European Banking Authority

EBA REPORT
RESULTS FROM THE 2023 MARKET RISK BENCHMARKING EXERCISE

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Abbreviations

APR	all price risk
CA	competent authority
CDS	credit default swap
CO	commodities
CRD	Capital Requirements Directive
CRR	Capital Requirements Regulation
CS	credit spread
CS01	credit spread value of 1 basis point changes
CTP	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

1. This report presents the results of the 2023 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).

2. The report summarises the conclusions drawn from a hypothetical portfolio exercise (HPE) conducted by the EBA during 2022/23. 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 44 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 list of outliers to be examined in detail. The banks with the most significant number of outliers were also considered for interviews to discuss the assumptions behind banks' models that produced the outliers. Nonetheless, in the 2023 exercise, no interviews with banks were carried out by CAs, which preferred to address the issues reported bilaterally. The issues detected in the benchmarking exercise were considered and addressed, where possible, by banks and CAs. Moreover, CAs and the EBA collected feedback on how to improve forthcoming benchmarking exercises.

5. Finally, considering the results of the benchmarking exercise, 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 2023 results show a significant reduction in the dispersion of the initial market valuation (IMV) versus the 2022 exercise regarding the Equity and Interest Rates asset class; see, for instance, Table 1. CS and Commodity remained stable versus the 2022 dispersion. Nonetheless, the FX average IQD increased significantly (8% vs 3% in 2023). The reason for this is that two FX instruments (301 and 310) present an IMV quite dispersed (25% and 47% IQD). While for the Fx FWD 310 the IMV is close to zero, which can exacerbate the relative dispersion, the instrument 301 (another Fx FWD) is not a new instrument in the sample, with an IMV far from zero, which means that there are still some issues linked to the common understanding of the booking for this instrument. Aside from the high IQD for these two FX instruments, there is no evidence of a significant misunderstanding of these instruments' features. Excluding them, the average IQD of the FX asset class is 2%, which is in line with the submissions for the previous exercises. CO remains a very high IQD (14% vs 24% in 2022) asset class, which is driven by two instruments (401 and 402), but since the whole set of CO instruments is very limited, as well as the total number of submissions, minor differences in the IMVs tend to impact the average IQD of this asset class substantially.

8. Based on this year's submission of IMVs, we can conclude that the quality of the data submitted has increased. The quality of the data is of paramount importance for the benchmarking exercise, and the banks should pay great attention when submitting these data. Some types of errors persist and are sometimes trivial, such as the wrong unit being reported. In order to substantially increase the data quality, the EBA notes that several rounds of iteration with submitters will be required, which is not possible within the short time frame of the exercise. Keep improving the specification of the details for the instruments is also a possibility that the EBA is always exploring. In general, significant effort needed to be persistently applied to data quality.

9. The majority of the significant dispersions have been examined and 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 Section 1.2 and Chapter 6 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 4: Interquartile dispersion for IMV, risk metrics and SBM OFR by risk factor).

11. Regarding the single risk measures, across all asset classes except for CO, the overall variability for value at risk (VaR) is lower than the observed variability for stressed VaR (sVaR) (16% and 21%, 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 (42%, compared to 45% in the 2022 exercise, with 43% in 2021 and 49% in 2020).

12. 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).

13. 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 model or the choice of absolute versus relative returns, offer further explanations for the results' variability (see Table 4: Interquartile dispersion for IMV, risk metrics and SBM OFR by risk factor).

14. Even so, within the subset of banks using an HS approach, modelling choices (see Table 6: 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 7: Average regulatory VaR by modelling choice). These observations differ from the findings of the previous exercises. Overall, it is clear that 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

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

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.

15. As mentioned above, the dispersion in sVaR figures is generally higher than the dispersion observed for regulatory VaR (see Table 20 and Table 21). 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 drew up 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 40: Stress VaR statistics (2008-2009 stress period only)).

16. 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 5: sVaR–VaR ratio by range (number of banks as a percentage of the total)). The ratio generally varies significantly between the portfolios (from 0.02 to 35.01), with values that cannot be explained except by errors. However, on average, the ratio comes in at around 1.77 (see Table 24: sVaR/VaR statistics).

17. 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 2023 exercise, the EBA noticed a significant decrease in the VaR dispersion, still that in some cases (24 over 77 single portfolios), the IQD remained above 20%, especially for the CS asset class (see Table 20: VaR statistics). The aggregate portfolios also feature notably low levels of IQDs.

18. 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 (42%). This high variability is slightly lower than in the previous exercise – the IQD was 45% on average in the 2022 exercise (43% in 2021) (see Table 13: IRC statistics and cluster analysis). The understanding of the IRC dispersion was further analysed by disaggregating various modelling choices (see Table 14, Table 42, Table 43, Table 44 and Table 45). 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 have an effect on the dispersion, but the effect cannot be generalised, and it looks very time-dependent.

19. Regarding the APR, the statistics for this risk measure are no longer reported because the number of the reporting entities for this metric is no longer sufficient to guarantee the anonymity of the statistics computed.

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 15: 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 similar to that found for VaR and P&L VaR (see Table 23).

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 16: 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 (16% applying three as the multiplier and 15% 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 5.2.5), 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 2020-2022 reports.

25. In a nutshell, based on this additional analysis, we can conclude that the size (in terms of RWA for market risk) of the bank has an impact on the figures since medium-sized banks tend to

produce slightly more dispersed results than larger banks (see Table 8: Asset class comparison for VaR in terms of banks' size). Smaller banks' statistics are affected by the low number of submissions, i.e., CO, and CS is not even reported. 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. The analysis based on the business model did not deliver strong conclusions. As in past exercises, 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 9: 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 33, Table 34 and Table 35). 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 10: 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 11: 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 41). 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 OFR analysis

30. The 2023 benchmarking exercise is the second year of the SBM sensitivities and OFR data collection. The data collection revealed to be quite valuable for assessing and understanding differences at a very granular level; still, the sensitivities data are very fragmented and too complicated to be represented in a concise manner at the moment. Therefore, this Report focuses mostly on the analysis of the SBM Own Funds Requirements (OFR), and provides some examples of how sensitivities have been provided at the portfolio level (see section 7.4).

31. Overall, the OFR data submitted by the banks was quite complete and close to the Risk Measures data submission. The dispersion of the SBM OFR, as expected, is generally lower than the dispersion for the standard Risk Measures (VaR and SVaR), as shown in Table 4, except for the CO asset class. On the one hand, this is a reassuring result, since standardised measures are supposed to be the same for all, and so a low IQD is expected. On the other side, there are portfolios where the IQD is higher for the SBM measures with respect to the VaR measures (see Figure 21). It is likely that for those portfolios, the SBM implementation could be challenging for some banks.

32. Finally, the level of detail in the SBM OFR submission allows the supervisors to clearly define which are the asset class and risk class components of the OFR (see Figure 22 and Figure 23), and this allows them to identify areas of potential problems in the application of the standardised methodology.

1.2 CAs' assessments based on supervisory benchmarks

33. 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.

34. 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 the majority 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.

35. The CAs are expected to pay the utmost attention to the minority of cases in which the over- and 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

36. 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.

37. In the 2020 exercise, the data submitted further improved in quality thanks to the clarification of the legal text description of some instruments and also 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.

38. 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.

39. 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.

40. 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.

41. 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.

42. At the moment this report is drafted, the exercise 2025 is under preparation, 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 Internal Model Approach.

43. 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. This is because the different interpretations of the instruments have been a significant source of variability. Nonetheless, further enrichment of the variety of the instruments monitored could be beneficial. In addition, and very importantly, an extension of the scope of the benchmarking exercise to the banks that do not have IMA approval but apply the ASA is understood to be of particular significance for the market risk benchmarking exercise.

In the future, the exercise will require a major redesign to take into consideration the specific features of the FRTB.

2. Introduction and legal background

44. European legislators have acknowledged the need to ensure consistency in the calculation of RWA for equivalent portfolios, and the CRR and CRD include a number of 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.

45. 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) 2019/878[4] of the European Parliament and of the Council of 20 May 2019 amending Capital Requirements Directive IV (CRD V) has not changed this mandate.

46. 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.

47. 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.

48. This MR benchmarking exercise is an MRWA variability assessment performed over a large sample of banks (44 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;

[4] 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.

49. 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.

50. 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.

51. 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.

52. 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 particular 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.

53. 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.

54. 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.

55. Regulation (EU) 2019/876[5] 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.

[5] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0876&from=EN

3. Main features of the 2023 market risk benchmarking exercise

56. 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.

3.1 Definition of the market risk hypothetical portfolios

57. 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 take into account 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.

58. 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.

59. A more detailed explanation of the portfolios can be found in the benchmarking ITS on the EBA website.[6]

3.2 Data collection process

60. 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.

3.2.1 IMV

61. The reference date for IMV was 22 September 2022, 5.30 p.m. CET. Banks entered all positions on 15 September 2022 ('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.

62. 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 22 September 2022, 5:30 p.m. CET.

3.2.2 Risk measures

63. Pursuant to the common instructions provided, banks were required to calculate the risks of the positions without taking into account 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.

64. 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.

65. 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.

[6] ITS package for benchmarking exercises | European Banking Authority (europa.eu). 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 (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1562830373986&uri=CELEX:32019R0439).

66. 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.

3.3 Participating banks

67. A total of 44 banks representing 13 EU countries participated in the exercise (see Table 17 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.

68. CAs are in charge of conducting similar benchmarking investigations for results at a 'solo' level within their own jurisdictions for eligible banks.

3.4 Data quality issues

69. 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.

70. IMV results reached the EBA in November/December 2022, 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,[7] 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.

71. 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.[8] 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

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

[8] Some banks reported values for aggregated portfolios, taking into account 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.[9] 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 the majority of submitters.

72. It should be recalled that the 2023 exercise is the second 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.

73. In the data analysis, it looks like no major errors in the reporting of some 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 Even the Cross-currency Swap (instrument 220, now included on IR instruments) finally present a very low IQD (1%)representing a consistent booking practice of this instrument, with only a couple of exceptions. Room for improvement in the consistency of the book is present for the instruments 221 (Ester/Euribor swap) and 223 (inflation swap)

- FX: this asset class shows generally low IQD, with a couple of noticeable exceptions in instrument 301 and instrument 310, both forward contracts. In the first case, the dispersion is attributed to

[9] Annex 5, Market risk 2021 BM, Section 1 (Common instructions), letter (ee)

mix of error in booking, and some inconsistent interpretation of the instruction. High IQD (47%) of instrument 310 is also exacerbated by the very low and close to zero IMV.

- Cmd: 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. The only noticeable high IQD instrument is 230 (iTraxx option).

74. 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.

75. Nonetheless, data quality for the 2023 exercise has been fairly good, in general. 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.

4. Market risk benchmarking framework

76. 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.

77. 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 of 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.

78. 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.

79. 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.

80. 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 3.2);
- 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).

4.1 Outlier analysis

81. 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.

82. 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.

83. Extreme IMVs and RMs are defined as values outside the range of two truncated standard deviations[10] 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.

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

84. 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.

85. 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.

