.107	614 4.651			23%	14 13	1,783 7,132	1,868 9,150	2,442 11.995	2,739 16,139	2,903 17.579	3,371 19,770	3,636 20,438	9% 19%
Eauity	1008	12,507	22,838	18,536	3,551			19%	12	13,168	13,771	15,562	19,781	21,447	21,712	22,232	16%
Liquity	1009 1010	42,816 21,826	81,321 39,997	59,709 32,307	10,952 5,114			18% 16%	14 14	45,989 23,404	48,407 25,679	53,403 30,149	59,334 32,484	62,311 35,562	76,077 38,404	81,116 39,692	8% 8%
		274,622	472,175	367,997	64,026			17%	15	275,361	283,605	317,141	390,701	404,739	446,283	472,137	12%
	1012 1013	259,158 44,653	447,090 90,767	350,963 63,735	61,241 12,838			17% 20%	15 14	259,418 45,854	268,498 47,376	300,319 57,591	374,060 64,221	388,524 65,583	423,966 80,110	442,666 85,195	13% 6%
	1014 1015	165,926 125,828	311,626 245,197	219,633 171,217	40,476 37,432			18% 22%	14 11	171,363 131,940	175,000 138.051	189,335 143,609	210,511 165,606	248,844 185.691	257,696 222,500	278,360 233,849	14% 13%
	1013	51,102	245,197 294,876	191,036	57,452 103,114			54%	5	69,180	87,258	143,609	178,885	288,828	292,457	233,649 293,666	34%
	2001 2002	144,168 136,316	240,356 239,967	195,034 176,576	26,335 27,575			14% 16%	23 19	148,065 138,462	152,511 146,743	189,214 157,963	192,473 178,581	204,626 188,305	234,096 209,294	236,624 226,156	4% 9%
	2003	23,181	30,910	27,686	2,264			8%	21	23,462	23,600	26,904	27,790	29,371	30,301	30,434	4%
	2004 2005	83,694 8,632	138,396 64,885	108,736 32,092	16,747 18,454			15% 58%	23 10	84,048 11,816	86,176 15,000	93,785 17,725	109,835 26,023	121,750 45,750	130,907 51,948	135,112 58,416	13% 44%
	2006 2007	15,587 58.076	39,246 126,190	28,611 82,195	5,568 17.850			19% 22%	19 19	21,220	22,179 67.679	24,835 68,541	29,420 79,315	31,585 84.608	34,667 105.213	35,534 116.127	12% 10%
	2008	48,382	124,943	79,877	23,725			30%	19	53,374	59,165	61,949	76,866	86,205	123,739	124,851	16%
	2009 2010	160,752 129,752	240,874 217,338	197,827 175,582	19,093 23,781			10% 14%	22 23	170,783 133,259	171,613 137,259	187,875 170,416	198,628 173,224	209,159 184,178	220,537 210,689	223,525 212,962	5% 4%
Interest Rate	2011 2012	352,525 55,388	479,131 126,712	408,765 78,776	39,726 14,420			10% 18%	20 20	363,990 63,720	367,862 66,998	383,009 72,331	389,196 76,988	445,611 80,909	464,308 88,240	473,565 100,278	8% 6%
interest nate		28,039	53,227	41,709	4,700			11%	23	38,574	38,742	40,101	40,560	43,377	46,999	48,349	4%
	2014 2015	15,534 6,199	71,063 19,941	39,299 10,347	15,200 3,711			39% 36%	14 19	22,159 6,254	26,236 6,442	30,040 7,299	34,701 9,029	46,753 13,136	58,858 14,529	63,455 15,110	22% 29%
		89,996	159,856	119,819	20,284			17%	19	93,832	95,116	108,009	116,758	124,939	152,510	155,082	7%
	2017 2018	19,800 14,378	45,864 35,185	30,470 24,117	7,105 5,061			23% 21%	20 23	20,620 16,382	24,258 18,109	25,955 22,305	28,400 23,747	34,081 25,719	40,661 31,626	42,288 33,287	14% 7%
	2019 2020	6,079 30,832	17,378 55.392	10,901	3,242 7,191			30% 17%	21 19	8,000 31,755	8,190 32,532	8,851 37,578	9,490 42,929	13,919 48.041	15,399 52.010	17,269	22% 12%
		31,387	58,855	37,987	7,170			19%	19	31,970	32,166	33,145	36,378	40,042	44,098	53,514	9%
	2022 2023	98,104 19,646	304,945 57,227	209,188 36,773	61,074 8,488			29% 23%	16 21	132,630 28,515	148,125 29,800	164,778 31,643	192,829 34,484	263,413 40,211	294,701 45,964	304,710 51,096	23% 12%
	3001	342,985	630,918	468,026	82,638			18%	17	344,808	363,106	416,686	486,346	495,863	561,434	630,758	9%
	3002 3003	239,141 74,228	488,006 139,529	327,286 114,557	58,904 21,463			18% 19%	16 16	241,237 79,015	257,728 83,658	301,346 100,501	326,738 123,073	344,589 129,832	371,651 135,778	418,951 139,302	7% 13%
FX	3004 3005	374,887 310,237	539,863 405,050	442,379 372,010	44,751 28,259			10% 8%	16 15	383,590 314,173	389,130 330,348	408,148 364,996	435,264 376,600	470,383 391,196	494,433 400,506	508,563 404,432	7% 3%
	3006	10,571	23,789	16,111	3,405			21%	19	10,918	11,399	14,273	15,370	18,100	19,795	21,177	12%
	3007 4001	371,186 8,992	727,498 55,740	533,069 27,611	94,103 14,624			18% 53%	17 9	376,900 11,247	402,197	495,170 18,802	527,895 22,124	564,068 38,179	655,269 42,924	674,144 49,332	7% 34%
Commodities	4002 4003	313,613 382,949	409,336 599,139	361,379 521,869	29,028 64,190			8% 12%	9	321,661 419,858	329,708 456,768	343,889 520,668	358,860 532,478	374,334 551,148	392,937 571,617	401,136 585,378	4% 3%
	4003	233,817	412,229	326,326	64,190 60,298			12%	6	250,522	267,227	305,156	322,959	355,820	388,794	400,512	8%
	5001 5002	4,278 16.044	10,678 31,316	7,443	1,800 4,316			24%	12 11	5,225 16.432	6,014 16.819	6,548 21,459	7,293	8,032 25.626	10,296 26,214	10,599 28,765	10%
	5003	3,406	5,976	4,451	956			21%	12	3,437	3,473	3,638	4,176	5,480	5,609	5,777	20%
	5004 5005	7,157 3,552	14,052 6,121	10,207 4,505	2,022 675			20% 15%	11 11	7,216 3,700	7,275 3,847	9,284 4,218	10,447 4,368	11,342 4,740	11,885 4,968	12,969 5,545	10% 6%
	5006 5007	4,652 21.691	14,499 58,513	7,552 35,740	2,630 11.924			35% 33%	10 10	5,144 24.354	5,637 27.017	6,515 28.606	7,207	7,694 38,389	8,523 54,706	11,511 56.610	8% 15%
	5008	54,021	88,134	69,327	11,641			17%	14	54,395	55,198	58,658	68,205	78,946	82,550	85,462	15%
	5009 5010	5,414 12,977	12,156 24,222	8,503 18,321	2,392 3,624			28% 20%	10 12	5,734 13,395	6,054 13,765	6,504 14,864	8,519 19,747	9,676 20,672	12,083 21,152	12,120 22,556	20% 16%
	5011 5012	26,110 1,750	37,353	32,733 3.172	4,215			13% 38%	11 11	26,568	27,025	29,502 2,509	34,077	36,131 3,475	36,577 4,967	36,965	10% 16%
		14,324	20,674	16,954	2,314			14%	11	14,438	14,552	15,340	16,047	18,758	20,246	20,460	10%
Credit Spread	5014 5015	3,130 16,919	6,357 33,296	4,137 23,475	1,035 5,115			25% 22%	12 13	3,134 17,476	3,144 17,931	3,440 19,122	3,999 22,913	4,207 25,444	5,805 30,698	6,143 32,071	10% 14%
	5016 5017	26,641 12,754	50,472 36.677	38,365	8,289 7,541			22%	10	27,012 14,908	27,384 17,061	30,850 18,975	40,014	44,494 23,631	45,670 35,367	48,071 36.022	18%
	5017	12,754 32,985	36,677 89,229	22,956 59,315	7,541 19,191			33%	11	14,908 33,648	34,311	45,723	21,334 58,084	23,631 69,364	35,367 87,007	36,022 88,118	21%
	5019 5020	7,123 118,540	20,071 182,465	10,743 159,052	3,428 19,273			32% 12%	13 14	7,890 124,312	8,464 129,004	8,826 159,102	9,667 162,949	10,443 170,238	14,150 176,494	16,594 178,594	8% 3%
		14,740	30,715	23,431	4,943			21%	13	16,014	17,213	20,462	23,685	26,536	30,067	30,681	13%
	5022 5023	114,514 40,813	175,298 94,343	151,577 72,290	19,480 18,573			13% 26%	13 7	119,384 45,249	122,901 49,685	147,528 62,861	157,437 76,638	165,795 84,257	169,879 89,154	172,270 91,748	6% 15%
	5024 5025	19,679 39,838	69,802 66,740	37,516 51,935	18,321 6,395			49% 12%	11 11	21,286 44,135	22,892 48,432	24,817 49,387	28,793 52,466	48,715 53,808	65,656 54,052	67,729 60,396	33% 4%
		15,580	43,473	29,127	8,649			30%	12	18,198	20,597	24,485	26,962	34,489	42,586	43,351	17%
	5027 6001	14,311 7,758	27,478 47,902	19,032 27,830	4,046			21% 102%	11	14,399 9,765	14,486 11,772	16,346 17,794	17,930 27,830	21,167 37,866	23,288 43,888	25,383 45,895	13% 36%
СТР	6002	6,964	58,958	32,961	36,765			112%	2	9,564	12,163	19,963	32,961	45,960	53,759	56,358	39%
- CIP	6003 6004	1,962 1,921	10,352 8,738	6,157 5,330	5,933 4,820			96% 90%	2	2,382 2,262	2,801 2,603	4,060 3,625	6,157 5,330	8,255 7,034	9,513 8,056	9,933 8,397	34% 32%
ALL-IN no-CTP	6005 10000	32,716 509,460	47,902 968,126	40,309 764,143	10,738 139,943			27%	2	33,475 562,763	34,235 616,067	36,513 687,836	40,309 796,067	44,106 835,271	46,383 890,458	47,143	9% 10%
Equity Cumulative	11000	157,349	294,879	215,209	38,198			18%	13	167,343	176,390	193,118	208,463	230,142	268,445	283,004	9%
IR Cumulative FX Cumulative	12000 13000	289,899 683,468	433,197 929,263	362,373 768,151	36,863 74,809			10% 10%	17 16	315,565 684,376	323,576 687,496	337,782 706,679	359,929 745,286	376,538 829,657	415,792 855,446	421,575 881,343	5% 8%
Commodity Cumulative CS Cumulative	14000 15000	297,269 157,424	502,693 266,822	376,836 208,531	69,719 31,537			19% 15%	9 12	306,263 163,557	315,258 168,960	330,492 183,366	371,080 219,591	387,804 225,307	478,837 232,143	490,765 248,135	8% 10%
CTP Cumulative	15000	157,424	200,822	206,531	31,537			94%	12	105,557	108,900	183,306	219,591	4	232,143	246,135	33%



Table 34: VaR statistics (low L3 A&L banks only)