86. Another metric used in the variability studies is the CV, which is defined as the ratio between the standard deviation[11] and the mean (in absolute values):

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

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

[11] The standard deviation was considered in order 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 1: IMV statistics and extreme values

EU Statistics for IMV by instrument

		Main statistics								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
Equity	101	3,376,090	3,405,000	3,381,889	7,254	22,129	1,130	0%	26	3,378,756	3,380,000	3,380,365	0%
	102	514,500	516,100	515,095	381	924	0	0%	25	515,000	515,000	515,000	0%
	103	-510,501	-502,984	-507,013	1,738	3,076	1,344	0%	24	-507,630	-507,268	-505,866	0%
	104	-130,165	-122,220	-125,008	2,141	2,937	1,676	2%	25	-125,670	-125,670	-123,237	1%
	105	-1,681,962	-1,634,108	-1,662,628	9,416	17,336	4,476	1%	26	-1,667,534	-1,663,539	-1,660,647	0%
	106	-16,903	-16,534	-16,733	90	102	40	1%	25	-16,794	-16,718	-16,718	0%
	107	-90,665	-89,010	-89,902	319	631	174	0%	26	-90,064	-89,822	-89,730	0%
	108	-88,858	-84,719	-86,818	987	1,552	562	1%	26	-87,779	-86,661	-86,158	1%
	109	47,817	53,255	50,346	1,384	1,449	832	3%	26	49,442	50,391	50,911	1%
	110	-65,658	-57,950	-63,437	1,848	3,122	1,025	3%	26	-64,780	-63,633	-62,430	2%
	111	20,214	23,826	21,777	1,201	1,144	1,171	6%	24	20,475	21,822	22,797	5%
	112	27,485	30,294	28,807	780	1,379	513	3%	22	28,202	28,705	29,585	2%
	113	42,313	46,274	44,554	1,099	1,512	757	3%	25	43,876	44,390	45,333	2%
	114	-32,987	-28,900	-30,877	955	1,196	459	3%	24	-31,348	-30,842	-30,303	2%
	115	2,490	3,591	2,999	263	424	142	9%	22	2,811	2,973	3,147	6%
	116	3,060	4,465	3,691	289	432	139	8%	22	3,552	3,666	3,864	4%
	117	-537,300,000	-524,155,171	-530,945,287	3,200,210	4,443,962	2,925,499	1%	24	-533,507,679	-531,986,290	-528,076,221	1%
	118	942,558	1,002,615	965,138	15,884	21,566	10,827	2%	19	953,258	963,286	976,658	1%
	119	184,432	198,948	191,567	3,706	4,021	2,439	2%	27	188,400	191,980	194,020	1%
	120	163,632	197,601	181,311	8,672	10,935	3,727	5%	20	179,835	181,896	186,634	2%
	121	295,559	658,776	539,652	127,932	153,013	58,655	24%	11	437,662	573,288	651,340	20%
Interest Rate	201	-156,843	-140,754	-151,022	4,407	7,397	2,221	3%	37	-154,662	-151,839	-147,521	2%
	202	-293,120	-244,714	-269,951	9,464	43,742	3,755	4%	33	-271,942	-269,752	-264,792	1%
	203	-14,192	-10,314	-12,442	838	1,114	636	7%	36	-13,041	-12,402	-11,757	5%
	204	-78,000	-66,628	-71,991	3,064	3,996	1,627	4%	37	-73,724	-71,319	-70,262	2%
	205	914,670	1,171,318	1,002,076	57,686	340,777	32,204	6%	17	961,074	992,026	1,029,043	3%
	206	1,141,572	1,237,762	1,189,151	12,877	44,584	2,030	1%	32	1,186,356	1,188,386	1,190,152	0%
	207	-1,227,194	-1,219,119	-1,221,261	1,371	3,369	531	0%	37	-1,221,640	-1,220,937	-1,220,715	0%
	208	1,109,214	1,119,032	1,112,261	2,112	27,190	1,490	0%	32	1,110,624	1,112,130	1,113,327	0%
	209	923,000	925,296	923,933	586	1,430	368	0%	33	923,489	923,836	924,200	0%
	210	938,864	956,570	943,529	2,491	18,120	849	0%	38	942,600	943,487	944,328	0%
	211	-945,732	-942,560	-943,985	894	1,215	907	0%	35	-944,760	-944,000	-943,116	0%
	212	-1,323,459	-1,299,175	-1,314,566	3,200	8,879	857	0%	37	-1,316,000	-1,314,122	-1,313,921	0%
	213	1,072,061	1,076,588	1,074,515	1,053	2,790	614	0%	35	1,073,850	1,074,495	1,075,003	0%
	214	965,042	968,205	967,119	662	1,833	307	0%	34	966,962	967,163	967,474	0%
	215	-935,366	-922,539	-928,943	1,897	3,671	347	0%	35	-929,181	-928,766	-928,382	0%
	216	948,500	964,055	957,862	3,364	17,942	859	0%	26	957,315	958,468	959,223	0%
	217	989,653	1,001,405	994,927	2,122	8,335	553	0%	26	994,413	995,144	995,519	0%
	218	183,259	230,086	215,016	11,286	16,881	6,806	5%	36	208,449	214,000	224,094	4%
	219	13,311	15,807	14,558	600	845	220	4%	36	14,138	14,729	14,971	3%
	220	-158,403	-138,312	-148,126	3,713	47,788	2,237	3%	31	-150,205	-147,314	-146,307	1%
	221	4,612	13,681	9,823	1,871	2,834	1,164	19%	37	8,862	9,918	11,093	11%
	222	1,034,149	1,062,026	1,038,195	4,807	28,714	1,341	1%	32	1,036,088	1,037,114	1,038,257	0%
	223	48,409	77,339	65,362	6,461	9,230	3,856	10%	27	59,502	65,761	69,554	8%
	224	-596,356	-266,631	-528,664	73,185	145,206	9,355	14%	29	-552,399	-537,197	-536,469	1%
FX	301	-22,914	122,426	33,898	25,879	44,258	5,750	76%	32	26,196	41,005	44,073	25%
	302	118,019	165,440	141,533	12,032	33,272	4,593	9%	32	135,417	138,611	148,618	5%
	303	9,942,364	10,195,902	10,139,559	68,671	130,361	17,736	1%	34	10,117,361	10,158,472	10,182,781	0%
	304	78,117	93,361	84,997	2,868	4,597	1,276	3%	32	83,626	85,180	86,205	2%
	305	1,124,269	1,171,142	1,142,860	11,685	16,562	7,434	1%	31	1,133,929	1,143,195	1,152,000	1%
	306	-439,960	-411,928	-423,819	6,683	11,108	3,639	2%	31	-428,332	-423,074	-418,454	1%
	307	-127,475	-115,890	-121,285	2,953	3,380	2,010	2%	31	-124,061	-120,999	-119,157	2%
	308	1,599,875	1,639,743	1,617,334	11,053	14,561	8,949	1%	30	1,608,404	1,617,052	1,626,789	1%
	309	-1,012,915	-959,767	-984,178	14,935	15,514	10,523	2%	33	-993,327	-984,921	-973,697	1%
	310	-4,159	1,146	-1,883	1,431	1,782	866	76%	34	-2,991	-2,000	-1,076	47%
	311	204,931	369,981	294,902	39,015	183,468	11,690	13%	24	278,592	303,907	311,282	6%
Commodities	401	-20,104	23,252	9,621	10,727	21,976	6,006	112%	14	5,722	11,975	15,710	47%
	402	-51,078	16,955	-15,612	14,186	23,710	4,213	91%	14	-19,600	-15,693	-11,175	27%
	403	299,653	421,609	352,461	30,635	39,824	8,926	9%	12	331,909	357,241	363,550	5%
	404	-318,765	-249,535	-281,749	17,595	26,766	1,992	6%	11	-293,134	-279,507	-275,724	3%
	405	619,682	943,490	780,073	109,876	109,876	47,199	14%	13	721,170	747,443	898,036	11%
Credit Spread	501	-20,761	-19,757	-20,235	244	513	104	1%	22	-20,316	-20,229	-20,107	1%
	502	20,904	23,029	21,784	531	831	347	2%	21	21,435	21,646	22,019	1%
	503	19,685	21,200	20,064	346	657	124	2%	22	19,849	19,964	20,097	1%
	504	33,889	36,805	34,896	614	1,347	271	2%	19	34,579	34,876	35,051	1%
	505	71,576	74,812	72,864	897	1,682	675	1%	19	72,235	72,560	73,571	1%
	506	-33,723	-32,658	-33,187	316	377	227	1%	21	-33,438	-33,186	-32,869	1%
	507	-11,622	-9,858	-10,793	429	484	181	4%	23	-11,122	-10,770	-10,646	2%
	508	-8,480	-7,178	-8,065	329	530	218	4%	21	-8,266	-8,094	-7,874	2%
	509	-11,029	-10,325	-10,654	155	291	77	2%	22	-10,727	-10,682	-10,567	1%
	510	-4,119	-2,857	-3,514	264	777	55	8%	21	-3,561	-3,459	-3,402	2%
	511	1,586	2,864	2,219	287	416	88	13%	22	2,091	2,295	2,326	5%
	512	-13,722	-12,676	-12,987	248	417	110	2%	22	-13,069	-12,899	-12,850	1%
	513	29,548	31,687	30,736	446	639	114	2%	20	30,572	30,764	30,865	0%
	514	25,529	30,598	26,401	1,076	2,776	271	4%	22	25,794	26,072	26,805	2%
	515	-19,102	-17,770	-18,246	412	523	311	2%	23	-18,552	-18,065	-17,885	2%
	516	43,737	44,817	44,283	312	359	279	1%	24	44,098	44,290	44,589	1%
	517	891,101	897,233	895,146	1,839	2,322	681	0%	22	895,004	895,707	896,366	0%
	518	241,082	245,580	243,125	1,186	1,186	847	1%	21	242,083	243,278	244,061	0%
	519	904,759	928,475	922,763	5,146	17,447	864	1%	27	922,550	924,453	925,040	0%
	520	931,701	959,390	949,577	4,534	10,694	615	1%	27	949,003	950,891	951,120	0%
	521	-993,111	-987,155	-992,230	1,254	5,544	331	0%	24	-992,855	-992,631	-992,117	0%
	522	993,190	997,930	996,017	1,027	3,783	223	0%	25	995,544	996,360	996,638	0%
	523	1,190,326	1,203,320	1,194,339	2,777	6,346	1,580	0%	25	1,192,533	1,193,081	1,196,489	0%
	524	-93,259	-84,764	-89,475	2,412	2,672	1,810	3%	21	-91,232	-89,502	-87,721	2%
	525	740,086	748,369	745,252	2,162	5,163	1,176	0%	27	744,074	745,019	747,105	0%
	526	-113,707	-101,195	-108,063	3,279	3,583	2,776	3%	21	-110,862	-107,884	-105,419	3%
	527	783,718	796,585	790,347	3,013	4,455	1,906	0%	27	788,672	789,501	792,650	0%
	528	-133,907	-103,671	-118,392	7,956	7,998	6,193	7%	22	-123,481	-118,137	-113,222	4%
	529	68,867	94,658	82,134	5,017	10,420	1,469	6%	21	80,837	81,936	83,190	1%
	530	-216,733	-53,510	-157,609	50,278	61,043	28,526	32%	13	-198,140	-170,706	-128,324	21%
	531	880,714	908,064	899,266	5,504	24,383	871	1%	21	898,995	900,820	901,108	0%
	532	889,544	960,703	929,240	13,077	25,750	1,904	1%	19	925,560	929,828	931,071	0%
	533	811,619	822,979	818,815	2,439	5,359	927	0%	20	817,497	819,465	819,983	0%
	534	1,029,560	1,035,078	1,032,615	1,134	7,104	281	0%	19	1,032,457	1,032,803	1,033,093	0%
CTP	601								4				
	602								4				
	603								4				
	604								4				
	605								4				
	606								4				
	607								4				
	608								4				
	609								4				
	610								4				

[1] *STDev trunc* is the standard deviation computed excluding values below the *5th* and above the *95th* percentile

[2] Refers to the number of banks included in the computation of the statistics

Table 2: Average IMVs' interquartile dispersion by asset class

Average Interquartile dispersion by asset class

	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	2%	21%	2%	1%	2%	2%
IR	2%	16%	19%	2%	3%	8%
FX	8%	3%	4%	16%	15%	6%
Commodity	14%	24%	4%	10%	6%	8%
Credit spreads	3%	1%	1%	1%	3%	6%
CTP				5%	8%	103%

88. Table 1 and Table 2 depict 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 310 (Fx forward in DDK) (IQD 47%). This high dispersion is due to the 'low value' (close to zero) 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. Moreover, 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 310 (fx forward – IQD 25%). Overall, excluding these two instruments with high dispersion, it would lead to an average IQD of 2% for the Fx asset class i.e., comparable or lower with respect the previous exercises.

89. The Cmd instruments 401 and 402 (previously 48 and 49) also show high IQDs (47% and 27%). 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.

90. The EQ instrument 121 is the only one with medium-high IQDs (20%). These medium-high IQD is likely do to the underling (Vix) which makes the instruments slightly more exotic with respect to the rest of the EQ instruments. Same explanation could be envisaged for the CS instrument 530 (ITraxx option – 21% IQD).

91. Overall, the IQD by asset class for the instruments of the 2023 exercise is substantially improved when comparable to the past exercises for the EQ and IR asset classes. The worsening of the

other asset class is driven by specific instruments (e.g., instrument 310, 401 and 401). This means that an adjustment to the 2022 instructions was successful.

92. Comparing the 2023 instruments with the 2022 instruments purely on the basis of the IQD, once the instruments with values of close to zero that skew the average by asset class have been excluded, it would appear that the quality of the data submission is improved.

93. From an aggregated risk-type perspective, Fx and CO instruments show the highest dispersion, with values higher for Fx with the 2022 exercise.

94. CTP IMVs are no longer reported since the observations obtained are too few to provide meaningful statistics.

95. A cluster analysis (see Table 3 and Figure 1, Figure 2, Figure 32) 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 IR instruments 220 and 224, and for Fx instrument 310, CO instruments 401 and CS instrument 530.

Table 3: IMV cluster analysis – number of banks by range

2023 IMV cluster analysis by instrument: number of banks by range

(X = ratio with the median)

100 *Range containing more than 15% of the total obs for that particular portfolio*

	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 obs.
Equity	101				11	20	1			32
	102				8	22				30
	103				10	19				29
	104				9	20				29
	105				14	15				29
	106				13	15				28
	107				15	14				29
	108				14	15				29
	109				14	14				28
	110				14	14				28
	111				12	13				25
	112				12	13				25
	113				14	14				28
	114				14	14				28
	115		1		12	13				26
	116				13	13				26
	117				14	13			1	28
	118				11	11				22
	119				15	15				30
	120				12	12				24
	121				6	5	1			12
Interest Rate	201				21	22				43
	202			1	19	20				40
	203				21	21	1			43
	204				21	20	1			42
	205				9	8		1		18
	206				18	18				36
	207				20	21				41
	208				17	18				35
	209				20	21				41
	210				20	21				41
	211				20	21				41
	212				20	21				41
	213				20	20				40
	214				20	20				40
	215				19	20				39
	216				13	16				29
	217				14	17				31
	218				21	22				43
	219				21	21	1			43
	220				18	13	6			37
	221	1		1	19	17	1	1		40
	222				17	18				35
	223				15	15				30
	224				20	8	10	1	1	40
FX	301	5	1		12	12	4	3		37
	302				18	14	5			37
	303				18	18	1			37
	304				18	18				36
	305				17	18				35
	306				17	18				35
	307				17	18				35
	308				17	18				35
	309				17	18				35
	310		1	7	10	8	2	6	2	36
	311				14	10		2	2	28
Commodities	401			3	4	3	3		1	14
	402	1			6	5	1		1	14
	403				6	7				13
	404				6	7				13
	405				6	7				13
Credit Spread	501				12	13				25
	502				12	12	1			25
	503				12	12			1	25
	504				10	11				21
	505				10	11				21
	506				12	12				24
	507				13	13				26
	508				13	13				26
	509	1			12	12	1			26
	510			3	10	11	1			25
	511			1	12	10	3			26
	512				13	13				26
	513				12	12				24
	514			1	12	12	1			26
	515				13	13				26
	516				13	13				26
	517				12	12				24
	518				11	12				23
	519				14	15				29
	520				14	15				29
	521				14	15				29
	522				14	15				29
	523				14	15				29
	524				12	12				24
	525			1	13	15				29
	526				12	12				24
	527			1	13	15				29
	528				12	12				24
	529			2	10	12				24
	530				7	4	4			15
	531				11	12				23
	532				11	12				23
	533				12	12				24
	534				11	12				23
CTP	601									0
	602									0
	603									0
	604									0
	605									0
	606									0
	607									0
	608									0
	609									0
	610									0

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

- Instruments 220 and 224 (IR): these instruments do no exhibit extreme outliers in terms of IQD; nonetheless, the CCS (220) and OTM Scwaption (224) present some residual issue in term of correct booking from banks.
- Instruments 310 (FX): the only outlier with a relatively high IQD (47%), here the clustering is also less relevant due to the very low IMV of the instrument.
- Instruments (CO): instruments 401 and 402 are high IQD instruments with some significant outliers.
- Instrument 530 (CS): relatively few submission (only 13), with benchmarking well defined, but some outliers values are highlithed.

97. Some of these extreme outlier banks were classified as a high priority for the CAs (see also Chapter 6), so they were followed with greater attention during the exercise in order to specifically define the reason for the extreme result.

98. CTPs are no longer reported in the cluster analysis because of the scarcity of contributions.

99. 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.

100. 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.

101. 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.

102. 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 32.

Figure 1: IMV scatter plots – low-IQD instruments

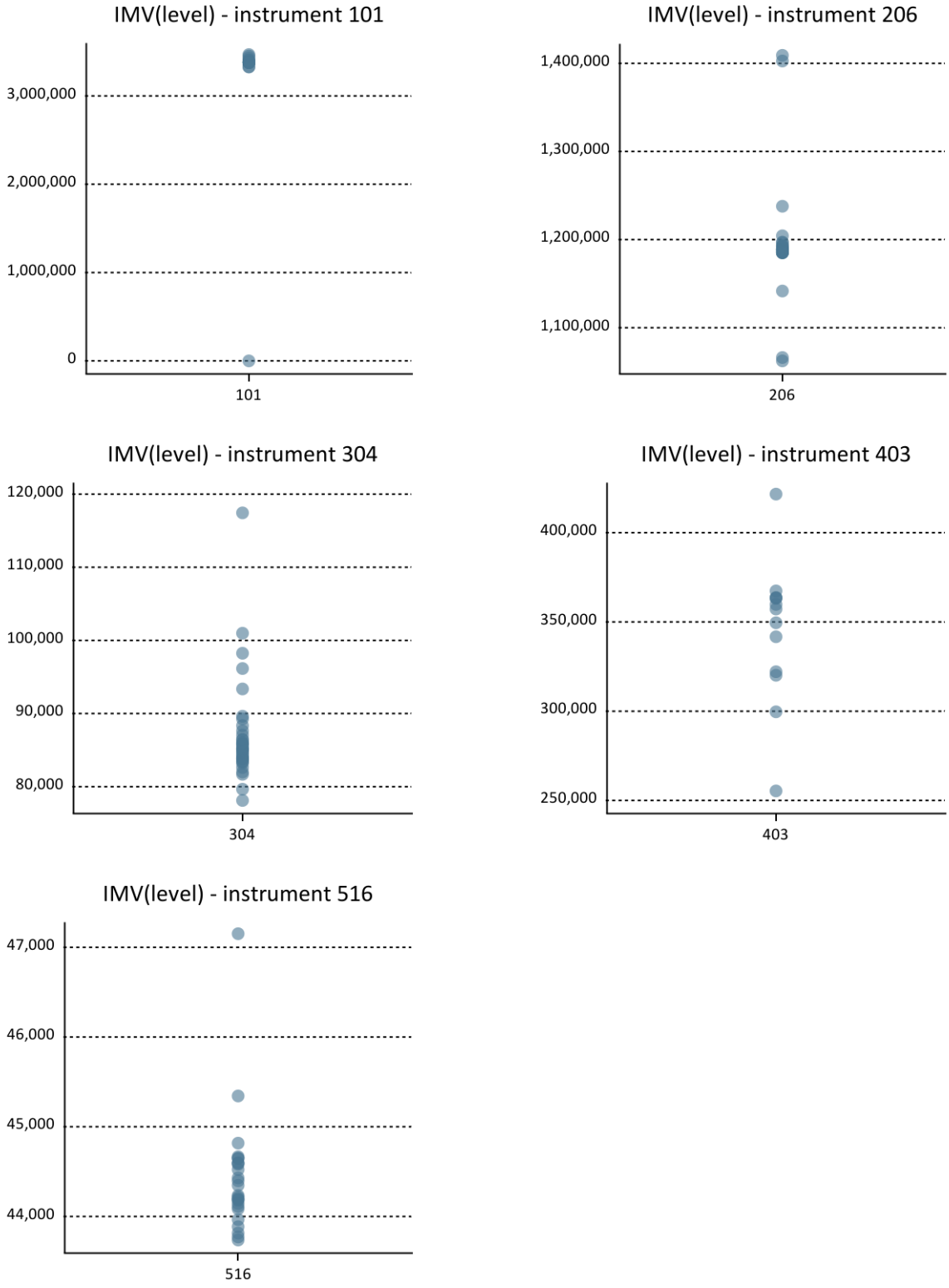
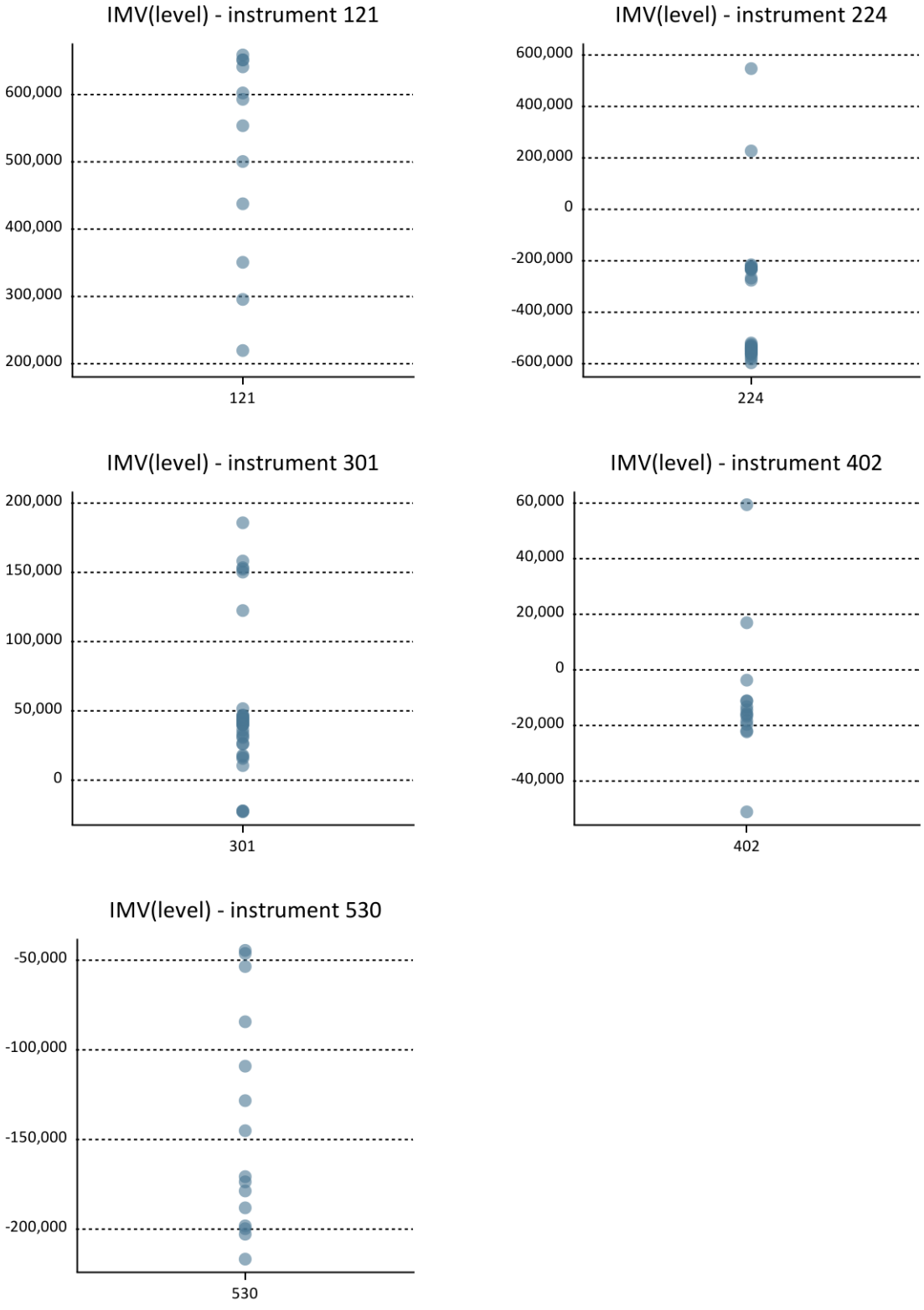


Figure 2: IMV scatter plots – high-IQD instruments



103. The 'concentration index' as per the percentage of values between 50% and 150% of the median value in Table 3 shows that, overall, 96% of the observations lie between those ranges.