		Other stats					Percentiles									Extreme values range	
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation Num obs (STDev/Mean)		10th	25th	i0th (Median)	75th	90th	95th	Interquantile range	STDev_trunc ¹	-2*STDev_trunc	+2*STDev_trunc
Equity	1001 1002	281,100 201,075	502,231 279,429	384,871 243,713	83,066 33,404	22% 14%	7 281,880 5 204,339	282,660 207,604	318,462 217,397	401,187 252,438	436,328 268,227	465,941 274,948	484,086 277,189	16% 10%	87,495 67,607	235,100 127,896	585,082 398,325
	1003 1004						4										
	1005 1006	51,728,788	66,910,973	56,276,349	5,461,739	10%	6 51,995,876 4	52,262,965	53,343,489	54,997,776	55,922,485	61,568,307	64,239,640	2%	7,394,419	41,474,204	71,051,881
	1007 1008					13%	3										
	1009 1010 1011	44,640 28,054 267,886	61,344 39,528 472,121	54,720 32,240 375,287	7,113 3,948 69,495	13% 12% 19%	5 45,724 6 28,500 6 284,525	46,809 28,946 301,165	50,062 30,149 343,771	57,701 31,683 384,874	59,851 32,563 405,143	60,747 36,092 439,824	61,045 37,810 455,972	9% 4% 8%	15,628 6,262 77,199	25,609 19,789 239,951	88,120 44,835 548,745
	1011 1012 1013	253,093 47 145	472,121 447,090 65.686	3/3,28/ 359,154 58,010	67,178 7.355	19%	6 270,097 5 48,975	287,100	343,771 329,026 56,293	367,436	405,145 394,593 63,960	433,824 422,926 64,996	435,972 435,008 65,341	074 9% 6%	75,097	239,951 227,484 22.768	546,745 527,872 94,287
	1013 1014 1015	47,145 176,623 135,207	311,626 245,197	235,720 184,936	42,002 42,655	13% 18% 23%	5 48,975 7 186,743 6 137,833	196,862 140,459	216,428 154,059	227,615 180,502	250,659 212,350	275,417 233,849	293,521 239,523	0% 7% 16%	17,880 51,745 33,844	22,768 113,094 114,209	94,287 320,072 249,587
Interest Rote	1015 1016 2001	164,990	245,197	184,936	42,000	10%	0 137,833 2 9 171,938	140,439	154,059	192,389	204,716	233,849	239,523	10%	33,844	114,209	249,387
interest note	2002 2003	136,316	202,703	169,067	23,476	14%	8 137,150 9 24,674	137,985	151,848	192,389	181,528	192,262	197,482	9% 4%	30,522	118,133	240,220
	2004 2005	83,900	138,801	114,570	22,920	20%	9 84,568	85,237	92,761	126,553	133,214	136,143	137,472	18%	26,439	58,799	164,555
	2006 2007	15,587 58.076	39,246 126,190	25,487 81,662	7,696 27,288	30% 33%	6 17,362 7 58,983	19,136 59,890	23,191 64.808	24,835 69.227	25,543 94,262	32,492 119,481	35,869 122,836	5% 19%	9,718 24,994	10,372 29,327	49,242 129,303
	2008 2009	48,382 186,648	124,943 216,140	76,452 198,922	33,451 10,902	44% 5%	7 50,046 9 187,770	51,710 188,893	56,439 190,651	60,474 197,106	94,243 207,446	124,882 214,050	124,912 215,095	25% 4%	28,419 20,895	24,275 157,639	137,951 241,220
	2010	148,488	212,222	176,086	17,783	10%	9 154,742	160,997	164,384	173,151	184,268	190,169	201,196 451,671	6% 3%	34,902 57,813	106,503	246,111 520,462
	2012 2013	65,172 38,800	87,057 46,354	75,016 42,225	7,160 2,449	10%	9 66,190 8 39,308	67,208 39,815	69,262 40,339	75,067 42,365	80,709 43,206	82,618 45,081	84,837 45,718	8% 3%	54,394 9,175	-30,315 23,712	187,263 60,413
	2014 2015	15,534	45,997 18,818	36,087	12,446 3,931	34%	5 19,093 7 7,728	22,651 8,085	33,327 9,387	41,897	43,679 14,054	45,070	45,533 17,545	13%	15,362 7,296	11,258 -3,493	72,706
	2016	111,489	152,000	120,310 34,951	14,304	12%	7 111,722 7 25,487	111,955	112,580	116,674	118,426	132,856	142,428	3%	40,617	38,858	201,327
	2018 2019	14,378	32,137	24,508	5,176	21%	9 17,286	20,193 8,152	22,687	24,191 9,410	25,775	31,098	31,617	6% 26%	7,696	8,724	39,508 19,129
	2019 2020 2021	36,368	56,843 58,855	44,815 38,129	7,757 9,358	17% 25%	8 37,219 7 32,407	38,070 32,778	39,453 33,593	41,782	49,759	55,827 46,071	56,335	20% 12% 5%	9,406 13,360	1,961 24,144 11,257	61,769 64,697
	2022 2022 2023	98,104 21,541	304,631 40,211	38,129 195,630 33,572	9,338 68,322 6,157	25% 35% 18%	7 116,692 8 24,432	135,279 27,322	33,393 163,904 31,182	34,122 187,407 33,821	225,729 38,650	279,304 39,577	291,968 39,894	16% 11%	15,360 85,977 31,334	32,985	376,891 100,878
FX	3001 3002	366,905	630,718 488,006	463,410 347.464	88,972 72,804	19%	8 369,738 8 276,442	372,572	406,265	438,575	515,422 366.567	560,484 433,197	595,601 460.602	12%	74,729	-24,435 336,133 162,334	635,047
	3002 3003 3004	273,520 86,705 394,283	488,000 139,719 539,863	121,513 445,086	20,291 47,309	21% 17% 11%	8 276,442 7 90,735 7 401,539	94,764 408,795	285,717 112,406 421,404	129,600 434,100	134,877 452,276	433,197 139,423 496,819	460,602 139,571 518,341	12% 9% 4%	82,435 37,359 45,697	162,334 54,770 366,411	492,074 204,208 549,199
	3005 3006	317,131 13,029	405,050 20,887	369,358 16,485	28,529 2,669	8% 16%	7 328,128 8 13,404	339,124 13,779	360,440 14,985	372,581 15,858	452,276 384,931 17,893	490,819 397,977 19,932	401,514 20,409	475 3% 9%	43,097 42,318 7,041	289,928 2,407	459,200 30,572
Commodities	3005 3007 4001	474,144	651,578	535,621	73,218	10%	8 13,404 5 475,561	476,979	481,231	510,477	560,675	615,217	633,397	9%	111,233	307,313	752,246
commonities	4002 4003						1										
Credit Spread	4004						4										
	5002 5003	3,664	5,565	4,798	901	19%	4 3,728	3,791	3.982	5,328	5,451	5,519	5,542	16%	1.022	1,903	5,991
	5004	3,552	6.121	4.754	986	21%	4	3 766	4.088	4.968	5.042	5.689	5.905	10%	1.077	2.377	6.685
	5006 5007	4,843	7,859	6,033	1,091	18%	6 4,901 4	4,959	5,242	5,994	6,384	7,145	7,502	10%	3,724	-204	14,693
	5008 5009	63,232 6,658	79,112 13,360	70,223 8,671	7,073 2,682	10% 31%	6 63,537 5 6,792	63,843 6,926	65,149 7,329	67,785 7,862	76,310 8,148	79,041 11,275	79,076 12,318	8% 5%	29,766 3,101	10,802 1,506	129,865 13,909
	5010 5011	15,277	24,222	19,267 33.605	3,361	17%	6 15,634 6 31,158	15,992 31,421	16,884 31,978	19,102 33.076	21,092	22,708	23,465 36,450	11% 5%	10,692	-1,349 17.081	41,419
	5012 5013	11,359	19,802	15,401	3,031	20%	4 6 11,702	12,045	13,356	15,920	16,657	18,238	19,020	11%	3,125	8,981	21,483
	5014 5015	21,050	28,476	24,374	2,797	11%	4 5 21,423	21,795	22,913	23,988	25,444	27,263	27,870	5%	11,547	561	46,750
	5016 5017						4										
	5018 5019	8,826	13,645	10,653	2,179	20%	4 5 8,898	8,970	9,187	9,304	12,305	13,109	13,377	15%	10,522	-10,889	31,197
	5020 5021	135,022 19,608	200,472 30,659	165,255 24,534	21,097 4,703	13% 19%	6 141,512 5 19,779	148,002 19,950	161,225 20,462	162,052 24,242	168,749 27,698	185,711 29,475	193,092 30,067	2% 15%	25,024 5,905	117,764 11,586	217,862 35,205
	5022 5023	127,251	175,298	156,565	18,003	11%	5 133,210 2	139,168	157,044	157,437	165,795	171,497	173,397	3%	25,383	111,216	212,747
	5024 5025	39,882	53,985	47,042	5,952	13%	3 5 40,268	40,654	41,811	49,592	49,938	52,366	53,176	9%	7,673	37,119	67,813
	5026 5027	22,264 16,736	33,787 30,428	26,688 21,260	4,394 5,379	16% 25%	5 22,768 5 17,017	23,273 17,299	24,786 18,143	25,010 20,098	27,591 20,897	31,309 26,616	32,548 28,522	5% 7%	9,295 11,597	9,506 -3,097	46,687 43,292
СТР	6001 6002																
	6003 6004																
ALL-IN no-CTP	6005 10000																
Equity Cumulative IR Cumulative	11000 12000	289,899	381,107	350,257	32,455	9%	3 6 302,997	316,095	345,205	358,809	368,889	375,868	378,487	3%	59,576	242,648	480,951
FX Cumulative Commodity Cumulative	13000 14000	704,509	929,263	784,431	75,920	10%	7 713,584	722,658	738,223	771,643	804,577	873,185	901,224	4%	108,524	539,370	973,466
CS Cumulative CTP Cumulative	15000 16000	188,625	266,822	220,749	28,906	13%	5 192,312	196,000	207,062	220,414	220,820	248,421	257,622	3%	59,477	102,582	340,491



Table 35: VaR statistics (medium L3 A&L banks only)

	[Other sta	ats						Percentiles				Γ		Extreme Values ran	ge (Full Sample)
	Port. ID	Min	Mex	Ave.	STDev	Coefficient of variation N (STDev/Mean)	um obs.		10th	25th 5	0th (Median)	75th	90th	95th	Interquantile range	STDev_trunc ¹	-2*STDev_trunc	+2*STDev_trunc
	1001 1002	276,609 138,749	503,770 329,653	391,319	75,304 56,958	19%	14	283,372	288,122 181,537	336,095 217,433	422,266	440,945 272,773	471,514	491,248	13% 11%	87,495 67,607	235,100 127,896	585,082 398,325
		204	2,441	246,802 1,486	655	23% 44%	12 13	161,940 549	835	1,079	263,110 1,478	1,981	319,416 2,354	326,294 2,436	29%	697	179	2,967
	1004 1005	512 51,771,147	1,840 67,700,086	1,234 58,321,716	334 5,452,782	27% 9%	13 13	751 52,411,227	927 52,999,249	1,067 54,687,404	1,267 56,300,445	1,414 63,863,734	1,544 66,350,187	1,666 67,250,705	14% 8%	508 7,394,419	266 41,474,204	2,299 71,051,881
	1006 1007	1,633 8,504	4,445 24,389	2,877 15,581	854 5.040	30% 32%	12	1,736	1,827	2,440 11,736	2,837	3,503 17,447	3,836 21,806	4,130 23,097	18% 20%	1,022	786	4,873 33,510
Equity		13,709	26,168	19,443	3,792	20%	11	14,018	14,326	17,001	20,835	21,386	22,838	24,503	11%	5,081	9,847	30,171
-4,	1009 1010	47,697 24,254	81,321 39,997	59,467 33,606	8,938 4,556	15% 14%	12	48,884 26,335	50,209 28,416	53,438 32,250	58,773 33,786	62,319 35,715	66,849 39,555	73,500 39,776	8% 5%	15,628 6,262	25,609 19,789	88,120 44,835
	1011 1012	261,378	472,175	367,912 350.408	70,733	19%	13 13	267,598 253,876	272,320 257,971	315,486 300.044	400,362 381,296	407,236	444,208 427,871	460,902 438,689	13% 13%	77,199 75,097	239,951 227,484	548,745
		44,653	90,767	64,052	11,716	18%	12	47,275	50,175	60,483	64,579	66,522	74,479	82,230	5%	17,880	22,768	94,287
	1014 1015	142,739 138,051	300,638 239,711	217,300 173,567	45,739 31,815	21% 18%	12 9	160,093 139,757	174,527 141,462	182,776 144,903	206,778 182,900	251,334 184,081	260,390 197,782	278,533 218,747	16% 12%	51,745 33,844	113,094 114,209	320,072 249,587
	1016 2001	51,102 144.168	316,474 246.875	203,108	107,005	53%	5	75,723	100,343	174,205	178,885	294,876	307,835 238,536	312,154	26%	103,704	-30,863	383,952
	2002 2003	154,709 23,181	239,967 30,910	185,204 26,934	28,751 2,033	16%	16 15	155,113 23,746	155,250 24,459	161,817 25,919	179,641 26,904	203,304 28,217	229,473 29,101	235,736 29,673	11%	30,522 2,448	118,133 22,711	240,220
		80,136	142,257	110,523	19,854	18%	15	82,805	85,010	91,374	111,092	120,773	138,297	139,361	14%	26,439	58,799	164,555
	2005 2006	8,632 22,262	50,510 48,230	32,590 30,302	14,865 6,530	46% 22%	9 15	11,772 22,305	14,913 22,839	21,452 26,277	30,376 29,807	45,314 32,821	46,818 35,135	48,664 39,070	36% 11%	24,422 9,718	-17,784 10,372	79,905 49,242
	2007 2008	57,406 46,268	102,764 131,950	79,656 84,092	13,396 25,276	17% 30%	14 16	62,971 56,218	66,610 60,120	68,944 65,390	78,966	84,975 90,006	99,566 124,819	102,434 127,619	10% 16%	24,994 28,419	29,327	129,303 137,951
		171,470	240,874	201,769	18,489	9%	14	172,398	177,067	192,198	201,614	210,920	220,466	229,682	5%	20,895	157,639	241,220
	2010 2011	129,752 368,225	222,188 506,035	176,737 424,447	29,002 43,802	16% 10%	16 15	132,320 371,561	138,903 377,419	162,336 388,079	172,691 404,835	199,590 458,881	215,191 475,694	218,551 487,202	10% 8%	34,902 57,813	106,503 289,208	246,111 520,462
Interest Rate	2012 2013	49,735 38,069	126,712 48,481	79,185 41,891	21,575 3,237	27% 8%	15 15	53,692 38,411	58,375 38,844	67,403 39,789	74,668 40,291	85,051 44,348	110,900 46,340	121,249 47,556	12% 5%	54,394 9,175	-30,315 23,712	187,263 60,413
		25,727	71,063	44,353	15,548	35%	12	26,660	27,477	29,438	43,334	57,910	62,482	66,534	33%	15,362	11,258	72,706
	2015 2016	6,574 94,258	19,941 159,856	10,642 119,779	4,109 20,780	39% 17%	13 14	6,965 94,955	7,306 98,210	8,002 106,524	9,026 112,956	11,886 129,679	16,539 151,686	18,203 156,408	20% 10%	7,296 40,617	-3,493 38,858	25,693 201,327
	2017 2018	19,701 17,817	40,630 35,185	28,644 24.418	6,376 5.021	22% 21%	15 14	20,374 18,765	21,513 19,637	25,137 22,140	27,046	31,154 24,910	38,393 32.265	39,282 34,035	11%	9,235 7,696	10,444 8,724	47,382 39,508
		8,295	17,378	11,257	3,327	30%	15	8,354	8,477	8,979	9,700	12,630	16,967	17,139	17%	4,287	1,981	19,129
	2020 2021	28,149 28,455	54,205 52,920	41,662 37,108	8,268 6,205	20% 17%	16 14	30,161 30,176	31,466 31,432	35,810 32,287	41,289 37,178	47,275 40,323	52,547 41,768	53,632 45,752	14% 11%	9,406 13,360	24,144 11,257	61,769 64,697
	2022 2023	152,112 26.065	304,945 97,586	211,089 42,101	52,088 16.897	25% 40%	13 18	155,081 28.005	158,101 29,429	165,615 32,147	200,525 36,347	229,140 49,813	296,439 55,343	304,348 63,281	16% 22%	85,977 31,334	32,985 -24,459	376,891 100,878
	3001	345,264	630,918 395,933	472,397 320,415	73,145 35,386	15% 11%	15	364,925	379,931 296,541	425,466 306,128	486,346 317,900	509,065 331,129	535,007 352,319	565,295 370,636	9%	74,729 82,435	336,133	635,047 492,074
	3002 3003	241,935 74,228	181,873	118,632	27,207	23%	13 14	273,460 83,948	89,886	96,392	123,073	131,788	138,540	154,349	16%	37,359	162,334 54,770	204,208
FX	3004 3005	374,887 315,860	525,578 439,428	450,767 369,799	44,105 28,544	10% 8%	15 13	383,010 331,116	395,312 343,956	428,324 360,097	453,913 368,956	476,947 382,106	509,388 388,351	519,499 409,249	5% 3%	45,697 42,318	366,411 289,928	549,199 459,200
	3006 3007	10,571	23,789 727,498	16,981 524.908	4,157	24% 18%	16	10,861	12,060	14,654 488,728	15,721	19,822 531,568	22,816	23,782	15%	7,041	2,407	30,572
	4001	8,992	55,740	28,654	15,502	54%	8	11,016	13,039	17,795	26,513	38,564	44,526	50,133	37%	20,710	-17,891	64,950
Commodities	4002 4003	333,732 382,949	409,336 599,139	361,044 514,045	27,178 62,700	8% 12%	7	333,813 419,858	333,894 456,768	338,946 495,028	358,860 531,854	373,745 536,567	388,335 563,521	398,835 581,330	5% 4%	58,472 113,229	249,065 305,828	482,951 758,742
	4004 5001	233,817 4,278	367,491 10,534	318,685 6.898	45,023 1,773	14% 26%	7	253,863 4,531	273,908	309,104 5.892	318,715	346,281	366,212 9.041	366,851	6% 12%	93,386 1.899	140,430 3,104	513,974
	5002 5003	16,044	31,316	22,650	4,785	21%	11	16,194 3.397	16,343 3,406	19,316 3.489	23,123	25,866	26,214	28,765 5,795	14%	4,520	14,083	32,163
	5004	6,932	14,052	9,894	2,304	23%	11 11	7,045	7,157	7,908	9,895	11,463	12,143	13,098	18%	2,099	6,250	14,644
	5005 5006	3,321 2,322	5,675 14,499	4,492 7,342	617 3,423	14% 47%	11 9	3,584 3,254	3,847 4,186	4,217 4,875	4,531 7,333	4,830 8,671	4,946 9,893	5,311 12,196	7% 28%	1,077 3,724	2,377 -204	6,685 14,693
	5007 5008	21,691 54,021	66,095 114,856	37,663 71,772	15,370 17,377	41% 24%	10 12	21,855 54,850	22,019 55,636	26,644 59,451	32,975 67,517	49,874 78,682	55,464 87,723	60,780 100,159	30% 14%	44,820 29,766	-52,053 10,802	127,225 129,865
		5,414	13,193	8,146	2,644	32%	11	5,494	5,573	6,185	7,142	9,556	12,156	12,675	21%	3,101	1,506	13,909
	5010 5011	13,737 26,110	30,295 49,744	18,727 34,341	4,554 6,595	24% 19%	11 10	13,877 26,537	14,016 26,963	16,104 31,110	18,641 34,119	20,188 36,245	20,634 38,592	25,465 44,168	11% 8%	10,692 9,166	-1,349 17,081	41,419 53,743
	5012 5013	1,750 10,066	4,986 21,007	3,011 15,849	1,086 3,526	36% 22%	11	1,930 10,945	2,110 11,823	2,341 14,438	2,656 15,185	3,325 18,147	4,967 20,674	4,977 20,841	17% 11%	1,571 3,125	-128 8,981	6,157 21,483
Credit Spread		2,231	6,356	3,918	962	25%	13	2,775	3,151	3,518	3,837	4,087	4,687	5,407	7%	1,212	1,581	6,430
	5015 5016	16,919 28,816	33,296 50,472	22,978 42,355	5,155 6,873	22% 16%	11 10	17,592 32,477	18,265 36,138	19,781 38,378	21,231 43,213	24,192 48,105	31,254 49,869	32,275 50,171	10% 11%	11,547 9,445	561 23,479	46,750 61,257
	5017 5018	12,754 34,311	36,677	25,462	7,440	29% 25%	10 11	15,562	18,370 49.071	22,123	23,368	30,554	35,367	36,022 88,118	16%	9,392 17,586	4,585	42,151 97.083
	5019 5020	7,123 118,540	20,071 207,875	11,115 164,493	3,496 23,581	31% 14%	12	7,826	8,424 130,552	9,407 159,240	9,962 167,799	11,910	14,234	16,884 193,900	12%	10,522 25,024	-10,889 117,764	31,197
		14,740	32,470	23,084	5,151	22%	12 12	123,424 16,867	18,671	19,621	22,368	176,472 25,948	181,869 30,297	31,505	14%	5,905	11,586	217,862 35,205
	5022 5023	114,514 40,813	186,894 94,343	155,227 71,187	20,597 18,776	13% 26%	11 6	119,249 45,494	123,984 50,175	149,879 62,896	160,519 74,807	165,458 81,274	170,251 88,581	178,573 91,462	5% 13%	25,383 18,751	111,216 25,463	212,747 100,467
	5024 5025	19,679 48,432	69,802 66,740	45,535 54,502	18,612	41% 10%	12	21,643 48,732	23,333	28,842 51,817	46,643	60,482 55,844	66,023 60,193	67,746 63,466	35% 4%	20,543	-5,196 37,119	76,976 67,813
		20,340	43,473	31,101	8,430	27%	11	21,561	22,782	24,177	29,212	38,363	43,252	43,363	23%	9,295	9,506	46,687
	5027 6001	14,486	30,822	19,164	4,866	25%	10	15,159	15,832	16,322	17,500	20,560	24,041	27,432	11%	11,597	-3,097	43,292
СТР	6002 6003						2											
C/P							2											
ALL-IN no-CTP	6005 10000	509,460	968,126	736,541	156,358	21%	2	535,525	561,590	629,049	776,141	821,982	884,033	926,080	13%	159,483	497,027	1,134,959
Equity Cumulative IR Cumulative	11000 12000	157,349 280,584	294,879 437,127	221,978 369,939	41,721 45,377	19% 12%	10 15	164,845 311,423	172,340 328,661	206,415 338,278	215,948 359,929	238,942 413,203	277,066	285,973 434,376	7% 10%	51,761 59,576	112,185 242,648	319,230 480,951
FX Cumulative	13000	683,468	857,655	750,428	53,393	7%	14	684,255	686,369	712,011	746,934	767,175	822,684	838,126	4%	108,524	539,370	973,466
Commodity Cumulative CS Cumulative	14000 15000	319,755 157,424	502,693 232,845	379,751 206,218	70,120 26,978	18% 13%	8 9	323,513 163,425	327,271 169,426	331,286 187,013	351,975 218,768	400,737 225,135	481,819 227,228	492,256 230,037	9% 9%	71,323 59,477	228,435 102,582	513,726 340,491
CTP Cumulative	16000						2											