104. This result is higher with respect to what reported last year's MR benchmarking exercise, demonstrating that the clarification of the instruments resulted in a decrease in the number of outliers.

105. 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. Nevertheless, the aim remains to increase this IMV empirical range coverage in subsequent exercises.

106. 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.

4.2 Risk and stressed measures assessment

107. For VaR and sVaR, variability was assessed by using the banks' reported VaR and sVaR over a 2-week period (from 16 January 2023 to 27 January 2023). 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.

108. In the sample, 14 out of 44 banks calculated weekly sVaR measures. One banks reported inconsistent results. The remaining 29 banks computed daily sVaR measures.

109. 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.

110. 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.

111. 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.[12]

[12] It should be noted that this expectation depends on the lookback period for VaR.

112. 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 3.4, 'Data quality issues').

113. 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:[13]

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

114. 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.

115. 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.

116. In the sample, 14 out of 26 banks computed weekly IRC measures.

117. 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).

118. 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.

119. 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.

[13] 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.

120. 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.

121. 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.

122. 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'.

123. 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 6 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.

4.2.1 Limitations

124. 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.

125. 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 5.2.5.d, 'Common stress period considered' below).

126. Another limitation that was tackled in this analisis 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.

127. 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.

128. 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.

5. Overview of the results obtained

5.1 Analysis of VaR and sVaR metrics

129. The dataset used to perform the assessment of risk measures for the 2023 exercise was determined on the basis of 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 4.1, 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 41, 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.

130. 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 19 in the annex reports the banks' VaR results in relation to the median, aggregated into six buckets, to enable the detection of unexpected clusters.

131. As Table 19 and Table 20 show, the variability of the VaR (on average 17% in IQD vs an average variability of 23%) has quite improved compared to the previous year, where basically all asset classes report some decrease in the IQDs (quite substantial for EQ, IR and CS). The analysis also identifies clusters for portfolios 1016 (EQ), portfolio 2015 (IR), portfolio 4001 (CO), and 5011 and 5016 (credit spread). After the spikes in the volatilities of the 2020-2021, in the 2021-2022 period the volatility in the market seems to be back to pre-Covid period (just slightly higher). This is reflected by lower levels of VaR. Moreover, the IQDs of portfolios in general is reduced. This decrease 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.

132. 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.

133. 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

134. Figure 3 and Table 4 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 4 also includes the VaR results for MC simulation banks and the expected shortfall.

135. In terms of risks across different assets classes, the IQDs for VaR for all asset classes but Commodities Fx are decreased and they are all below 20%. The asset class with the lower level of IQD is FX, with just 12%. The asset class with the highest IQD remain the CS (18%, it was 28% in 2022; it was 37% in 2021). Overall, the IQD is lower (16%) 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 it is slightly lower of the 17% before Covid pandemic in 2020. This decrease in the IQD of the VaR is likely to have stemmed from a decrease in the volatility in the market in 2023, but also to a good refinement of the instructions and submission of the data.

136. As expected, the IQD for sVaR is higher than for VaR (see the bottom panels of Figure 3), with an average IQD of 22% (28% in 2022, 29% in 2021 and 25% in 2020). The CS asset class features a higher dispersion once again (29% vs 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.

Figure 3: Interquartile dispersion and coefficient of variation for IMV and risk metrics by portfolio

Table 4: Interquartile dispersion for IMV, risk metrics and SBM OFR by risk factor

Average Interquartile dispersion by risk factor

	IMV	*VaR (all sample)*	*SVaR*	*P&L VaR*	*VaR HS banks*	*VaR MC banks*	*Exp shortfall*	*OFR*
Equity	2%	17%	24%	12%	13%	10%	12%	13%
IR	2%	16%	23%	14%	15%	9%	13%	8%
FX	8%	12%	19%	8%	12%	12%	6%	5%
Commodity	14%	17%	17%	9%	20%	6%	11%	20%
Credit spr.	3%	18%	29%	17%	15%	12%	15%	18%

137. Table 4 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 15% vs. 16%). With regard to the P&L VaR, it is evident that the dispersion (12% on average) is slightly lower with respect to both HS VaR and all-sample VaR for almost all the asset classes. This is not consistent with the assumption that fewer differences in the methodology would imply less dispersion among the risk measures. Further investigations on the P&L VaR shall be run in the future in order to clarify this inconsistency.

138. 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., three banks in the sample – the remaining three apply a combination of methods).

139. The ratio between sVaR and VaR was also analysed across the sample (see Table 24 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 have to pay attention to these observations.

140. Table 5 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 5: 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
Equity	1001	8.7%	69.6%	21.7%
	1002	4.8%	95.2%	0.0%
	1003	0.0%	91.7%	8.3%
	1004	27.8%	55.6%	16.7%
	1005	0.0%	85.0%	15.0%
	1006	4.3%	91.3%	4.3%
	1007	40.9%	59.1%	0.0%
	1008	0.0%	100.0%	0.0%
	1009	0.0%	100.0%	0.0%
	1010	0.0%	84.6%	15.4%
	1011	0.0%	96.2%	3.8%
	1012	0.0%	95.5%	4.5%
	1013	10.0%	80.0%	10.0%
	1014	0.0%	30.3%	69.7%
	1015	0.0%	16.7%	83.3%
	1016	0.0%	93.3%	6.7%
Interest Rate	2001	0.0%	20.0%	80.0%
	2002	21.4%	57.1%	21.4%
	2003	0.0%	65.5%	34.5%
	2004	0.0%	34.6%	65.4%
	2005	0.0%	30.8%	69.2%
	2006	0.0%	68.8%	31.3%
	2007	0.0%	27.3%	72.7%
	2008	0.0%	18.8%	81.3%
	2009	0.0%	32.3%	67.7%
	2010	0.0%	25.0%	75.0%
	2011	20.0%	60.0%	20.0%
	2012	48.5%	39.4%	12.1%
	2013	0.0%	19.2%	80.8%
	2014	80.6%	16.1%	3.2%
	2015	0.0%	10.0%	90.0%
	2016	0.0%	71.4%	28.6%
	2017	24.1%	65.5%	10.3%
	2018	0.0%	11.1%	88.9%
	2019	0.0%	8.3%	91.7%
	2020	0.0%	21.9%	78.1%
	2021	0.0%	81.8%	18.2%
	2022	0.0%	93.3%	6.7%
	2023	0.0%	96.8%	3.2%
FX	3001	0.0%	100.0%	0.0%
	3002	14.3%	82.1%	3.6%
	3003	28.1%	65.6%	6.3%
	3004	0.0%	95.0%	5.0%
	3005	8.3%	83.3%	8.3%
	3006	0.0%	76.9%	23.1%
	3007	18.2%	81.8%	0.0%
Commodities	4001	0.0%	100.0%	0.0%
	4002	0.0%	90.0%	10.0%
	4003	35.3%	64.7%	0.0%
	4004	4.5%	95.5%	0.0%
Credit Spread	5001	29.4%	70.6%	0.0%
	5002	31.8%	59.1%	9.1%
	5003	34.8%	65.2%	0.0%
	5004	0.0%	72.2%	27.8%
	5005	0.0%	54.2%	45.8%
	5006	0.0%	62.5%	37.5%
	5007	0.0%	65.0%	35.0%
	5008	0.0%	68.2%	31.8%
	5009	45.0%	55.0%	0.0%
	5010	0.0%	90.5%	9.5%
	5011	20.0%	75.0%	5.0%
	5012	0.0%	42.1%	57.9%
	5013	0.0%	87.5%	12.5%
	5014	12.5%	81.3%	6.3%
	5015	0.0%	87.5%	12.5%
	5016	0.0%	100.0%	0.0%
	5017	0.0%	60.9%	39.1%
	5018	41.2%	58.8%	0.0%
	5019	0.0%	78.9%	21.1%
	5020	15.4%	84.6%	0.0%
	5021	0.0%	84.2%	15.8%
	5022	0.0%	87.5%	12.5%
	5023	0.0%	50.0%	50.0%
	5024	5.0%	70.0%	25.0%
	5025	0.0%	0.0%	0.0%
	5026	0.0%	0.0%	0.0%
	5027	0.0%	0.0%	0.0%
CTP	6001	0.0%	0.0%	0.0%
	6002	0.0%	0.0%	0.0%
	6003	0.0%	100.0%	0.0%
	6004	0.0%	100.0%	0.0%
	6005	0.0%	68.0%	32.0%
ALL-IN no-CTP	10000	0.0%	93.1%	6.9%
Equity Cumulative	11000	0.0%	83.3%	16.7%
IR Cumulative	12000	0.0%	63.2%	36.8%
FX Cumulative	13000	0.0%	0.0%	0.0%
Commodity Cumulative	14000	0.0%	0.0%	0.0%
CS Cumulative	15000	0.0%	100.0%	0.0%
CTP Cumulative	16000	12.5%	27.5%	60.0%

5.2 A closer look at the VaR and sVaR results

141. 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 3.4).

142. Broken down by portfolio, the figures show the average VaR and sVaR over the 10-day submission period for each bank, normalised by the median[14] of the given portfolio.[15]

143. Comparing Figure 4 and Figure 5, it looks as if the dispersion is higher for sVaR than for VaR (sVaR 22% IQD versus 16% 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%).

144. FX and CO are the asset classes with the lowest levels of dispersion for VaR (12% and 17%), as they are for sVaR (19% and 17%).

[14] The portfolio median is the median of the average VaR and sVaR over the submission period.

[15] 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

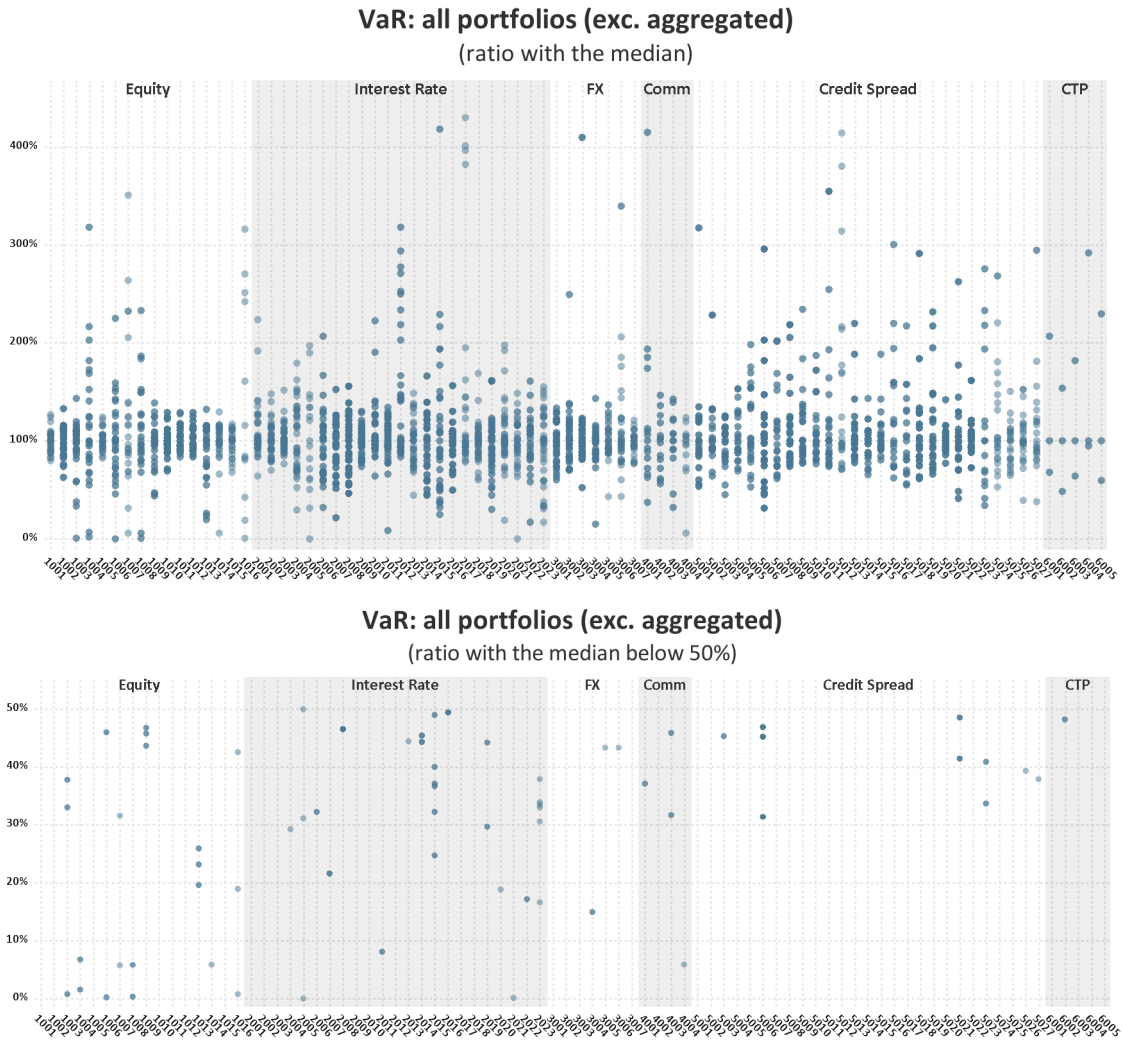
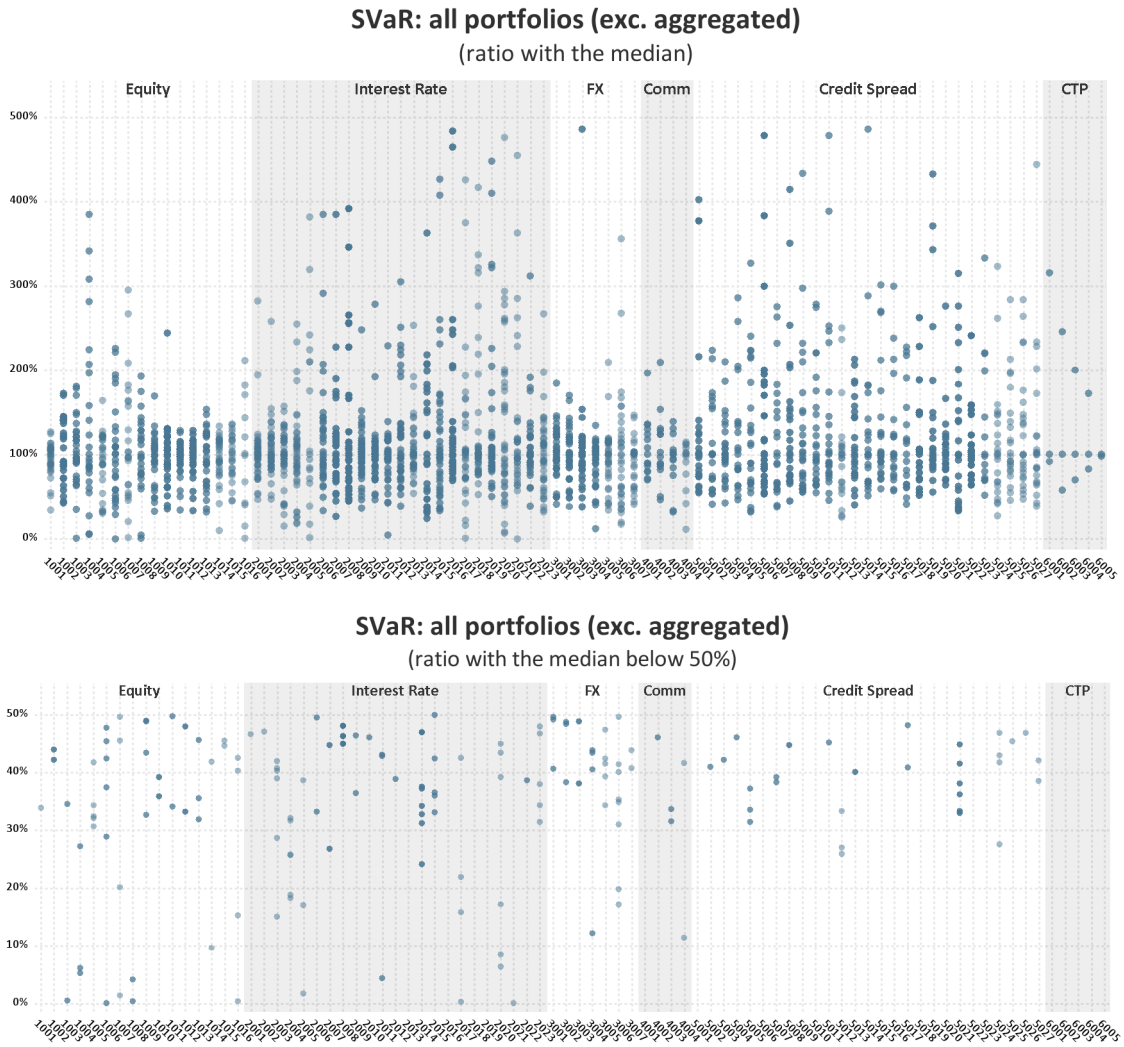


Figure 5: sVaR submissions normalised by the median of each portfolio



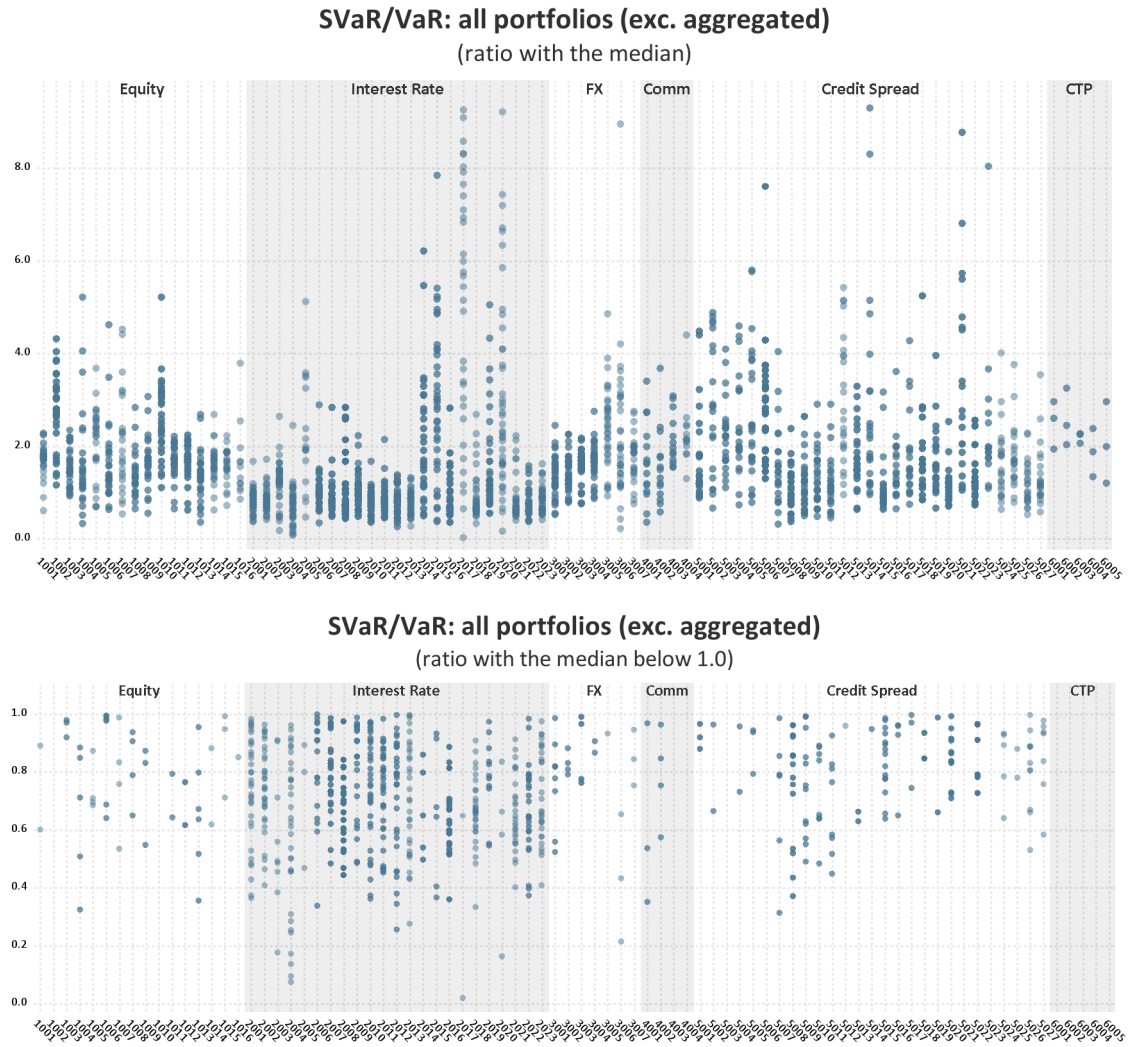
145. Table 20 and Table 21 in the annex report all the VaR and sVaR statistics along with EU benchmarks for all HPE portfolios.

5.2.1 Comparison of sVaR and VaR ratios

146. 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 24). 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 71% of cases. This was 89% in 2022 and 73% in 2021.

147. 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 0.02 and 14.19 and averages 1.64.

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



148. 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.