Table 36: VaR statistics (high L3 A&L banks only)

				Other sta	ts					Percentiles						Extreme Values ra	nge (Full Sample)
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation Num obs.		10th	25th	50th (Median)	75th	90th	95th	Interquantile range	STDev_trunc ¹	-2*STDev_trunc	+2*STDev_trunc
	1001	291,555	545,084	399,977	105,003	(STDev/Mean) 26% 5	296,609	301,663	316,826	382,605	463,814	512,576	528,830	19%	87,495	235,100	585,082
	1002 1003	1,148	2,636	1,860	532	4 29% 5	1,262	1,377	1,720	1,884	1,912	2,346	2,491	5%	697	179	2,967
	1004 1005					2											
	1006	2,475	4,213	3,171	655	21% 5	2,546	2,617	2,830	3,050	3,288	3,843	4,028	7%	1,022	786	4,873
Equity	1007	42.816	84.955	63.741	19.090	4 30% 5	43.712	44.607	47.294	62.633	81.006	83.375	84.165	26%	15.628	25.609	88.120
		42,816		373.591		30% 5 4 26% 5		283,605	47,294	355.081	435.040						548,745
	1011 1012	259,530	506,663 481,566	356,272	96,841 92,937	26% 5	279,641 264,014	268,498	281,951	340,942	417,370	478,014 455,888	492,338 468,727	19% 19%	77,199 75,097	239,951 227,484	527,872
	1013 1014	46,500	93,216	67,680	19,432	29% 5 4	48,201	49,902	55,004	61,484	82,195	88,808	91,012	20%	17,880	22,768	94,287
	1015 1016					4											
	2001 2002	148,895 137,288	233,368 203,647	198,251 169,717	25,846 25,133	13% 8 15% 6	163,581 140,155	178,266 143,021	192,068 151,868	194,299 169,896	210,223 186,262	229,110 196,235	231,239 199,941	5% 10%	38,700 30,522	118,497 118,133	273,297 240,220
	2003 2004	23,462 85,380	29,754 129,790	27,917 107,952	2,120 15,050	8% 7 14% 8	24,665 88,680	25,868 91,980	27,742 100,447	28,295 106,167	29,211 115,582	29,524 128,045	29,639 128,917	3% 7%	2,448 26,439	22,711 58,799	32,502 164,555
	2005 2006	18,671	36,440	28,279	6,455	23% 2	19,624	20,576	24,188	29,044	32,710	35,308	35,874	15%	9,718	10,372	49,242
	2007 2008	61,805 60,540	97,089 107,676	77,966 78,470	12,567 16,821	16% 6 21% 6	63,412 61,283	65,019 62,026	69,758 66,851	78,441 78,935	83,479 81,168	90,440 94,450	93,764 101,063	9% 10%	24,994 28,419	29,327 24,275	129,303 137,951
	2009 2010	160,752 134,005	221,026 210,035	194,946 178,458	21,240 23,253	11% 8 13% 8	164,250 147,309	167,749 160,612	183,198 172,922	197,971 174,869	211,306	215,422 206,200	218,224 208,118	7%	20,895	157,639 106,503	241,220 246,111
		352,525	484,208	423,153	51,646	12% 8	363,324	374,122	384,242	421,999	465,802	476,553	480,380	10%	57,813	289,208	520,462
Interest Rate	2012 2013	64,158 28,039	150,338 53,227	87,881 41,100	31,323 7,163	36% 6 17% 8	66,429 31,780	68,700 35,521	74,020 38,870	77,571 40,731	83,001 43,017	117,372 48,590	133,855 50,909	6% 5%	54,394 9,175	-30,315 23,712	187,263 60,413
	2014 2015	30,368 6,199	57,688 14,025	38,894 10,154	11,458 3,622	29% 5 36% 7	30,633 6,217	30,898 6,236	31,693 6,374	32,739 12,623	41,982 12,741	51,406 13,256	54,547 13,641	14% 33%	15,362 7,296	11,258 -3,493	72,706 25,693
	2016 2017	89,996 19,800	179,909 43,709	126,835 31,162	30,481 9,116	24% 6 29% 6	94,324 21,340	98,652 22,881	110,703 26,468	124,939 28,501	132,687 37,630	156,914 42,105	168,412 42,907	9% 17%	40,617 9,235	38,858 10,444	201,327 47,382
	2018 2019	16,223 6,079	32,911 16,287	24,300 11,665	4,735 3,933	19% 8 34% 7	18,359 6,795	20,494 7,511	22,555 8,659	24,064 12,083	25,876 14,944	28,435 15,754	30,673 16,021	7% 27%	7,696 4,287	8,724 1,981	39,508 19,129
	2020 2021	31,857 31,387	51,795 54,940	43,344 41,149	6,813 8,558	16% 6 21% 6	34,258 32,536	36,658 33,684	41,827 36,097	43,311 38,898	47,172 45,429	50,063 50,864	50,929 52,902	6% 11%	9,406 13,360	24,144 11,257	61,769 64,697
	2022 2023	144,138 19,646	372,082 44,785	262,031 35,732	91,320 10,170	35% 5 28% 6	154,634 21,863	165,131 24,081	196,620 29,976	284,771 38,753	312,545 43,744	348,267 44,364	360,175 44,575	23% 19%	85,977 31,334	32,985 -24,459	376,891 100,878
	3001 3002	342,985	541,772	458,420	75,873	17% 6	354,374	365,762	413,120	487,208	498,992	522,289	532,030	9%	74,729	336,133 162,334	635,047 492.074
FX	3003	80,610	185,141	130,742	38,691	30% 6	87,872	95,135	110,585	121,371 447.080	157,069	175,720	180,431	17%	37,359	54,770	204,208
1X	3004 3005	391,769 310,237	477,163 411,007	439,214 374,501	38,539 42,621	9% 5 11% 5	394,808 318,606	397,847 326,974	406,964 352,080	395,015	473,094 404,167	475,535 408,271	476,349 409,639	8% 7%	45,697 42,318	366,411 289,928	549,199 459,200
	3006 3007	11,510 378,329	18,168 584,002	15,557 516,146	2,522 83,942	16% 6 16% 5	12,244 401,697	12,978 425,065	14,515 495,170	15,640 559,163	17,593 564,068	18,053 576,028	18,111 580,015	10% 7%	7,041 111,233	2,407 307,313	30,572 752,246
Commodities	4001 4002					2											
commonities	4003 4004					1											
	5001 5002					3											
	5003 5004					3											
	5005 5006					2											
	5007 5008					3											
						4											
	5010 5011					3											
	5012 5013					3											
Credit Spread	5014 5015					3											
	5016 5017					2											
	5018 5019					1											
						4											
	5021 5022					3											
	5023 5024					3											
	5025 5026					2											
	5027 6001					3											
СТР	6002 6003					1											
	6004 6005					1											
ALL-IN no-CTP	10000					3					284,552						319,230
Equity Cumulative IR Cumulative	11000 12000	193,118	311,963	242,391	52,530	22% 5	195,817	198,516	206,614	215,708	284,552	300,999	306,481	16%	51,761	112,185	319,230
FX Cumulative Commodity Cumulative	13000 14000					4											
CS Cumulative CTP Cumulative	15000 16000					3											



Table 37: VaR statistics (IR and CS asset classes – only banks with general and specific IR risk approval)