5.2.2 Drivers of variation

149. 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 (70%). Although the majority of banks use the same methodological approach, the dispersion of VaR remains significant 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

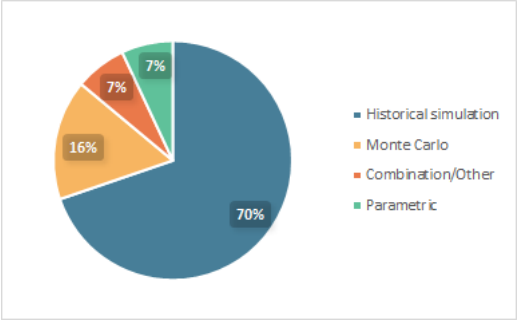
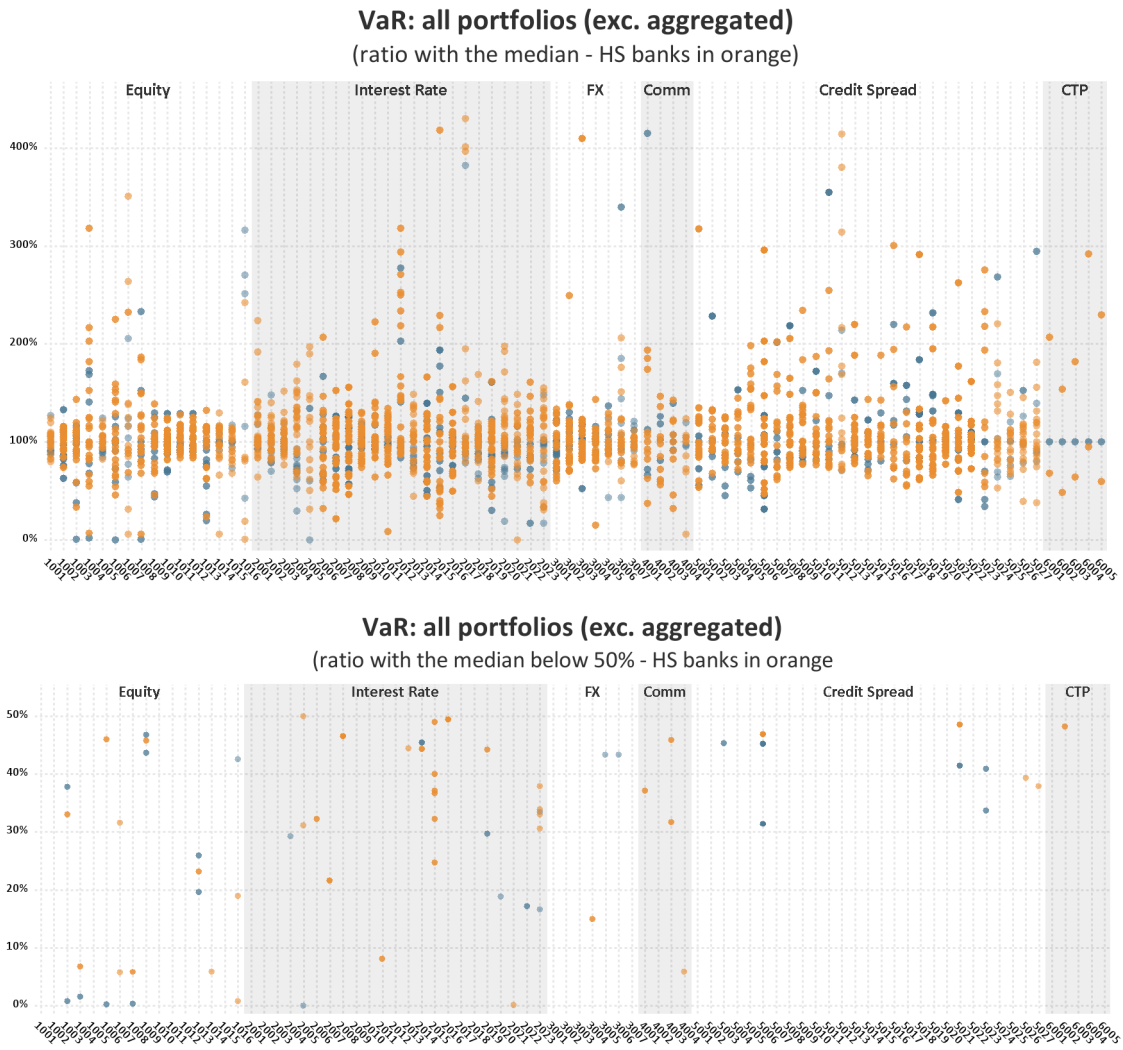
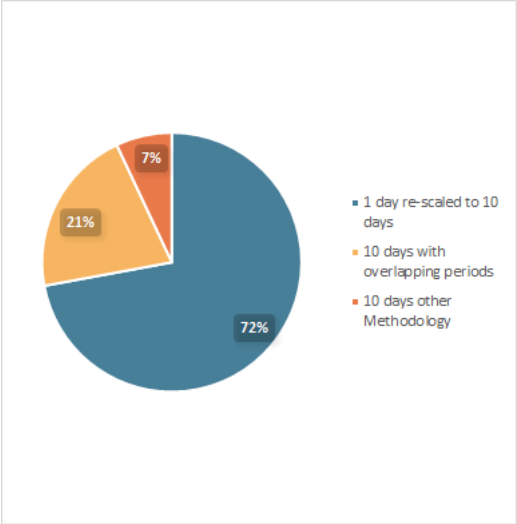


Figure 8: VaR submissions normalised by the median of each portfolio (by methodological approach)



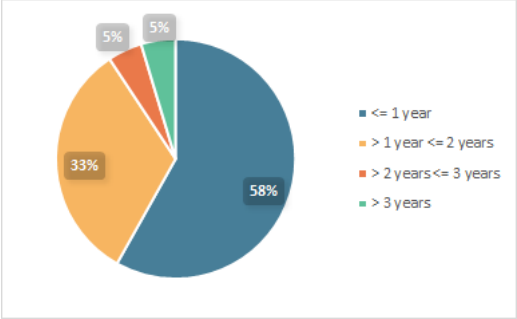
150. With regard to the regulatory 10-day VaR computation, by far the preferred method is rescaling the 1-day VaR to the 10-day VaR using the square root of time approximation.

Figure 9: Qualitative data: VaR time-scaling techniques



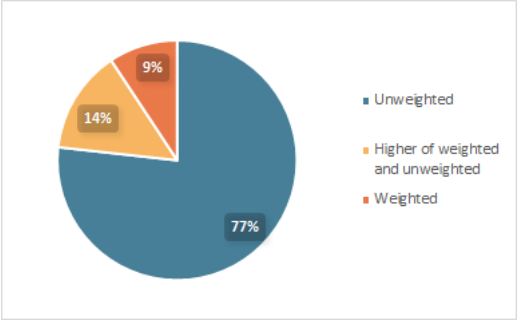
151. With regard to the historical lookback period used to calibrate banks' VaR models, 58% of the banks use the minimum period of one year and applying a period longer than 2 years is very unusual.

Figure 10: Qualitative data – length of VaR lookback period



152. As for the possible use of a data-weighting scheme, the great majority of banks' models use unweighted data in the regulatory VaR computation (77% of respondents).

Figure 11: Qualitative data – VaR weighting choices



153. Finally, with regard to supervisory actions on regulatory add-ons, 80% 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 3.86, with a maximum of 5.9. As a result, quite a number of banks either have to 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.

154. These responses suggest that the observed variation may be due to a number of different drivers. The EBA chooses to present the analysis using the following broad headings:

- supervisory actions;
- modelling differences; and
- other drivers of variation.

5.2.3 Supervisory actions

155. 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:

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

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).

156. 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.

157. Other supervisory measures, such as capital add-ons, cannot be easily captured. They are normally calculated at an aggregate level on the basis of 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.

5.2.4 Modelling differences

158. As outlined in Chapter 4, 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.

159. 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 returns[16];
- the length of the historical lookback period (1 year versus > 1 year)[17]; and
- keeping constant the 1-day and unweighted modelling choices and varying the length of the lookback period (1 year versus > 1 year).[18]

160. As shown in Table 6 and Table 7, there seems to be evidence that the modelling choices matter in terms of 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 and more conservative results.

161. For the IR portfolio the 1-day and more than 1-year calibrations produce more dispersed and more conservative results.

162. For the IR, FX and CS portfolios, the '1 year' calibration produces less dispersed but less conservative results.

[16] 31 banks adopted 1-day returns, while 10 banks adopted 10-day returns.

[17] 24 banks adopted 1-year, while 17 banks adopted > 1 year.

[18] 16 banks adopted 1-day, unweighted & 1-year, while 9 banks adopted 1-day, unweighted & >1 year.

163. Columns 5 and 6 of Table 6 and Table 7 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.

164. The is result is the inconsistent with what observed in the previous exercise, and it is clear that 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 support the idea that one specific model choice will lead to consistently more conservative and less dispersed risk measures, at least on a stable basis.

Table 6: Coefficient of variation for regulatory VaR (controlling for HS) by modelling choice (%)

	Coefficient of Variation for regulatory VaR (controlling for HS)					
Port.	*1-day*	*10-day*	*1y*	*>1y*	*1d, 1y, unw*	*1d, >1y, unw*
EQ 1010	8.1%	12.3%	6.5%	6.2%	5.5%	8.0%
IR 2010	8.8%	13.1%	10.5%	10.3%	8.3%	6.4%
FX 3004	9.4%	8.8%	8.6%	11.8%	6.1%	7.8%
CS 5020	6.4%	6.7%	7.3%	9.4%	5.6%	3.2%
mean	8.1%	10.2%	8.2%	9.4%	6.4%	6.3%

Table 7: Average regulatory VaR by modelling choice

	Average VaR subsamples					
	1-day	*10-day*	*1y*	*>1y*	*1d, 1y, unw*	*1d, >1y, unw*
EQ 1010	42,045	43,258	44,226	38,841	43,935	38,814
IR 2010	221,502	252,083	235,650	211,589	228,931	199,608
FX 3004	615,307	546,760	615,539	567,531	627,481	549,093
CS 5020	197,344	219,637	201,870	211,590	195,106	195,568

5.2.5 Other drivers of variation

165. In addition to the drivers of variation discussed in the preceding two subsections, there may be other drivers of variation.

166. In subsection 5.2.4 '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.

167. 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), the majority 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 17 observations (across 44 banks, where the average number of submissions is 33 for IR asset class) are available. Nonetheless, for this non-vanilla product the IQD is 37% for the VaR (portfolio 2005, it was only 3% 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.

168. 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.

169. 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 (2020-2022), the EBA also tested different definitions of size and business models.

a. Size of the bank

170. The size of the bank could have some impact on the internal model. Larger banks are expected to invest more in 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.

171. 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.

172. 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 26, Table 27 and Table 28).

173. Table 8 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 means 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. For EQ, IR and FX 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.

174. 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 book[19] 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 29, Table 30 and Table 31. Looking solely at the trading book size, we obtain different results. The average IQD ratio is not monotonic with the size of the trading book. The average IQD is 8% for small TB banks (very few portfolios submission need to be considered as a factor here), 14% for medium TB and 13% for large TB banks.

Table 8: Asset class comparison for VaR in terms of banks' size

	VaR - Avg. Interquartile Range			
	All Banks	*Small Banks*	*Medium Banks*	*Large Banks*
Equity	17%	11%	13%	12%
Interest Rate	16%	13%	15%	13%
FX	12%	11%	12%	9%
Commodities	17%	10%	10%	11%
Credit Spread	18%	13%	14%	14%
CTP				
All-in	13%	8%	10%	10%

b. Business model

175. The business model of the banks in the sample was selected based on a previous analysis run by the EBA (EBA – LCR Report[20]). In the sample of 44 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.

176. Specific VaR results for banks classified as cross-border universal banks are shown in Table 3233 of the annex. Table 9 summarises the impact of the business model on different asset

[19] The size of the trading book was defined as: (assets held for trading + liabilities held for trading) / (total assets × 2). Data source: FINREP data)

[20] https://www.eba.europa.eu/regulation-and-policy/liquidity-risk

classes. It is clear that 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 models has some effect in increasing the dispersion of the VaR submission.

177. 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 book[21] (FINREP data), the results are reported in Table 33, Table 34 and Table 35. The average IQD is 10% for the low level of Level 3 A&L banks, 14% for the medium level and 11% for the high level of Level 3 A&L banks. Therefore, it seems that a more exotic composition of the bank's trading book does not affect the variability of the results.

Table 9: Asset class comparison for VaR within the same business model (cross-border universal bank)

	VaR - Avg. Interquartile Range	
	All Banks	*Cross-border Universal bank*
Equity	17%	16%
Interest Rate	16%	15%
FX	12%	11%
Commodities	17%	17%
Credit Spread	18%	14%
CTP		
All-in	13%	11%

c. Level of approval

178. Banks can 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 4.2 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.

179. Among the banks that submitted results for interest rate risk, 23 banks in the report have general and specific approval (see Table 36) and 17 banks have only general approval (see Table

[21] (Level 3 assets held for trading + level 3 liabilities held for trading) / (assets held for trading+ liabilities held for trading)

37). Among the banks that submitted results for equity asset risk, 26 banks in the report have general and specific approval (see Table 38) and 8 banks have only general approval (see Table 39).

180. Table 10 summarises the result of the analysis when the filter for the level of approval is applied. It is clear that the presence of banks with different levels of approval tends to moderately impact the benchmarking results.

181. Looking at Table 10, we see that the EQ asset class IQD is 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, 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.

Table 10: Asset class comparison for VaR in terms of level of approval

	VaR - Avg. Interquartile Range			
	All Banks	*IR Gen + Specific*	*IR Gen only*	*Eq Gen + Specific*
Equity	17%			13%
Interest Rate	16%	16%	14%	
Credit Spread	18%	17%	12%	

d. Common stress period considered

182. 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.

183. Generally speaking, 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 30 banks. The benchmark and the related statistics for this subsample of banks are available in Table 40 in the annex, and they are easily comparable with the full sample sVaR statistics in Table 21.

184. Table 11 summarises this stress period filtering analysis. It seems clear that the different time window selected for the bank actually 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.

Table 11: Asset class comparison for sVaR in terms of the time window applied

	SVaR - Avg. Interquartile Range	
	All Banks	*Stressed Period*
Equity	24%	22%
Interest Rate	23%	20%
FX	19%	15%
Commodities	17%	12%
Credit Spread	29%	26%
CTP		
All-in	17%	14%

5.2.6 Portfolio comparison

185. 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.

186. This hypothesis can be tested with several portfolios in the 2023 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.

187. Both of these 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:

$$VaR_{Portfolio\ 2007} > 200\% \times VaR_{Portfolio\ 2006}$$

188. Table 12 reports when this hypothesis holds true.

Table 12: Portfolio comparison for VaR, sVaR and IRC

	VaR(P2007) > VaR(P2006)	sVaR(P2007) > sVaR(P2006)	IRC(P2007) > IRC(P2006)
Num of banks	33 out of 34	33 out of 34	25 out of 25
	VaR(P2007) > 1.5*VaR(P2006)	sVaR(P2007) > 1.5*sVaR(P2006)	IRC(P2007) > 1.5*IRC(P2006)
Num of banks	32 out of 34	32 out of 34	25 out of 25
	VaR(P2007) > 1.75*VaR(P2006)	sVaR(P2007) > 1.75*sVaR(P2006)	IRC(P2007) > 1.75*IRC(P2006)
Num of banks	32 out of 34	31 out of 34	25 out of 25
	VaR(P2007) > 2*VaR(P2006)	sVaR(P2007) > 2*sVaR(P2006)	IRC(P2007) > 2*IRC(P2006)
Num of banks	31 out of 34	20 out of 34	25 out of 25

189. The comparison between the two portfolios with respect to regulatory VaR shows that only 3 out of 34 banks do not meet the initial expectation. The same comparison based on sVaR yields 14 banks that are not in line with this expectation. With regard to the IRC model, no bank does not meet the a priori expectation.

5.3 Analysis of IRC

190. 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).

191. 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 13.

192. 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.

193. 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.

194. 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 5.2.6, the expected diversification relationship holds true for all but one of the banks that submitted such results.

195. 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 or not they need to be added to the model.

196. CAs should give particular attention to portfolios 2005-2006, 2013, 2018-2019, 5004, 5011, 5014-5016, 5019-5020 and 5022, i.e., where IRC shows a higher level of dispersion (above 50%) above the average.

197. 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:

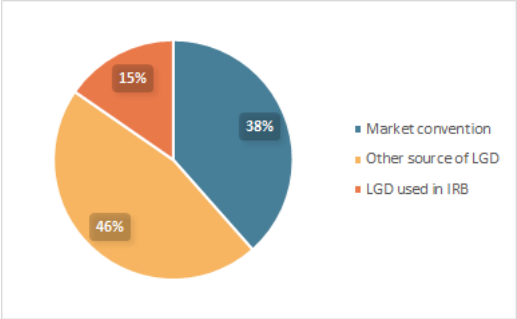
- a source of credit risk estimates such as PD and loss given default (LGD).
- the number of systemic factors used to model the co-movement among obligors in their portfolios.
- the size and granularity of credit spread shocks to apply to positions with an obligor following a rating transition; and
- the liquidity horizons to assign to positions with a particular obligor.

198. 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 24 banks using market convention as the source of LGD. A minority of banks – 4 out of 24 –

use their own IRB models as the source of LGD. The majority – 12 banks – use various other sources to obtain the LGD.

199. The PDs are provided by rating agencies in 63% of cases, by the IRB in 26% and by other sources in %. The transition matrices are mostly taken from rating agencies (19 respondents out of 25), and the rest of the banks use their IRB, 'market implied transition matrices and various other sources.

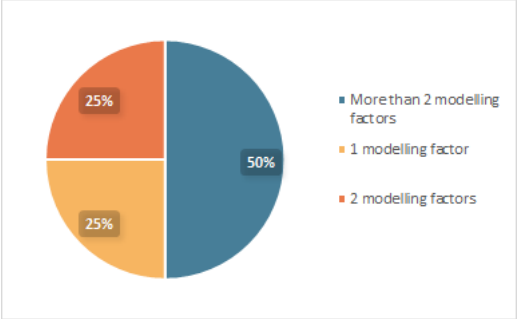
Figure 12: Qualitative data: source of LGD for IRC modelling



200. Moreover, a majority of respondents stated that they use more than two systemic modelling factors at the overall IRC model level (Figure 13).

201. 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



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

Table 13: IRC statistics and cluster analysis

EU Statistics for IRC

		Main statistics								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
Interest Rate	2005	67,815	907,541	404,279	307,923	343,069	195,712	76%	13	125,915	330,556	564,760	64%
	2006	4	114,851	33,880	31,212	47,858	14,143	92%	23	7,654	31,981	43,261	70%
	2007	61,473	816,687	372,799	217,345	254,102	133,845	58%	22	214,159	363,858	513,562	41%
	2008	79,452	1,426,880	672,941	377,133	413,662	279,523	56%	23	338,697	617,271	984,091	49%
	2013	4,619	195,967	67,229	48,949	107,414	30,429	73%	19	21,447	86,955	93,703	63%
	2014	526,691	1,044,207	794,742	152,896	171,226	124,847	19%	18	728,129	783,457	916,877	11%
	2016	94,583	1,460,729	753,329	401,218	430,960	263,005	53%	23	491,604	750,014	1,196,842	42%
	2018	16,123	493,922	166,947	139,018	195,177	79,159	83%	20	52,710	133,516	276,598	68%
	2019	16,123	391,297	149,738	118,943	190,783	66,304	79%	19	51,263	131,763	265,041	68%
	2022												
Credit Spread	5001	20,347	242,387	63,677	52,258	122,498	18,314	82%	20	31,262	50,115	74,859	41%
	5002	11,566	130,552	68,541	29,101	36,134	15,522	43%	19	52,866	75,002	85,296	23%
	5003	29,014	158,867	81,282	30,842	55,005	14,788	38%	19	62,806	77,253	106,243	26%
	5004	22,953	299,124	109,585	97,707	132,330	48,286	89%	18	30,447	79,533	185,396	72%
	5005	7,240	96,328	52,453	20,788	25,754	8,657	40%	21	40,080	49,332	55,121	16%
	5006	347,424	1,030,617	669,983	200,640	200,640	142,885	30%	23	528,502	633,154	804,132	21%
	5007	24,573	198,637	126,945	42,993	98,406	11,316	34%	18	121,379	134,742	142,499	8%
	5008	434,737	993,071	721,130	157,295	168,155	141,631	22%	24	590,862	701,603	836,370	17%
	5009	36,282	140,218	81,818	29,373	33,416	20,963	36%	22	60,598	83,568	94,896	22%
	5010	2,679	199,174	91,680	55,477	96,353	42,114	61%	20	46,817	105,434	129,094	47%
	5011	3	96,190	16,203	22,830	43,591	7,313	141%	23	2,885	9,829	18,418	73%
	5012	39,680	299,909	118,921	68,995	94,150	45,910	58%	21	64,077	126,891	148,580	40%
	5013	2,978	61,845	17,375	15,268	27,011	5,286	88%	22	7,815	13,120	21,960	48%
	5014	14,963	309,690	112,366	104,954	140,199	51,622	93%	21	28,106	77,292	179,918	73%
	5015	282	63,587	13,071	14,535	67,294	3,288	111%	22	4,821	8,397	16,123	54%
	5016	1,001	230,774	45,147	77,010	110,169	6,508	171%	18	5,784	11,985	19,475	54%
	5017	4,496	66,180	33,114	16,817	64,206	7,560	51%	18	26,397	34,897	41,516	22%
	5018	9,179	146,755	50,835	39,513	75,900	17,549	78%	18	28,412	39,098	63,836	38%
	5019	282	63,587	13,197	14,882	68,685	3,659	113%	21	4,821	7,948	16,123	54%
	5020	34,989	694,358	263,331	190,804	226,597	146,589	73%	24	79,968	277,581	374,576	65%
	5021	4	145,990	51,109	38,153	72,932	18,948	75%	20	24,362	52,898	64,111	45%
	5022	685	286,746	86,685	100,376	134,197	36,191	116%	21	7,947	48,468	126,966	88%
	5023	10,719	96,197	43,169	26,072	30,185	14,454	60%	15	24,337	36,554	56,626	40%
	5024	98,097	587,874	309,876	128,118	138,763	98,337	41%	21	213,188	328,360	401,253	31%
	5025	335,427	900,237	573,537	140,997	163,428	72,186	25%	20	454,710	584,751	646,540	17%
	5026	212,098	721,739	419,780	121,445	142,151	72,273	29%	20	344,090	444,147	501,953	19%
	5027	340,417	737,830	571,351	107,238	188,323	90,208	19%	18	505,421	569,000	661,641	13%
ALL-IN no-CTP **	10000	494,651	1,877,570	1,031,972	375,161	493,109	219,475	36%	14	705,559	1,048,879	1,090,104	21%
CS Cumulative **	15000	494,651	1,150,550	816,577	206,725	188,491	193,598	25%	21	633,889	818,269	1,011,868	23%

[1] *STDev trunc* is the standard deviation computed excluding values below the *5th* and above the *95th* percentile

[2] Refers to the number of banks included in the computation of the statistics

*** For the aggregated portfolios (60 to 66), banks that reported at least a missing portfolio IMV among the ones composing the aggregate are not included in the computation of the benchmarks for that particular aggregate portfolio.*

203. Table 13 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 20 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 not much higher than 20%.

204. 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 14 below, the average interquartile is reported. The full set of results is also reported in Table 42, Table 43, Table 44 and Table 45.

205. The IQD dispersion of the subsample is very stable for the CS portfolios among different model choices. Market convention and more than 2 modelling factors seem to produce slightly less dispersed results for CS portfolios.

Table 14: Coefficient of variation for regulatory IRC by modelling choice (%)

	VaR - Avg. Interquartile Range				
	All Banks	Source of LGDss		No. modelling factors	
		Market Convention	Non-market Convention	1-2 factors	>2 factors
Interest Rate	53%	56%	39%	38%	56%
Credit Spread	39%	32%	41%	41%	35%
All-in	22%	19%	14%	11%	27%

5.4 Analysis of APR

206. This report is no longer reporting the summary of the responses to the qualitative questionnaire relating to the APR methodological aspects, since only 3 responses are available at the overall CTP model level, so no disclosure is possible without disclosing some specific information on the submitters.