				Other sta	ats						Percentiles				1
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range
	2001	144,168	258,202	194,763	33,254	17%	20	147,783	159,450	166,478	191,286	211,238	241,008	247,441	
	2002	148,754	239,967	184,268	28,382	15%	18	154,273	155,251	161,054	178,763	202,673	228,167	236,971	
	2003	23,181	31,062	27,840	2,055	7%	16	24,670	25,574	26,749	28,190	29,074	30,213	31,031	4%
	2004	67,975	138,801	112,522	21,598	19%	20	84,510	85,552	91,374	114,596	132,161	135,771	138,416	18%
	2005	4,629	64,885	30,903	20,903	68%	9	6,230	7,831	16,483	21,810	45,314	53,385	59,135	
	2006	18,671	45,679	28,846	6,930	24%	16	21,364	22,474	24,337	27,694	31,738	37,195	40,854	
	2007	61,099	126,190	81,589	18,855	23%	16	61,629	64,956	68,482	75,464	87,390	108,633	117,804	12%
	2008	58,948	131,950	89,031	28,491	32%	19	60,321	60,527	63,419	81,003	124,152	130,124	131,950	
	2009	171,470	240,874	204,149	18,773	9%	18	172,683	182,523	192,951	203,678	213,402	226,208	238,686	
	2010	129,752	232,375	175,521	30,199	17%	20	133,005	143,485	149,830	172,280	190,972	217,823	222,697	12%
	2011	352,795	508,469	422,712	50,974	12%	18	365,911	370,602	383,549	397,511	465,724	487,202	506,400	
Interest Rate	2012	55,388	150,338	82,330	23,296	28%	19	62,109	63,898	68,490	75,067	85,081	114,514	122,051	
	2013	28,039	53,227	42,375	5,500	13%	17	36,453	38,987	40,135	41,822	44,608	48,459	50,972	
	2014	25,727	59,359	43,665	9,852	23%	14	30,667	33,443	37,192	42,831	47,364	57,610	58,273	12%
	2015	6,574	19,941	11,900	4,337	36%	14	7,092	7,448	8,627	11,251	13,903	18,286	19,211	
	2016	94,258	179,909	123,832	24,567	20%	17	95,116	101,609	108,710	112,893	132,839	158,322	163,867	
	2017	19,701	45,864	30,379	7,857	26%	20	19,795	22,490	25,518	28,802	33,623	43,823	44,898	
	2018	15,905	35,185	23,988	4,867	20%	18 19	17,530	18,838	21,807	23,053	25,404	31,228	32,594	
	2019 2020	8,190	18,782	12,255	3,694	30% 19%	19	8,425	8,463	9,233	10,555	16,119 50.063	16,944	17,420	
	2020	30,832 31,387	56,843	43,553 40,136	8,060 9,624	24%	19	31,755 31,905	32,051 32,168	39,015 33,274	42,929 37,156	41,477	54,442 55,294	55,537 59,692	12%
	2021		63,040			24%	1/								29%
	2022	152,112 19,646	353,823 57,227	228,061 38,609	67,465 10,436	30%	21	158,075 21,541	161,164 28,515	167,213 32,192	201,372 37,498	304,120 44,785	308,745 54,535	322,865 54,535	29%
	5001	4,259				27%	16	4,273	28,515						10%
	5001	4,259	9,493 27,093	7,049 22,212	1,539 3,828	22%	15	4,273	16,354	6,071 19,804	7,101 23,123	8,032 25,623	9,053 25,986	9,351 26,453	14%
	5002	3,387	5,976	4,315	3,828	22%	15	3,404	3,412	3,489	3,943	5,390	25,986	26,453	21%
	5003	3,387	12,278	4,315	1,834	22%	19	3,404	3,412	3,489	3,943 9,895	5,390	12,139	5,915	
	5004	3,321	6,121	4,478	1,054	15%	17	3,506	3,729	4.090	4,368	4,848	4,998	5,258	8%
	5006	2,322	14,499	7,050	2,549	36%	19	4,419	4,805	5,410	6,768	8,265	8,943	10,226	
	5007	21,691	71,614	42,213	15,879	38%	19	24,701	26,708	29,565	37,443	54,071	63,820	68,027	21%
	5008	54,021	114,856	75,262	19,381	26%	18	56,215	57,635	63,537	67,785	79,076	110,805	114,856	
	5009	5,414	13,360	8,633	2,526	29%	18	6,018	6,205	6,779	7,720	9,676	12,467	13,218	
	5010	13,737	30,295	20,260	5,004	25%	19	13,988	14,920	16,886	20,165	20,990	28,765	30,295	
	5011	26,110	49,744	35,858	6,676	19%	18	26,916	29,744	32,132	35,087	36,450	47,669	49,744	6%
	5012	1.654	5,763	2,986	1,170	39%	18	1,736	1,803	2,171	2,586	3,462	4.812	5,086	
	5013	10,066	21,007	15,299	3,219	21%	19	10,066	11,100	13,527	15,232	16,906	19,976	20,707	11%
Credit Spread	5014	2,231	6,357	4,219	1,343	32%	15	2,517	2,838	3,363	3,882	5,151	6,224	6,356	
	5015	14,571	39,379	23,634	6,143	26%	16	16,332	17,592	20,515	23,285	24,907	30,886	34,817	
	5016	27,466	59,819	40,886	8,941	22%	14	28,344	29,258	37,182	40,014	44,789	50,271	53,743	9%
	5017	12,754	36,677	23,858	6,874	29%	12	15,386	17,685	20,004	22,191	28,143	32,481	34,449	17%
	5018	34,311	89,229	58,119	15,192	26%	13	37,397	40,466	49,071	55,905	70,145	71,337	78,635	18%
	5019	7,123	20,848	11,711	4,207	36%	16	8,082	8,558	9,097	9,962	12,640	18,835	20,265	16%
	5020	118,540	200,472	163,664	21,963	13%	17	125,644	131,981	159,405	162,146	170,950	193,241	197,609	3%
	5021	14,740	32,470	23,716	4,799	20%	14	17,254	18,907	20,349	23,915	26,340	29,771	31,293	13%
	5022	114,514	192,895	156,288	21,607	14%	15	121,143	125,291	149,879	157,437	168,023	180,394	186,523	6%
	5023	40,813	94,343	67,167	17,653	26%	9	43,489	46,164	53,884	70,121	76,638	87,424	90,883	17%
	5024	19,679	69,802	38,155	17,667	46%	13	21,822	23,320	24,082	28,793	54,613	64,201	67,314	
	5025	39,882	66,740	51,422	6,647	13%	14	41,136	43,676	48,620	50,878	53,897	57,742	61,420	5%
	5026	20,340	43,473	31,458	7,922	25%	16	21,783	22,587	24,954	28,986	39,105	41,691	43,307	22%
	5027	14,486	30,822	21,916	6,121	28%	15	15,754	16,336	17,035	20,098	28,587	30,664	30,822	25%
IR Cumulative	12000	280,584	447,514	371,430	47,869	13%	16	311,633	323,311	337,010	367,149	414,067	435,162	439,724	10%
CS Cumulative	15000	157,424	338,003	222,442	44,937	20%	15	167,925	178,261	197,463	220,414	225,480	274,570	297,216	7%



Table 38: VaR statistics (IR and CS asset classes – only banks with general IR risk approval)

		Other stats Coefficient of							Percentiles							
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range	
	2001	148,895	233,368	198,450	19,659	10%	15	174,055	186,592	192,020	195,897	204,945	223,547	229,110	3%	
	2002	136,316	234,325	170,759	26,107	15%		136,948	137,712	156,335		179,375	192,702	208,351	7%	
	2003	23,462	30,434	27,405	2,242	8%		23,572	23,833	26,058		29,039	29,973	30,328		
	2004	80,136	142,257	108,870	20,294	19%		82,627	83,776	93,785		124,793	136,204	139,415		
	2005	15,707	45,895	29,496	10,935	37%		17,619	19,531	25,268		30,376	39,687	42,791	9%	
	2006	15,587	36,440	28,263	6,525	23%		18,717	21,846	23,515		33,301	35,122	35,781	17% 15%	
	2007	57,406	123,613	80,833	20,358	25%		57,741	58,076	67,242 56,732		90,440	102,764	113,189 111,498		
	2008 2009	46,268 160,752	115,320 213,020	74,956 194,532	24,258 14,265	32%		47,325 168,248	48,382 178,773	188,928		91,273 205,186	107,676 210,726	211,306	23%	
	2003	134,005	210,020	178,600	14,205	10%		156,650	167,933	172,768		184,462	201,193	206,200	3%	
	2010	352,525	484,208	406.220	40,681	10%		361,576	368,792	381,831		442,221	464,823	473,956		
Interest Rate	2012	49,735	181,999	88,359	39,808	45%		59,769	65,814	67,603		83,681	150,180	178,901	11%	
niter est finite	2013	38,069	48,481	41,696	3,161	8%		38,530	38,757	39,214		43,601	46,006	47,166	5%	
	2014	15,534	71,063	41,266	20,580	50%		20,505	25,476	29,930		62,829	69,635	70,349		
	2015	6,199	14,573	9,767	2,899	30%		6,242	6,339	7,245		11,862	13,806	14,535	24%	
	2016	89,996	154,551	121,651	18,852	15%		97,464	104,931	112,956		127,404	150,917	152,734	6%	
	2017	20,663	44,847	33,188	8,425	25%	10	22,460	24,258	26,366	32,471	40,598	42,375	43,611	21%	
	2018	14,378	37,897	25,615	6,156	24%	16	15,762	19,158	22,644	24,450	29,895	33,242	34,654	14%	
	2019	6,079	18,782	11,845	4,207	36%	15	7,424	8,118	8,502	9,550	15,385	17,420	17,848	29%	
	2020	28,149	56,069	43,240	7,592	18%	14	31,108	33,801	39,245	43,573	48,121	50,972	53,198	10%	
	2021	28,455	54,940	38,798	8,672	22%	11	29,779	31,103	33,056	35,981	41,623	53,338	54,139	11%	
	2022	98,104	372,082	206,907	81,276	39%		116,518	134,931	157,060		229,140	302,233	337,158		
	2023	26,065	83,915	40,858	18,484	45%	14	27,548	28,783	30,331	33,592	39,340	70,526	82,618	13%	
Credit Spread	5001 5003 5004 5005 5006 5006 5008 5008 5008 5010 5011 5011 5013 5014 5015 5016 5017 5018 5019 5020 5021 5022 5022 5022 5022 5022	54,596 4,987 12,977 27,025 132,699	117,512 8,889 29,715 52,921 200,472	73,347 6,646 19,097 35,619 171,249	23,501 1,536 6,326 10,253 22,376	32% 23% 33% 29%	5 5 2 4 4 3 3 4 4 4 4 4	54,829 5,104 13,723 27,762 141,478	55,063 5,221 14,469 28,500 150,256	57,455 5,573 16,706 30,712 167,885	6,453 17,062 30,895	76,741 7,329 19,023 36,543 180,578	98,194 8,265 25,438 46,370 191,212	107,853 8,577 27,577 49,645 195,842	14% 6%	
IR Cumulative CS Cumulative	5027 12000 15000	289,899	413,874	357,038	31,838	9%	4 10 4	311,893	333,887	345,584	356,817	372,342	381,628	397,751	4%	

EU Statistics for VaR

Table 39: VaR statistics (EQ asset class – only banks with general and specific EQ risk approval)

				Other sta	its						Percentiles				
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range
	1001	276,609	545,084	411,630	83,599	20%	22	281,230	284,401	346,910	433,171	477,217	503,218	503,748	16%
	1002	180,915	343,002	258,675	48,151	19%	17	185,893	195,500	227,531	265,121	279,429	325,989	332,323	10%
	1003	779	2,441	1,570	537	34%	18	950	997	1,079	1,526	2,025	2,227	2,434	30%
	1004	911	1,840	1,356	249	18%	18	977	1,044	1,152	1,403	1,528	1,591	1,673	14%
	1005	52,797,141	67,700,086	58,558,723	5,629,959	10%	15	52,825,705	53,577,730	54,997,776	56,225,640	62,917,057	67,277,468	67,556,550	7%
	1006	1,633	4,445	2,923	774	26%	19	1,802	1,855	2,453	2,915	3,501	3,766	3,929	18%
	1007	2,132	24,389	15,154	5,436	36%	15	6,592	9,797	12,525	15,569	18,300	20,679	22,129	19%
Equity	1008	14,326	26,168	20,182	2,713	13%	18	15,727	16,731	18,450	20,855	21,442	22,067	23,338	8%
Lyony	1009	42,816	84,955	57,986	10,711	18%	20	44,549	47,391	50,011	58,215	61,400	68,523	81,503	
	1010	24,254	43,968	34,154	5,147	15%	19	27,674	28,344	31,184	32,656	39,542	39,749	40,394	12%
		261,378	506,663	390,492	74,353	19%	21	267,886	274,622	355,081	403,722	453,387	472,175	477,757	12%
		248,179	481,566	372,610	71,766	19%	21	253,093	259,158	340,942	388,357	437,302	447,090	462,573	12%
		36,106	93,216	60,403	13,469	22%	21	44,653	46,500	52,505	61,484	65,275	67,584	90,767	11%
		142,739	311,626	230,065	47,730	21%	21	165,926	176,623	194,090	227,615	260,447	300,638	300,638	15%
		135,207	245,197	189,341	36,802	19%	16	137,340	141,477	162,557	183,491	221,806	239,711	241,083	15%
	1016	51,102	294,876	172,358	94,326	55%		61,394	71,685	107,979	166,998	241,152	278,392	286,634	
Equity Cumulative	11000	157,349	311,963	226,338	45,863	20%	15	169,009	178,773	203,385	208,992	258,481	291,013	300,004	12%



Table 40: VaR statistics (EQ asset class - only banks with general EQ risk approval)

Max 5th 50th (N erq 349,30 54,0 401,97 316,82 358,55 51,728,788 70,540,542 57,284,091 8,009,150 51,739,378 51,749,968 51,965,728 52,858,801 61,251,884 67,243,505 68,892,02



Table 41: Stress VaR statistics (2008-2009 stress period only)

				Other sta	its						Percentiles				
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range
	1001 1002	695,666 856,224	1,210,174 1,710,748	965,207 1.270.682	115,037 272.445	12% 21%	23 21	802,155 865,052	829,357 893.197	863,845 1.027.575	999,963 1.395.183	1,032,601 1.477.855	1,069,671 1.546.966	1,084,923 1,590,275	9% 18%
	1003	45	6,175	3,258	1,488	46%	20	604	1,499	2,497	3,541	4,136	4,612	5,075	25%
	1004 1005	56 114,333,423	4,645 207,722,826	2,412 174,419,383	1,364 27,176,692	57% 16%	18 18	563 134,548,896	963 142,385,147	1,689 151,253,279	1,918 181,734,188	3,428 198,626,435	4,508 200,685,021	4,609 201,864,314	34% 14%
	1005	2,034	8,770	5,925	1,880	32%	19	3,245	3,437	4,754	5,853	7,482	8,364	8,649	22%
	1007 1008	1,328 15.129	92,329 50,545	45,566 34,323	21,570 10.195	47% 30%	16 18	15,929 16,799	24,687 19.123	29,924 29,333	47,725 37,273	57,331 41.093	67,679 44,556	74,047 46.635	31% 17%
Equity	1008	64,768	50,545 98,092	34,323 82,933	9,715	30%	18	67,499	19,123 68,900	29,333 74,846	37,273 86,635	41,093 89,068	44,556 91,331	46,635 94,592	9%
	1010	91,888	157,766	134,164	16,596	12%	20	103,562	109,767	128,578	135,604	145,329	151,882	152,206	6%
	1011 1012	763,041 705,648	1,130,107 1,079,333	909,295 876,306	95,446 99,839	10% 11%	21 21	763,498 729,030	781,269 741,638	820,105 773,476	926,487 894,652	960,810 946,970	1,015,853 979,796	1,031,412 989,169	8% 10%
		20,752	120,621	73,144	28,581	39%	21	21,045	31,099	61,110	71,778	90,869	105,903	106,097	20%
	1014 1015	254,221 217,138	663,630 522,090	484,179 387,077	114,941 87,816	24% 23%	22 16	269,614 235,328	302,444 258,187	436,932 343,809	514,385 402,671	554,161 447,836	602,194 477,825	658,894 498,406	12% 13%
	1015	143,776	604,922	361,484	140,721	39%	10	175,177	206,577	283,474	345,069	458,337	537,370	571,146	24%
	2001 2002	153,539 108,963	277,488 210,802	219,768 173,559	29,130 24,029	13% 14%	25 25	176,847 134,634	188,425 153,101	205,946 162,910	217,422 171,569	235,883 192,407	255,113 204,526	264,691 208,372	7% 8%
	2003	19,445	44,997	34,996	5,879	17%	24	26,272	27,813	31,923	35,717	38,611	42,043	43,964	9%
	2004 2005	60,995 4,342	162,913 181,397	102,910 76,322	25,829 56,346	25% 74%	26 12	74,317 14,992	75,156 24,317	80,308 33,689	104,179 62,281	118,912 117,130	136,786 148,591	146,252 164,080	19% 55%
	2005	4,342 22,144	66,868	45,379	50,340 11,486	25%	22	25,058	24,317 27,755	33,089 39,298	47,276	50,847	148,591 58,902	164,080	13%
	2007	42,207	161,832	96,572	26,966	28% 38%	22	61,627	63,180 66 909	83,962 80,005	93,730	106,712	135,915	141,180	12%
	2008 2009	42,708 189,529	193,909 370,636	102,377 281,613	38,809 43,614	38% 15%	23 25	45,167 226,732	66,909 238,174	80,005 256,346	97,241 273,590	105,925 296,482	153,570 348,846	186,041 363,153	14% 7%
		138,186	249,740	197,862	26,215	13%	25	159,163	169,586	185,351	197,013	212,295	229,602	238,224	7%
Interest Rate	2011 2012	300,109 81,730	584,888 174,883	447,250 114,221	67,260 28,055	15% 25%	26 25	330,488 82,556	368,776 85,196	409,738 93,837	435,607 106.046	504,915 133,394	524,324 160,751	532,597 164,476	10% 17%
		27,619	66,742	44,328	9,718	22%	21	29,905	31,947	40,465	43,509	47,100	52,848	64,846	8%
	2014 2015	35,443 14,494	269,420 62,222	116,842 32,421	69,516 13,908	59% 43%	19 22	38,759 16,315	40,719 17,678	54,588 21,772	125,622 30.606	140,652 40,298	204,231 52,833	251,246 60,471	44% 30%
	2016	88,245	164,469	117,970	21,303	18%	22	90,795	93,536	102,050	115,663	134,778	141,685	158,424	14%
	2017 2018	60,853 11,041	326,623 33,775	186,005 23,856	71,438 4,961	38% 21%	19 23	86,139 14,394	104,783 17,217	133,650 22,344	189,038 25,578	233,979 26,637	275,410 27,562	282,245 28,469	27% 9%
	2018	12,729	25,775	19,323	3,405	18%	23	13,207	15,811	17,374	19,438	20,994	24,055	24,944	9%
	2020 2021	7,740 26.118	276,819 66.206	137,683 44.031	73,459 8,980	53% 20%	23 22	58,358 26,845	70,110 34,935	88,277 37.889	105,878 45.661	191,668 48.821	247,267 50,237	267,363 53.878	37% 13%
	2021	119,610	346,475	257,159	47,173	20%	22	20,845 210,683	225,246	232,092	45,001 259,911	285,739	297,696	336,005	13%
	2023	21,115	66,035	42,103	11,662	28%	24	28,060	30,369	33,761	38,778	51,743	56,333	58,801	21%
	3001 3002	558,145 362,315	1,217,111 926.123	954,708 708,897	181,116 144,968	19% 20%	24 21	722,884 534,277	777,367 534,722	790,826 611.031	951,483 705.610	1,106,492 789,748	1,195,207 893,235	1,211,302 910,544	17% 13%
	3003	80,700	374,845	263,612	66,306	25%	21	175,993	192,230	231,339	270,058	305,190	338,310	339,216	14%
FX	3004 3005	578,384 572,711	1,315,742 1,758,842	1,043,953 1,201,741	161,563 272,460	15% 23%	21 21	712,169 863,709	942,930 930,798	985,635 1.097,737	1,079,000 1,154,781	1,119,616 1,294,253	1,200,076	1,211,228 1.684,820	6% 8%
	3006	14,414	96,440	39,667	18,015	45%	22	18,527	18,763	25,346	41,081	43,863	55,612	61,059	27%
	3007 4001	1,021,016 27,580	2,423,672 69,841	1,726,943 46,377	352,941 12,389	20%	18	1,166,890 31,166	1,343,408 34,753	1,584,738 39,312	1,709,458 45,536	1,852,976 52,434	2,136,295 58,789	2,366,470 64,315	8% 14%
Commodities	4002	489,389	917,919	701,055	141,213	20%	10	504,466	519,544	606,431	693,577	795,377	862,133	890,026	13%
	4003 4004	651,717 649,554	1,814,706 851,341	1,368,453 782,077	333,886 72,155	24% 9%	9	871,321 667,884	1,090,924 686,214	1,282,149 758,520	1,403,230 801.000	1,453,524 830,815	1,749,684 850,397	1,782,195 850,869	6% 5%
	5001	7,415	24,325	15,635	5,626	36%	15	7,723	7,963	10,044	16,540	19,890	20,817	22,151	33%
	5002 5003	43,469 8,063	159,284 14,823	71,999 11,240	34,151 2,275	47% 20%	10 15	45,785 8,139	48,101 8,487	54,882 9,449	60,045 10,665	74,104 13,120	102,386 14,138	130,835 14,544	15% 16%
	5004	16,642	76,513	35,039	20,880	60%	11	16,866	17,090	22,365	25,538	37,680	72,726	74,620	26%
	5005 5006	4,646 13.030	32,798 52,753	16,959 30.655	8,939 14,604	53% 48%	13 15	7,962 15.016	10,316 16.157	10,982 18,597	12,709 23.902	20,547 45.616	30,967 49,437	32,082 51.617	30% 42%
	5007	38,947	194,212	92,036	44,895	49%	14	39,833	42,193	53,127	89,507	121,394	132,646	154,596	39%
	5008 5009	33,171 5,559	221,144 27,894	103,136 13,128	42,908 6,214	42% 47%	16 15	60,049 5,851	71,931 6,025	80,149 8,498	97,971 11,768	106,081 15,975	152,928 20,041	172,774 23,034	14% 31%
	5010	11,566	54,369	30,126	14,256	47%	16	16,060	18,314	19,771	23,745	40,298	52,218	53,928	31%
	5011 5012	16,553 4,970	106,101 12,248	56,084 8,018	27,308 2,067	49% 26%	17 14	25,880 5,154	31,327 5,290	35,446 6,268	47,765 8,118	63,518 9,303	102,009 9,495	105,811 10,459	28% 19%
	5012	12,372	71,170	40,742	18,587	26% 46%	14	5,134 19,019	22,291	25,283	39,774	51,971	9,495 69,358	70,387	35%
Credit Spread	5014 5015	5,927 13.479	19,522 38.580	11,391 28,216	3,808 6,450	33% 23%	14 14	6,003 16,917	6,682 20.429	8,469 27,752	11,428 28,973	13,534 29,776	15,029 35,995	16,963 38,165	23% 4%
	5015	40,738	38,580 169,297	28,216 91,938	40,995	23% 45%	14	47,459	20,429 53,660	62,251	28,973 86,340	103,477	35,995 160,014	38,105	4%
	5017 5018	25,828 68,955	125,566 242,254	70,172 130,600	31,171 55,946	44% 43%	13	30,530 73,206	36,295 77,321	48,875 94,619	73,444 116,139	84,227 141,898	115,856 225,438	123,650 237,548	27% 20%
	5018	14,642	42,254	22,579	6,888	43%	12 14	16,334	17,321	94,619 18,704	20,690	141,898 24,173	225,438 27,786	237,548 33,214	13%
	5020	129,809	264,353	186,430	39,105	21%	15	131,382	137,003	157,421	184,122	209,436	228,250	240,820	14%
	5021 5022	36,046 144,339	185,369 335,507	104,838 230,837	52,341 66,281	50% 29%	13 14	42,381 150,212	46,611 155,639	53,076 176,685	98,528 225,317	145,984 278,859	171,719 324,161	178,778 331,409	47% 22%
	5023	33,865	235,521	131,870	64,968	49%	12	49,234	62,508	77,910	134,091	180,399	216,537	227,005	40%
	5024 5025	27,952 66,819	156,446 145,107	77,869 99,519	42,511 26,714	55% 27%	14 12	30,850 68,658	33,673 70,794	40,846 80,060	66,721 95,282	106,689 108,694	134,473 141,591	144,721 143,834	45% 15%
	5026	24,467	76,948	42,758	16,390	38%	14	24,522	26,483	32,054	38,239	48,943	68,642	75,701	21%
	5027 6001	7,077	74,995 173.404	30,850 87,100	17,401 74,355	56% 85%	15	13,657 14,560	18,171 19.687	20,974	23,598 82,782	40,141 134.811	50,021 157.967	57,642 165.685	31% 59%
	6002	9,686	116,513	74,547	49,650	67%	4	17,512	25,337	48,814	85,994	111,726	114,598	115,556	39%
CTP	6003 6004	2,661 2,203	14,305 12,701	7,762 7,909	5,661 5,525	73% 70%	4	2,774 2,494	2,887 2,785	3,227 3,659	7,040 8,366	11,575 12,616	13,213 12,667	13,759 12,684	56% 55%
	6004 6005	40,269	173,404	7,909 88,999	73,388	82%	4	41,575	42,880	46,797	53,325	12,616	149,388	161,396	42%
ALL-IN no-CTP Equity Cumulative	10000 11000	1,429,751 485,203	2,353,012 865,476	1,953,237 672,183	351,840 105,839	18% 16%	8 15	1,462,984 532,713	1,496,217 558,790	1,645,148 613,982	2,124,905 645,546	2,189,219 735,569	2,243,489 816,209	2,298,250 837,786	14% 9%
IR Cumulative	11000 12000	485,203 269,331	865,476 599,569	672,183 446,910	105,839 74,270	16% 17%	15 22	532,/13 383,441	558,790 388,446	613,982 404,727	645,546 430,350	735,569 497,642	816,209 533,185	837,786 570,582	9% 10%
FX Cumulative	13000	1,216,020	2,572,732	1,892,325	386,162	20%	21	1,221,716	1,274,411	1,744,885	1,929,046	2,041,067	2,310,793	2,510,858	8%
Commodity Cumulative CS Cumulative	14000 15000	487,420 180,948	919,882 411,157	698,637 301,200	146,852 79,376	21% 26%	10 14	501,406 193,173	515,393 201,369	594,702 255,268	689,625 285,455	813,849 385,692	865,446 394,036	892,664 400,390	16% 20%
CTP Cumulative	16000	1	4	3	2	85%	2	1	1	2	3	3	4	4	30%



Table 42: PV statistics

EU Statistics for PV

	[Main st	atistics					Percentiles		
	Port. ID	Min	Max	Ave	STDev	STDev_trunc ¹	MAD (median absolute	Coefficient of variation	Num obs.*	25th	50th (Median)	75th	Interquantile range
	1001	4,388,300	4,525,586	4,458,837	18,835	772,471	deviation) 900	(STDev/Ave) 0%	31	4,457,486	4,459,300	4,459,708	0%
	1002	-2,917,561	-2,874,072	-2,906,317	8,687	63,428	2,917	0%	26	-2,909,623	-2,907,964	-2,903,579	0%
	1003 1004	-2,291 2,992	-1,105 4,192	-1,459 3,474	234 262	553 456	114 143	16% 8%	23 21	-1,536 3,295	-1,401 3,451	-1,341 3,668	7% 5%
	1005	-719,170,000	-531,710,000	-707,843,322	35,296,187	131,718,381	1,085,015	5%	27	-715,980,000	-714,710,000	-713,647,801	0%
	1006 1007	-4,007 989,417	-1,965 1,022,554	-2,925 1,011,583	432 8,190	742 14,494	249 4,630	15% 1%	24 20	-3,159 1,007,878	-2,932 1,011,145	-2,699 1,018,739	8% 1%
Equity	1008	35,242	39,128	37,094	795	1,370	400	2%	20	36,671	36,915	37,489	1%
- cquity	1009 1010	326,688 -263,704	328,091 -246,161	327,365 -259,767	416 3,303	416 43,669	322 627	0% 1%	26 26	327,081 -260,955	327,328 -260,316	327,740 -258,666	0% 0%
	1010	4,070,328	4,206,306	4,136,004	19,617	43,669	901	1%	26	4,134,822	4,136,729	4,137,156	0%
	1012	3,880,124	4,022,843	3,947,289	21,254	63,461	1,615	1%	26	3,939,403	3,950,722	3,951,070	0%
	1013 1014	127,719 261,663	142,970 288,733	139,387 269,297	5,472 5,251	31,453 9,938	579 2,847	4% 2%	26 26	140,500 266,366	141,999 269,901	142,444 270,867	1% 1%
	1015	186,100	234,061	210,161	11,733	16,849	5,011	6%	21	204,308	209,948	213,853	2%
	1016 2001	74,323 213,878	408,577 239,026	249,654 225,265	116,649 7,217	116,649 7,974	115,716 5,254	47%	11 38	162,923 219,159	241,141 224,584	358,059 232,293	37%
	2002	-447,038	-277,500	-350,888	40,700	57,610	5,479	12%	34	-343,572	-335,092	-330,504	2%
	2003 2004	25,607 220,035	30,504 298,171	27,340 254,780	1,123 11.360	4,351 35,370	772 3.271	4% 5%	32 37	26,484 250,224	27,132 253,155	27,837 256,600	2% 1%
	2004	946,034	1,160,761	1,026,246	52,868	121,970	26,237	5%	16	991,696	1,023,633	1,042,380	2%
	2006	281,075	346,370	300,700	11,095	70,361	324	4% 1%	31 30	298,031	298,261	298,878	0% 0%
	2007 2008	1,451,127 1,240,194	1,535,930 1,324,762	1,493,270 1,282,606	11,735 13,138	133,264 152,780	823 677	1%	30	1,492,000 1,280,731	1,492,644 1,281,366	1,493,551 1,282,183	0%
	2009	-249,564	-221,569	-240,257	5,924	10,849	3,554	3%	34	-245,441	-240,431	-237,012	2%
	2010 2011	192,491 -509,557	215,124 -466,808	202,719 -487,178	6,530 11,114	7,283 18,127	4,596 8,539	3% 2%	38 36	197,243 -494,405	202,079 -486,238	209,326 -477,746	3% 2%
Interest Rate	2012	-229,174	-39,500	-132,419	48,786	61,928	4,877	37%	37	-124,998	-110,980	-107,982	7%
	2013 2014	1,032,794 1,101,809	1,035,708 1,141,797	1,034,826 1,130,579	584 7,494	1,341 26,715	257 1,743	0% 1%	32 23	1,034,680 1.130.000	1,034,912 1,132,470	1,035,177	0%
	2015	-801,779	-754,925	-787,818	7,882	17,777	720	1%	35	-788,936	-788,081	-787,344	0%
	2016 2017	3,976,591 -86,350	4,124,416 -65,693	4,109,326 -78,083	26,583 3,487	100,716 28,899	1,339 300	1% 5%	29 33	4,113,785 -78,802	4,115,977 -78,589	4,117,240 -78,035	0% 0%
	2017 2018	-80,350 985,703	-05,093 989,020	-78,083 987,395	3,487 549	28,899 990	183	5%	33	-78,802 987,305	-78,589 987,480	-78,035 987,580	0%
	2019	963,001	966,572	964,856	789	1,089	451	0%	36	964,352	964,837	965,437	0%
	2020 2021	102,820 1,084,383	110,678 1,134,660	106,232 1,109,182	1,868 7,499	4,338 43,420	1,121 268	2% 1%	35 30	105,195 1,109,451	105,962 1,109,936	107,401 1,110,221	1% 0%
	2022	-136,197	3,944	-66,810	28,678	36,766	9,458	43%	29	-73,710	-67,892	-52,932	16%
	2023 3001	-69,700 -232,074	-808 -151,521	-42,362 -178,004	10,968 17,001	50,537 32,752	2,056	26% 10%	37	-47,589 -183,015	-45,997 -173,886	-36,109 -168,127	14%
	3002	9,138,626	9,398,753	9,222,829	50,521	2,636,273	1,654	1%	30	9,214,260	9,215,355	9,217,567	0%
FX	3003 3004	851,159 1.093.652	869,300	861,620 1,098,984	3,328 3,692	15,746 5,800	1,662 2,355	0% 0%	32 30	859,902 1,096,752	861,527 1,098,660	863,338	0% 0%
~~~~	3004	-1,052,107	1,109,067 -1,034,532	-1,044,152	3,689	5,800	2,355	0%	30	-1,046,267	-1,043,856	1,101,803 -1,042,715	0%
	3006	-11,004	15,374	323	10,302	10,302	7,035	3193%	35	-9,909	-3,621	10,415	4017%
	3007 4001	-74,362 6,970	277,385 15.016	127,846 10,543	137,144 2.379	154,063 3,204	100,668	107% 23%	26 14	-28,742 8,485	209,864 11,588	257,203	125%
Commodities	4002	-202,566	-113,407	-183,715	22,929	74,003	3,118	13%	12	-191,801	-190,578	-183,784	2%
	4003 4004	-8,832 178,169	66,087 818,980	22,604 668,849	18,613 167,267	42,647 317,900	7,334 16,290	82% 25%	11 11	12,963 677,878	17,768 707,570	28,730 725,293	38% 3%
	5001	-14,787	-11,215	-13,404	648	1,510	65	5%	21	-13,460	-13,413	-13,354	0%
	5002 5003	9,365 -2,935	10,582 -1.535	10,083 -2,382	322 247	1,279 1,645	97 80	3% 10%	20 24	9,933 -2,481	10,171 -2,350	10,247	2% 3%
	5004	21,617	22,160	21,905	154	205	101	1%	19	21,803	21,918	22,033	1%
	5005 5006	-825	817	244	303 494	778	15	124%	23	220	235	264	9%
	5008	44,541 1,111,220	46,661 1,122,749	45,901 1,116,812	2,417	2,170 4,611	203 439	1% 0%	21 21	45,636 1,115,473	46,131 1,117,304	46,214 1,117,601	1% 0%
	5008	2,637,257	2,695,238	2,670,010	11,258	21,153	4,417	0%	23	2,665,584	2,669,856	2,676,185	0%
	5009 5010	-13,293 918,855	-3,955 922,155	-8,255 921,054	2,297 1,045	2,913 1,332	1,432 484	28% 0%	26 22	-9,395 920,328	-7,720 921,481	-6,452 921,816	19% 0%
	5011	786,809	848,850	816,803	12,024	20,582	4,486	2%	21	810,966	817,706	819,839	1%
	5012 5013	27,907 -10,249	28,845 -1,391	28,576 -5,634	286 2.281	398 2.927	112 1.626	1% 41%	20 24	28,417 -6,945	28,700 -5,220	28,790 -3.803	1% 29%
Credit Spread	5014	-5,742	-3,928	-4,482	419	739	43	9%	22	-4,650	-4,288	-4,268	4%
	5015 5016	974,126 949,604	976,673 956,505	975,665 953,644	690 1,450	1,706 2,507	248 414	0% 0%	21 17	975,238 953,157	975,788 954,103	976,110 954,386	0% 0%
	5017	949,604 997,702	1,007,467	1,002,866	2,298	2,578	1,749	0%	18	1,001,955	1,002,505	1,004,761	0%
	5018 5019	1,951,962 951,530	1,959,599 954,322	1,956,797 953,207	2,127 935	4,779 2,802	1,074 930	0% 0%	16 21	1,956,432 952,464	1,956,790 953,149	1,958,283 954,115	0% 0%
	5019 5020	951,530 2,586,828	954,322 2,596,284	953,207 2,593,497	935 2,200	2,802	930 1,136	0%	21 23	952,464 2,592,769	953,149 2,593,698	954,115 2,595,028	0%
	5021	-318,159	-278,224	-299,019	8,061	13,185	2,479	3%	20	-301,666	-298,209	-295,678	1%
	5022 5023	2,279,771 -260,141	2,338,218 -200,062	2,313,393 -207,173	14,274 15,381	34,391 40,153	4,017 1,969	1% 7%	20 14	2,304,668 -205,890	2,318,385 -202,572	2,321,437 -201,408	0% 1%
	5024	966,606	972,426	970,321	1,250	6,690	276	0%	19	970,083	970,604	970,936	0%
	5025	943,727	1,000,194	971,800	11,080	21,993	653	1%	18	972,325	972,896	973,584	0%
	5026 5027	850,764 939,743	854,409 946,241	853,062 942,633	1,033 1,327	1,343 4,168	473 359	0% 0%	20 20	852,638 942,214	853,335 942,701	853,789 943,139	0%
	6001	555,745	540,241	542,033	*,3£1	4,200		570	4	544,414	542,151	545,235	070
СТР	6002 6003								4				
CIP	6003 6004								4				
	6005								3				
ALL-IN no-CTP ** Equity Cumulative **	10000 11000	13,301,578 2,537,767	19,961,081 3,214,675	18,586,151 2,884,644	2,056,802 110,550	3,319,817 224,270	99,960 7,877	11% 4%	10 20	19,256,594 2,876,753	19,339,971 2,887,367	19,456,514 2,895,099	1% 0%
IR Cumulative **	12000	417,035	952,584	2,884,044	93,870	148,366	12,697	478	30	2,870,733	689,649	2,893,099 697,665	3%
FX Cumulative **	13000	10,907,145	11,194,883	11,003,968	60,980	2,449,042	14,976	1%	29	10,980,202	10,995,295	11,013,244	0%
Commodity Cumulative ** CS Cumulative **	14000 15000	-194,717 4,970,586	-102,416 5,054,387	-173,095 5,024,597	24,564 22,264	76,810 50,905	3,426 11,497	14% 0%	11 18	-183,559 5,018,560	-180,056 5,027,532	-169,372 5,039,921	4% 0%
CTP Cumulative **	16000												

CTP cumulative ** 1000
 STPer truns is the standard deviation computed excluding values below the 5th and above the 95th percentile
 StPer truns is the standard deviation computed excluding values below the statistics
 For the aggregated part/olis (26) to 66), book that reported at least a missing part/polio MIV among the ones compasing the aggregate are not included
 in the computation of the benchmarks for that particular aggregate part/plia.



		EU Stati	stics fo	r IRC														
				Other sta	its	Coefficient of					Percentiles						Extreme Values ra	nge (Full Sample)
	Port. ID	Min	Мах	Ave.	STDev	variation (STDev/Mean)	Num obs.	Sth	10th	25th	50th (Median)	75th	90th	95th	Interquantile range	STDev_trunc ¹	-2*STDev_trunc	+2*STDev_trunc
Equity	1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1011 1012 1013 1014 1015 1016																	
Interest Rate	2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012	0 0 98,981 147,137	271,298 50,535 867,098 1,579,283	165,339 13,136 464,271 816,793	97,045 16,353 294,981 557,506	59% 124% 64% 68%		25,744 0 102,422 164,510	51,488 0 105,863 181,882	127,548 521 185,831 272,849	177,780 7,344 471,660 776,761	226,601 17,614 681,593 1,283,145	271,116 31,130 847,372 1,490,383	271,207 40,833 857,235 1,534,833	28% 94% 57% 65%	145,652 28,847 234,388 427,464	-109,095 -31,901 55,686 118,437	473,511 83,488 993,240 1,628,291
	2013 2014 2015 2016 2017 2018	0 197,368 152,347 35,999	197,073 846,878 1,644,845 717,199	64,240 587,928 891,988 347,841	56,987 263,482 578,410 274,987	89% 45% 65% 79%		8,136 236,030 180,039 38,029	16,271 274,692 207,731 40,058	38,993 378,326 337,621 85,551	51,026 738,391 825,994 305,660	76,043 788,102 1,452,551 625,829	112,461 824,147 1,513,698 647,046	154,767 835,513 1,579,271 682,122	32% 35% 62% 76%	84,353 282,084 449,663 219,209	-114,742 188,633 104,876 -62,353	222,670 1,316,969 1,903,528 814,481
	2019 2020 2021 2022 2023	35,999 51,947	717,199	347,841 414,057	274,987	79%	10	38,029 59,011	40,058	85,551 173,891	305,660 451,967	625,829	647,046 766,362	682,122	57%	214,454	-3,871	772,118 893,926
FX	3001 3002 3003 3004 3005 3006 3007																	
Commodities	4001 4002 4003 4004																	
Gredit Spread	5001 5002 5003 5005 5006 5007 5008 5007 5008 5010 5011 5012 5013 5014 5015 5018 5015 5018 5015 5017 5018 5015 5027 5023 5024 5025 5025 5025 5025 5025 5025 5025	0 40,549 31,159 0 9 10,64,609 38,74,157 10,95,90 40,317 10,2537 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 10,425 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54,082 13,887 75,678 54,082 13,887 72,0785 54,082 13,887 72,0785 54,082 13,887 72,0785 54,082 13,887 72,0785 54,082 13,887 72,0785 54,082 13,887 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,076 15,077 15,076 15,076 15,077 15,076 15,076 15,077 15,076 15,077 15,076 15,077 15,077 15,076 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 15,077 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44,657 3100,403 100,953 12,489 26,262 310,010 99,921 10,994 80,162 310,010 182,156 45,569 77,778 83,688 266,810 77,778 83,688 266,810 77,778 83,688 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,810 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 77,788 266,910 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138,125 138,125 138,125 138,125 138,125 138,125 138,125 138,125 138,125 138,125 68,588 201,850 132,113 132,112 68,588 331,990 50,397 105,352 64,147 403,106 586,253 505,027 542,108	111,308 99,482 114,003 149,039 74,105 753,722 130,675,899 12,433 135,509 209,954 135,509 209,954 136,550 134,357 76,550 243,882 14,132 195,757 76,550 375,794 55,971 25,572 76,554 454,718 636,984 519,421	206,469 100,399 21,389 79,491 793,804 137,655,950 40,610 139,878 228,941 172,980 40,610 128,578 81,177 250,151 14,466 221,914 81,177 478,029 58,156 224,914 81,177 478,029 58,156 56,656,039 558,470 582,011	42% 26% 16% 39% 4% 33% 52% 33% 52% 33% 52% 66% 55% 66% 55% 66% 55% 66% 55% 42% 55% 66% 55% 42% 55% 66% 55% 66% 55% 66% 55% 66% 55% 66% 55% 66% 55% 66% 55% 66% 55% 66% 55% 55	174,514 23,015 23,014 34,557 36,457 37,468 39,464 142,256 39,464 142,257 37,377 37,638 31,346 31,346 31,346 31,346 33,346 33,346 33,346 33,346 33,346 33,346 33,346 33,346 33,346 33,346 33,346 33,346 33,346 33,346 33,346 33,346 33,346 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147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 147.252 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 235.456 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CTP ALL-IN no-CTP Equity Cumulative IR Cumulative	6002 6003 6004 6005 10000 11000 12000	645,623	1,339,693	901,424	284,453	32%	6	651,834	658,046	681,915	803,883	1,081,624	1,242,344	1,291,019	23%	378,427	288,876	1,802,584
IR Cumulative FX Cumulative Commodity Cumulative CS Cumulative CTP Cumulative	12000 13000 14000 15000 16000	619,889	928,556	720,112	111,667	16%	8	626,491	633,092	640,424	664,658	794,320	850,093	889,325	11%	135,786	490,279	1,033,422

#### Table 43: IRC – modelling choice: source of LGD – market convention



		EU Stati	stics fo	r IRC														
				Other st	ats						Percentiles						Extreme Values ra	nge (Full Sample)
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.		10th	25th	50th (Median)	75th	90th	95th	Interquantile range	STDev_trunc ¹	-2*STDev_trunc	+2*STDev_trunc
l quity	1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016					(Dev)mean)												
Interest Race	2001 2002 2003 2004 2005 2006 2009 2010 2010 2010 2010 2011 2012 2013 2014 2015 2016 2017 2018 2017 2018 2017 2018 2010 2020	20,889 6,471 105,896 366,456 6,154 185,175 43,511 43,511 65,216	425,631 56,173 874,866 1,543,043 176,920 983,179 65,984 1,765,730 668,177 790,217	226,343 28,733 506,652 907,546 51,226 51,226 51,226 34,597 986,470 359,186 326,234 418,898	168,402 16,855 226,630 398,363 48,415 205,668 39,201 438,405 209,898 200,755 215,728	74% 599 45% 45% 44% 29% 85% 44% 58% 62% 51%	8 14 16 16 13 12 5 5 16 17 7 15 1 1 16 2	33,607 7,005 160,461 241,040 10,861 448,517 7,285 335,445 60,313 58,213 112,668	46,325 8,223 207,775 308,386 11,593 515,657 8,415 387,009 71,892 69,433 144,189	108,833 12,840 351,887 686,967 14,570 517,500 11,807 738,846 170,266 134,378 239,409	176,430 28,609 524,463 1,011,549 44,203 753,539 23,055 1,068,700 428,857 376,064 442,289	408,261 43,314 642,670 1,099,119 55,561 882,086 65,984 1,218,334 490,296 477,371 561,132	425,631 47,700 801,650 1,335,979 108,909 945,720 65,984 1,480,189 599,636 521,446 658,587	425,631 51,130 849,228 1,401,733 142,845 963,953 65,984 1,619,708 645,443 580,002 697,191	58% 54% 29% 23% 58% 20% 70% 24% 48% 56% 48%	145,652 28,87 234,388 427,464 38,4353 282,084 28,260 449,663 219,209 214,454 224,449	-109,075 -31,901 55,666 -118,437 -114,742 -186,633 -38,888 -104,674 -62,353 -85,700 -3,871	473.511 83.488 993.240 1,428.291 222.670 1,316.969 73.750 1,501.528 814.481 772.118 893.926
FX Commodities	2023 3001 3002 3003 3004 3005 3006 3007 4001 4002						1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1											
Commodities	4003 4004 5001 5003 5003 5004 5006 5007 5008 5000 5010 5012 5013 5014 5015 5014 5015 5014 5015 5014 5015 5019 5019 5020 5021 5021 5021 5023 5020	10.359 44,727 22,335 13,464 12 55,013 34,720 13,6,61 22,212 0 13,65 11,187 24,107 10,049 14,551 115 5,049 0,059 14,551 115 5,049 0,029 2,563 3,200 2,563 3,200 2,563 3,200 2,563 3,200 2,563 3,200 2,563 3,200 2,563 3,200 2,563 3,200 2,563 3,200 2,563 3,200 2,563 3,200 2,563 3,200 2,563 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,200 2,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 3,575 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47,894 47,894 1,847 83,150 17,501 10,080 13,166 94,639 459,874 304,367 43,045	27,201 51,176 51,345 27,382 37,401 499,221 67,803 497,864 4,903 11,742 63,075 78,823 10,464 22,994 9,995 57,247 7,668 120,229 61,542 27,768 120,229 61,542 27,768 120,229 61,542 22,546 120,229 61,542 22,546 120,229 61,542 22,546 120,229 61,542 22,546 120,229 61,542 22,546 120,229 61,542 22,546 120,229 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,464 120,299 13,659 10,454 10,454 10,454 10,454 10,454 10,454 10,454 10,454 10,454 10,454 10,454 10,454 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100,215 23,885 100,215 23,885 13,840 15,597 33,424 78,401 15,517 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,013 33,840 60,015 33,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 74,840 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197,563 39,026 134,844 57,567 93,152 28,230 331,675 60,049 149,273 359,212 43,780	316,921 112,989 83,641 36,777 62,303 798,563 211,696 132,5452 132,652 132,652 132,652 132,652 138,807 32,900 360,447 96,846 103,644 104,748 104,747 104,815 104,747 104,815 104,747 104,815 104,747 104,815 104,747 104,815 104,747 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 104,815 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35,681 141,287 109,345 226,256 24,237 169,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 109,345 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42% 42% 42% 42% 55% 42% 33% 33% 32% 33% 32% 22% 93% 93% 93% 93%	1745.34 280.55 27.043 180.265 68.752 28.4527 28.4547 14.2506 14.2506 29.5777 76.688 29.5777 20.688 29.547 29.541 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 29.2540 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9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,729 9,	407,277 155,309 131,331 441,071 149,177 299,577 299,577 470,643 40,813 155,410 441,245 1441,245 145,250 1441,245 115,525 1444,246 135,555 1444,246 135,555 1444,246 135,555 1444,246 135,555 1444,246 135,555 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 145,2169 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CTP ALL-IN no-CTP	6001 6002 6003 6004 6005 10000	656,734	1,435,718	1,041,639	277,269	27%	8	670,207	683,680	850,876	1,092,689	1,184,148	1,353,070	1,394,394	16%	378,427	288,876	1,802,584
Equity Cumulative IR Cumulative FX Cumulative Commodity Cumulative CS Cumulative CTP Cumulative	11000 12000 13000 14000 15000	347,683 492,813	1,543,043	1,029,694 771,935	429,591 168,364	42%	1 5 16	494,241 511,048	640,798 529,601	1,080,471 662,418	1,088,636 804,813	1,088,636 879,371	1,361,280 973,885	1,452,162	0%	429,591 135,786	229,454 490,279	1,947,817 1,033,422

#### Table 44: IRC – modelling choice: source of LGD – non-market convention



		EU Stati	stics fo	r IRC														
	Port. ID	Min	Max	Other sta	its STDev	Coefficient of variation	Num obs.	Sth	10th	25th	Percentiles 50th (Median)	75th	90th	95th	Interquantile	STDev_trunc ¹	Extreme Values ra	nge (Full Sample) +2*STDev_trunc
Equity	1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1011 1012 1013 1014 1015 1016					(STDev/Mean)									range			
interest Rote	2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017	57,226 0 105,784 156,896 0 430,411 185,175	425,631 50,535 874,866 1,543,043 197,073 983,179 1,763,730	235,492 21,750 497,407 899,904 58,638 705,956 985,154	139,644 18,640 253,914 472,057 49,922 185,948 498,705	59% 80% 51% 52% 85% 26% 51%	10 14 15 15 15 11 4 15		82,954 0 156,754 233,738 11,593 515,657 284,170	136,847 7,290 315,184 508,990 27,191 516,886 651,831	195,920 17,151 591,467 1,080,471 51,026 767,211 1,080,684	369,602 40,341 672,318 1,275,343 70,037 850,892 1,420,198	425,631 45,217 812,155 1,430,155 108,600 868,381 1,542,670	425,631 47,609 854,086 1,499,266 1,43,212 925,780 1,629,309	46% 69% 36% 43% 44% 24% 37%	145,652 28,847 234,388 427,464 84,353 282,084 449,663	-109,095 -31,901 -55,686 -118,437 -114,742 -188,633 -104,876	473,511 83,488 993,240 1,828,791 222,670 1,316,969 1,903,528
	2018 2019 2020 2021 2022 2022 2023	43,511 43,511 65,216	668,177 668,177 790,217	372,744 354,943 439,913	230,549 226,975 246,654	62% 64% 56%	16 15 14 1	61,320 60,133 106,341	72,034 71,078 142,107	162,808 155,351 224,054	405,712 376,064 547,927	600,610 539,148 619,377	639,506 638,926 727,934	646,864 647,929 771,167	57% 55% 47%	219,209 214,454 224,449	-62,353 -85,700 -3,871	814,481 772,118 893,926
FX	3001 3002 3003 3004 3005 3006 3006 3007																	
Commodities	4001 4002 4003																	
Credit Spread	4004 5001 5002 5003 5004 5005 5006 5007 5008 5000 5011 5011 5011 5013 5016 5017 5018 5016 5017 5018 5016 5017 5018 5019 5020 5021 5021 5022 5023 5024 5022 5024 5025 5024 5025 5026	0 41,727 22,335 9 47,2371 39,453 18,369 60,860 3,974 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9 9 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 9,947 10 10 10 10 10 10 10 10 10 10 10 10 10	335,530 116,646 96,449 338,010 7,4,412 22,833,886 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 200,460 2	99,059 80,639 59,040 40,435 46,1,280 116,070 41,420 40,435 58,621 106,575 18,154 40,025 78,150 136,046 137,729 136,046 137,729 136,046 130,729 136,046 132,729 136,046 132,729 136,046 132,729 136,046 132,729 136,046 132,729 136,046 132,729 136,046 132,729 136,046 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,070 136,0700 136,0700 136,0700000000000000000000000	122,066 28,128 23,589 133,018 20,485 123,978 64,87 44,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,286 47,28647,286 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459,874 404,221 91,444	20,817 60,735 44,487 23,977 36,714 618,409 103,656 530,009 3,882 13,669 61,948 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 78,328 74,40 71,845 78,328 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40 74,40,400 74,40,400,400,400,400,400,400,400,400,40	34,130 81,391 65,555 43,4413 40,619 65,851 122,766 60,7,28 56,853 56,755 78,782 79,864 72,976 74,785 74,785 74,785 74,785 74,785 74,785 74,785 74,785 74,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,785 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795 75,795	142,640 104,751 73,760 200,274 53,754 144,517 736,404 8,369 108,362 108,170 132,373 152,523 105,152 40,151 196,140 57,557 112,174 40,151 1330,090 58,090 105,352 69,583 223,683 596,310 464,979 529,575	295,715 116,646 84,095 286,231 60,744 813,482 238,844 162,920 22,233 132,444 135,369 129,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 29,913 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20,915 20,915 20,915 20,915 20,915 20,915 20,915 20,915 20,915 20,915 20,915 20,915 20,91	316,885 116,646 89,601 322,121 65,275 802,477 247,639 802,303 122,885 135,909 165,901 32,346 406,054 245,972 74,886 200,984 441,252 70,807 213,255 70,807 517,330 648,246 654,366 542,366 542,366 542,366 542,366 542,366 542,366 542,366 542,366 542,366 542,366 542,366 542,575 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 122,121 123,121 123,246 123,246 123,246 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,242 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245 124,245	75% 27% 25% 19% 11% 16% 37% 27% 27% 26% 57% 40% 68% 26% 57% 40% 68% 26% 35% 31% 33% 33% 33% 33% 33% 33% 33% 33% 33	174,514 28,015 27,048 180,245 48,727 188,646 414,206 414,8571 18,854 414,206 416,934 413,555 405,557 405,557 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 405,555 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405,55555 405,5555555 405,5555555555	-200,700 9,526 9,526 9,548 9,548 9,5489 9,5489 9,5499 9,5499 9,5499 9,549 9,549 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,77,488 9,70,700 9,700,700 9,700,700 9,700,700 9,700,700 9,700,700 9,700,700 9,700,700 9,700,700 9,700,700 9,700,700 9,700,700 9,700,700 9,700,700,700 9,700,700,700,700,700,700,700,700,700,70	407,277 125,309 413,033 441,033 441,033 441,033 441,034 441,034 40,810 265,440 265,440 265,450 40,157 44,590 444,590 144,590 444,590 155,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 135,952 1
СТР	6002 6003 6004 6005																	
ALL-IN no-CTP Equity Cumulative IR Cumulative FX Cumulative Commodity Cumulative	10000 11000 12000 13000 14000	656,734	1,339,693	984,742	258,256	26%	4	670,207	683,680	710,999	1,092,689	1,140,985	1,203,404	1,271,549	23%	378,427	288,876	1,802,584
CS Cumulative CTP Cumulative	15000 16000	492,813	1,021,210	775,628	156,663	20%	14	508,616	547,955	672,297	822,975	869,511	922,674	960,985	13%	135,786	490,279	1,033,422

#### Table 45: IRC – modelling choice: source of LGD – 1-2 modelling factors



		EU Stati	stics fo	r IRC														
				Other sta	ats	Coefficient of					Percentiles						Extreme Values ra	nge (Full Sample)
	Port. ID	Min	Мәх	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	Sth	10th	25th	50th (Median)	75th	90th	95th	Interquantile range	STDev_trunc ¹	-2*STDev_trunc	+2*STDev_trunc
Equity	1001 1002 1003 1004 1005 1005 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016																	
Interest Rate	2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2012 2013	0 2,085 98,981 147,137 9,762	271,298 56,173 867,098 1,579,283 176,920	122,639 22,911 480,746 835,463 52,076	112,869 18,240 256,948 456,323 57,608	92% 80% 53% 55%	5 10 11 11 7	4,178 3,371 102,805 166,440 12,935	8,356 4,656 106,628 185,743 16,108	20,889 9,367 330,437 538,970 22,565	143,228 17,537 523,219 882,046 30,156	177,780 31,755 588,640 1,079,095 51,282	233,891 49,191 840,682 1,317,327 108,910	252,594 52,682 853,890 1,448,305 1442,915	79% 54% 28% 33%	145,652 28,847 234,388 427,464 84,353	-109,095 -31,901 55,886 118,437 -114,742	473,511 83,488 993,340 1,828,291 222,670
	2014 2015 2016	197,368 152,347	948,222	625,870	289,120	46%	8 3 11	242,474	287,579 213,885	356,402 586,313	716,661 907,792	839,910 1,271,130	930,708	939,465 1,516,762	40%	282,084 449,663	188,633	1,316,969
	2017 2018 2019	35,999 35,999	717,199 717,199	329,151 304,778	240,125 238,340	73%	11	38,254 38,029	40,509 40,058	81,502 73,008	343,209 327,775	503,329 455,548	572,887 559,712	645,043 638,455	72% 72%	219,209 214,454	-62,353 -85,700	814,481 772,118
	2020 2021 2022 2023	51,947	788,168	388,191	239,475	62%	1 11 2 1	60,777	69,607	195,911	439,570	513,873	666,182	727,175	45%	224,449	-3,871	893,926
R	3001 3002 3003 3004 3005 3006 3007						1											
Commodities	4001 4002 4003 4004						1		-									
Credit Spread	5001 5002 5003 5004 5005 5006 5007 5008 5009 5010 5011 5012 5013 5016 5015 5016 5017 5015 5016 5017 5017 5017 5015 5016 5019 5021 5021 5021 5021 5022 5023 5024 5025 5025 5026 5026 5026 5021 5026 5021 5026 5021 5026 5021 5027 5027 5027 5027 5027 5027 5027 5027	20,078 40,642 55,500 16,756 16,756 12 250,133 34,720 387,473 34,720 387,473 34,720 387,473 34,720 387,473 34,720 387,473 34,720 367,473 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720 34,720,720 34,720 34,720 34	392,380 75,0495 115,445 33,569 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,22 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 80,222 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100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998 100,998	113,897 12,285 20,527 199,292 28,450 158,884 36,348 40,781 36,348 40,781 199,293 34,57 76,679 34,57 77,570 22,314 77,659 33,118 199,864 30,771 100,373 32,754 174,024 57,769 105,040	1399 2155 2555 2556 2576 2576 2576 2576 2576 25	1 10 9 9 10 10 9 9 9 11 18 9 9 11 18 8 9 9 9 11 18 8 9 9 9 11 10 9 9 9 11 10 9 9 9 11 10 9 9 9 9 11 10 9 9 9 9 11 10 9 9 9 9 9 9 9 9 9 9 9 9 9	20,227 42,057 59,590 18,978 4,317 134,744 38,289 398,670 3,3914 47,257 43,021 16,726 1,549 28,719 4,242 40,666 1,351 37,674 6,310 3,062 33,062 33,062 33,294	20,377 43,572 63,281 21,091 8,662 359,295 41,558 409,905 4,055 2,2447 58,442 58,812 2,905 2,537 33,332 6,065 40,741 2,142 33,465 12,619 3,561 12,619 3,561 12,619 3,561 12,11,394	26,408 49,921 70,403 26,144 34,627 554,810 96,943 490,431 5,285 66,221 13,461 26,144 8,999 47,886 2,686 2,686 2,686 6,5,049 17,501 6,193 25,774 21,4505 549,102 335,373 111,670	42,727 33,822 74,675 6,78 83,553 64,553 552,826 7,026 73,783 115,847 93,656 23,161 64,728 22,988 67,225 13,882 13,882 33,552 24,385 57,1001 40,942 243,683 57,1001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,001 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,000 57,0	66,850 67,279 95,264 137,102 64,886 119,108 714,016 66,331 131,102 85,060 90,962 27,554 38,931 132,877 34,541 392,085 38,931 175,214 36,052 27,554 430,582 573,602 453,527 423,143	162,631 73,281 109,013 248,581 84,877 793,3185 727,876 727,876 727,876 727,876 727,876 74,418 36,643 36,643 36,643 36,643 44,183 36,643 44,183 36,643 44,613 497,680 65,524 22,285 55,518 55,519,99 607,408 566,925 540,813	277,510 74,190 1112,249 89,223 797,198 138,972 743,796 125,907 142,083 347,765 112,108 220,370 42,083 347,765 112,108 85,030 85,706 545,756 541,890	43% 15% 68% 27% 35% 33% 33% 33% 88% 33% 33% 33% 33% 33% 33	294,514 292,743 1810,254 687,752 1846,772 1846,772 1846,772 1846,772 17,759 1846,772 17,759 1846,775 1843,774 1843,774 1843,774 1843,774 1843,774 1845,755 1843,755 1843,755 1843,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,755 1845,7555 1845,755 1845,755 1845,755 1845,7555 1845,7555 1845,7555 1845,7	220,100 2,9250 15,561 -90,005 250,825 3,880 30,870 -2,8,77 -7,3,880 -2,8,77 -7,3,880 -2,8,77 -7,3,880 -2,8,77 -7,3,880 -4,3,87 -3,486 -3,486 -3,486 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -3,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -4,440 -	407,277 407,277 123,230 123,231 430,073 138,028 998,177 299,588 870,043 40,810 136,440 201,549 201,557 454,006 147,252 293,556 144,174 296,559 115,500 643,218 135,557 758,555 144,575 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,579 155,
ALL-IN no-CTP	6004 6005 10000	645,623	1,435,718	977,288	329,562	34%	6	651,834	658,046	725,729	897,134	1,213,926	1,376,684	1,406,201	25%	378,427	288,876	1,802,584
Equity Cumulative IR Cumulative FX Cumulative Commodity Cumulative CS Cumulative	11000 12000 13000 14000 15000	542,076	1,004,436	725,306	146,428	20%	1 1	585,580	629,084	641,276	658,813	770,997	949,444	976,940	9%	135,786	490,279	1,033,422
CTP Cumulative	16000																	

#### Table 46: IRC – modelling choice: source of LGD – >2 modelling factors



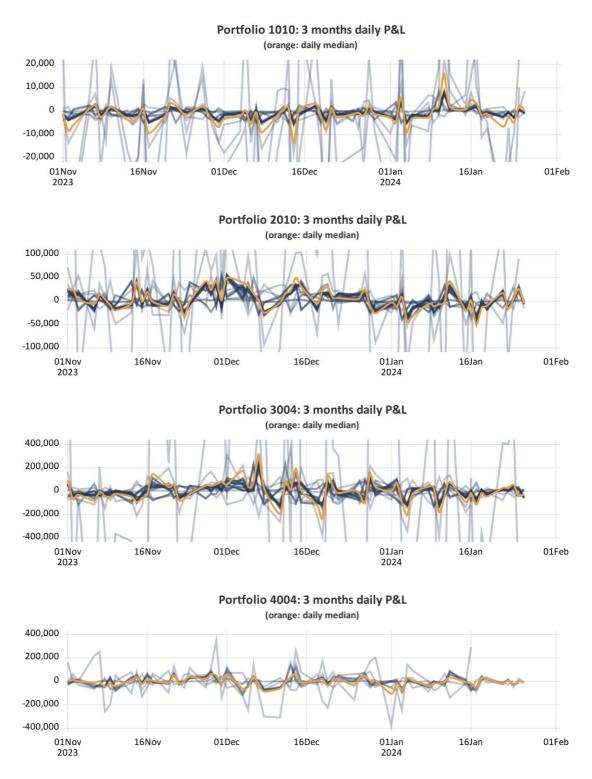
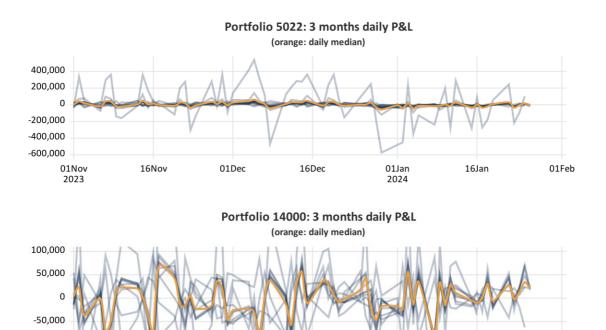


Figure 25: Additional P&L charts with examples of low IQD





16Dec

01Jan

2024

16Jan

01Feb

-100,000

01Nov 2023

16Nov

01Dec



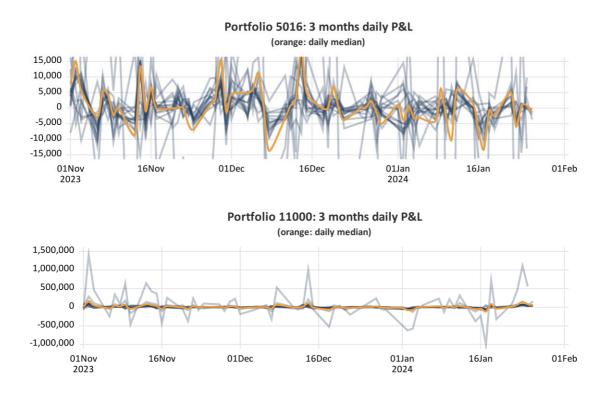
#### Portfolio 1007: 3 months daily P&L (orange: daily median) 20,000 10,000 0 -10,000 -20,000 01Nov 2023 01Jan 2024 01Feb 16Nov 01Dec 16Dec 16Jan Portfolio 2014: 3 months daily P&L (orange: daily median) 20,000 10,000 0 -10,000 -20,000 01Nov 16Nov 01Dec 16Dec 01Jan 16Jan 01Feb 2023 2024 Portfolio 3001: 3 months daily P&L (orange: daily median) 200,000 100,000 0 -100,000 -200,000 01Nov 16Nov 01Dec 16Dec 01Jan 16Jan 01Feb 2023 2024 Portfolio 4001: 3 months daily P&L (orange: daily median) 10,000 5,000 0 -5,000 -10,000 01Nov 16Nov 01Dec 16Dec 01Jan 16Jan 01Feb

2024

2023

#### Figure 26: Additional P&L charts with examples of high IQD







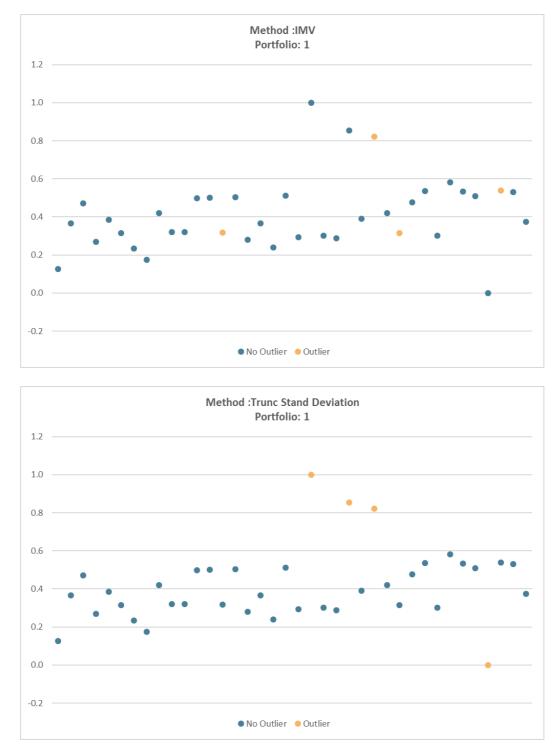


Figure 27: Comparison between IMV and truncated STD deviation method to select outliers for risk measures

Figure 26. Example of dispersion in VaR submission for portfolio 1. Above the chart, marked in yellow: the portfolios which would have been excluded based on the IMV methodology outlier, which was used in 2019 (and before) to detect outliers among risk measures. Below the chart: the same submission, but marked in yellow, indicating the submissions that have been excluded in VaR and benchmarking statistics in the 2020 exercise (and onward) based on the +/- two times truncated standard deviation of the sample.





# 8. Annex 2 – Legal background

- 226. European legislators have acknowledged the need to ensure consistency in the calculation of RWA for equivalent portfolios, and the CRR and CRD include several mandates for the EBA to deliver technical standards, guidelines and reports with the aim of reducing uncertainty and differences in the calculation of capital requirements.
- 227. In this regard, Article 78 of the CRD requires the EBA to produce a benchmarking study on both credit and market risk to assist CAs in the assessment of internal models. The study should highlight potential divergences among banks or areas in which internal approaches might have the potential to underestimate their own funds requirements that are not attributable to differences in the underlying risk profiles. CAs are required to share this evidence within colleges of supervisors as appropriate and take appropriate corrective actions to overcome these drawbacks when deemed necessary. Directive (EU) 2019/878²⁰ of the European Parliament and of the Council of 20 May 2019 amending Capital Requirements Directive IV (CRD V) has not changed this mandate.
- 228. The EBA has devoted significant effort to the analysis of the consistency of outcomes in RWA, to understand the causes of possible inconsistencies and to inform the regulatory repair process. The EBA's ongoing work on benchmarking, supervisory consistency and transparency is fundamental to restoring trust in internal models and the ways in which banks calculate asset risks.
- 229. The use of internal models gives banks the opportunity to model their risks according to their business models and the risks faced by the bank itself. The introduction of a benchmarking exercise does not change this objective; rather, it helps to identify the non-risk-based variability drivers observed across institutions.
- 230. This MR benchmarking exercise is an MRWA variability assessment performed over a large sample of banks (43 banks at the highest level of consolidation across 13 jurisdictions within the EU). The banks participating in this exercise are those that have been granted permission to calculate their own funds requirements using internal models for one or more of the following risk categories:
  - a) general risk of equity instruments;
  - b) specific risk of equity instruments;

²⁰ https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L0878&from=EN



- c) general risk of debt instruments;
- d) specific risk of debt instruments;
- e) foreign exchange risk;
- f) commodities risk; and
- g) correlation trading.
- 231. Pursuant to Article 362 of the CRR, the general risk of debt instruments should refer to interest rate risk. Similarly, the general risk of equity instruments refers to the change in the value of indices.
- 232. Banks that have approval only for the general risk of equity or debt instruments (in accordance with Article 363 of the CRR) may use a different definition of general risk (e.g., by including credit spread risk in the interest rate general risk) if they are able to demonstrate that this leads to higher RWA. Separate permission is required for each risk category. Many banks do not have permission for internal models for all risk categories, so the number of contributions for each hypothetical portfolio in this exercise varies across the sample.
- 233. Banks that have permission to use the internal model for calculating MR own funds requirements for one or more but not all of the risk categories in accordance with Article 363(1) of the CRR ('partial use') exclude certain risks or positions from the scope of the internal model approval. In this case, the own funds requirements for the risk categories outside the scope of the internal model are calculated according to the standardised approach.
- 234. In addition, as set out in Article 369(1)(c) of the CRR, banks should conduct validation exercises on hypothetical portfolios to test that the model is able to account for structural features. These portfolios should not be limited to the portfolios defined in this exercise; however, this exercise is a useful starting point for banks to meet this legislative requirement.
- 235. The assessed MR results, when provided and where applicable, are VaR, sVaR, IRC and APR figures for specific and aggregated trades. Moreover, a preliminary assessment of IMV was performed, primarily to ensure that the participating banks make uniform assumptions when entering the hypothetical trades.
- 236. In addition to these submissions, banks using an HS approach for VaR were requested to provide one year of P&L data for each of the individual and aggregated portfolios modelled. The objective of collecting this additional information was to employ the data vector to perform alternative calculations for VaR using, where possible, a consistent 1-year lookback period and controlling, as far as possible, for the different options that banks can apply within regulation.



Regulation (EU) 2019/876²¹ of the European Parliament and of the Council of 20 May 2019 amending the Capital Requirements Regulation as regards the leverage ratio, the net stable funding ratio, requirements for own funds and eligible liabilities, counterparty credit risk, market risk, exposures to central counterparties, exposures to collective investment undertakings, large exposures, reporting and disclosure requirements (CRR II) will have a significant impact on the market risk benchmarking exercise once it is fully implemented. However, for the time being the CRR framework will be applied for the purpose of the benchmark exercise in accordance with Article 78 of the CRD.

²¹ <u>https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0876&from=EN</u>

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