207. 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.

5.5 P&L analysis

208. 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 22).

209. 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 2022 to 1 February 2023) are reported to simplify the representation. Additional examples of low and high IQD portfolios can be found in the annex in Figure 39 and Figure 4032. It is clear that 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

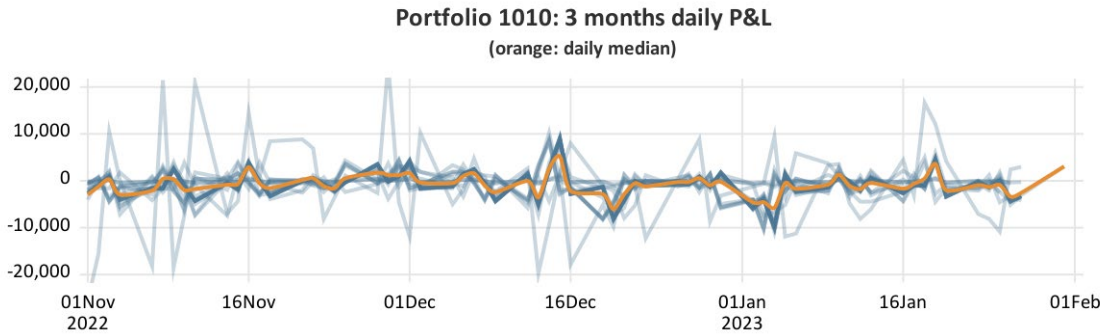
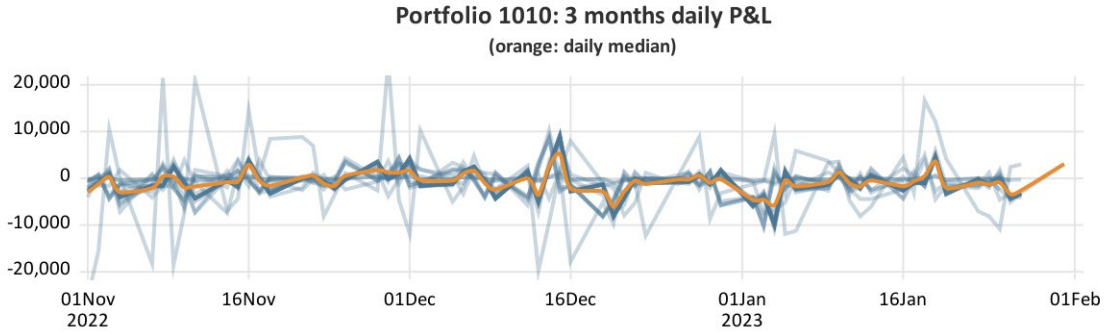


Figure 15: P&L chart example of high IQD



210. 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 4.2 and Table 25) 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 25 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.

211. Another metric computed by the EBA from the P&L series provided by HS banks is the empirical ES (see Table 23 in the annex). The empirical ES results have approximately the same level of dispersion as the P&L VaR (see Table 4 in Section 5.1).

5.6 Diversification benefit

212. An additional metric considered as part of the analysis was the diversification benefit observed for VaR, sVaR and IRC in the aggregated portfolios.

213. 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 15 summarises the results of the analysis.

214. 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. With regard to 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).

Table 15: Diversification benefit statistics

Diversification benefit statistics

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

VaR

		Other statistics			Percentiles			
	Port.	Ave.	STDev	Num obs. [3]	25th	50th	75th	Interquartile dispersion
ALL-IN no-CTP	10000	79%	1%	9	78%	79%	80%	1%
Equity Cumulative	11000	68%	4%	22	67%	68%	69%	2%
IR Cumulative	12000	65%	13%	32	63%	66%	69%	4%
FX Cumulative	13000	51%	10%	33	44%	50%	59%	14%
Commodity Cumulative	14000	4%	2%	13	2%	4%	5%	38%
Credit spread Cumulative	15000	15%	6%	22	9%	15%	19%	34%

sVaR

		Other statistics			Percentiles			
	Port.	Ave.	STDev	Num obs. [3]	25th	50th	75th	Interquartile dispersion
ALL-IN no-CTP	10000	53%	5%	9	48%	52%	56%	7%
Equity Cumulative	11000	33%	10%	22	26%	30%	33%	12%
IR Cumulative	12000	80%	28%	32	67%	77%	91%	15%
FX Cumulative	13000	36%	11%	33	28%	34%	40%	18%
Commodity Cumulative	14000	3%	2%	13	1%	2%	5%	63%
Credit spread Cumulative	15000	11%	5%	22	8%	11%	15%	31%

IRC

		Other statistics			Percentiles			
	Port.	Ave.	STDev	Num obs. [3]	25th	50th	75th	Interquartile dispersion
Credit spread (36 to 53)**	27	3%	2%	21	2%	3%	4%	42%

5.7 Dispersion in capital outcome

215. 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.

216. In addition, 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 16: Interquartile dispersion for capital proxy

Interquartile dispersion for capital proxy

	Capital proxy (banks own mult)	*Capital proxy (fixed mult, =3)*	*Capital proxy Stressed period (fixed mult, =3)*
Equity	18%	17%	18%
IR	18%	16%	14%
FX	16%	13%	12%
Commodity	15%	14%	12%
Credit spreads	21%	20%	20%
CTP			

217. Table 16 suggests that variability is slightly exacerbated by regulatory add-ons. The ranges of capital value dispersion remain broadly aligned whether or not the banks' actual multiplication factors are used. Moreover, filtering for banks with the same stress window seems to have a further impact in decreasing the variability. Nonetheless, 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.

5.8 Present value

218. The 2020 exercise introduced the PV as a statistic to be provided by the banks. The full set of statistics is provided in Table 41 for this year's exercise as well.

219. The average IQD of the PV among the single portfolios is 5% (it was 4% in 2022 and 11% in 2021). This IQD would be much lower, at 2%, if 2 portfolios with a relatively high IQD (Portfolios 1016, 3006 and 5023) were excluded. By asset class, the IQD is distributed as follows: EQ (3%- or 1% if portfolio 1016 is excluded), IR (4%), FX (24% or 1% when 3006 is excluded), CO (11%) and CS (2% or 1% when 5023 is exluded).

220. 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.

6. Competent authorities' assessment

221. 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.

222. 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.

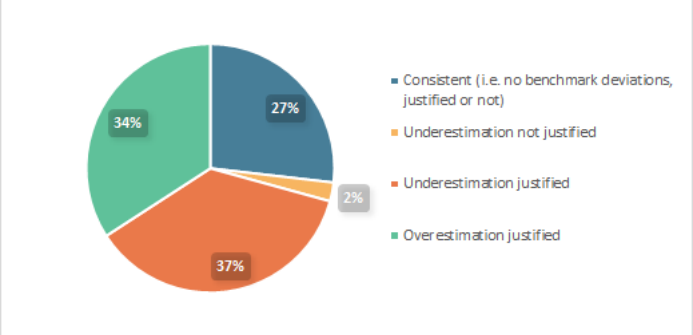
223. A total of 42 questionnaires from 13 jurisdictions, provided by the CAs, have been considered in this assessment of the MR benchmarking exercise.

224. Regarding the level of priority of the assessments, only one bank was reported to be a high priority for intervention by CAs. The CA gave high priority because of the valuable comparison coming from the benchmarking exercise for that jurisdiction.

225. Figure 16 reports the CAs' own overall assessments of the levels of own funds requirements. When it comes to benchmark deviations, justified or not, 31 banks were reported by CAs as under or overestimating MR own funds requirements, of which 29 provided justifications for this. Obviously, 'not justified' implies that further and targeted CA investigation is required. Finally, 11 banks had consistent results (i.e., no benchmark deviations).

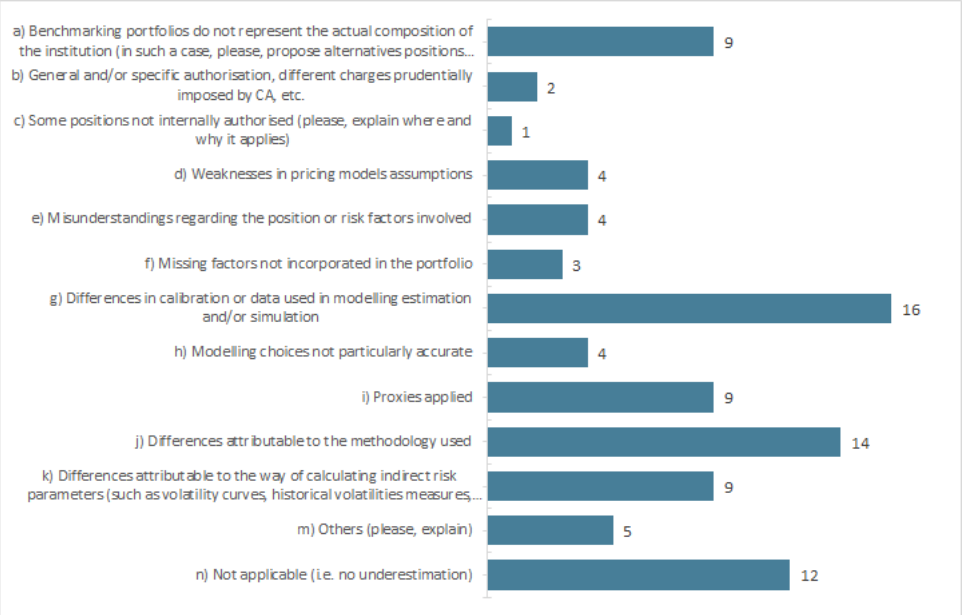
226. CAs' assessments acknowledge two case out of 42 of unjustified underestimation of internal model market capital requirements that require further in-depth analysis. Obviously, CAs – and the joint supervisory teams, where applicable – pay close attention to the potential cases of underestimation, both across the portfolio and across the risk categories. These cases were classified as low priority by its supervisor.

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



227. 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 (9/92); differences in calibration or data used in modelling estimation and/or simulation (16/92); proxies applied (9/92); and differences attributable to the methodology used (14/92). These explanations, and very often a combination of these explanations, were offered by a large majority of the applicable respondents.

Figure 17: CAs' reported reasons for over-underestimation of MR own funds requirements (BM exercise 2023)



228. One bank identified as underestimating without justification motivated the underestimation to its CAs mainly due to error in booking and calculation. The explanation was deemed insufficient by the CA, which was nonetheless satisfied by the bank initiative to improve the quality of the data representation for the future. The second bank identified as underestimating without justification was required to provide additional explanations by its competent authority.

229. Overall, CAs planned some action in respect of 7 banks, such as:

a. reviewing the banks' internal VaR and IRC models;

b. extra supervisory charges;

c. further internal model investigations at the peer level.

230. Currently, two banks have a due date for making improvements to their MR internal models, as already requested by CAs.

231. EBA reported 5 cases of substantial presence of outliers to CAs. Of these case, EBA received 5 explanations. All of the explanation reported classify as justified over-underestimation (3 overestimation, one under). The overestimations were generally explained by conservativeness of the model applied. One case of underestimation of the model, was motivated by operational errors and deficiencies of the model applied. The CA also ensured that the model is currently under investigation by the supervisor. The second case of underestimation was not explained and further explanations were required to the banks on the results by the competent authority.

7. SBM OFR

232. Since the ITS 2022, the benchmarking exercise introduced the sensitivities-based method (SBM) component of the alternative standardised approach (ASA)/FRTB SA to the EBA Benchmarking exercise.

233. The ITS 2022 required banks the submission of granular sensitivity data and aggregated OFR computed via SBM. The same submission was provided for the 2023 exercise.

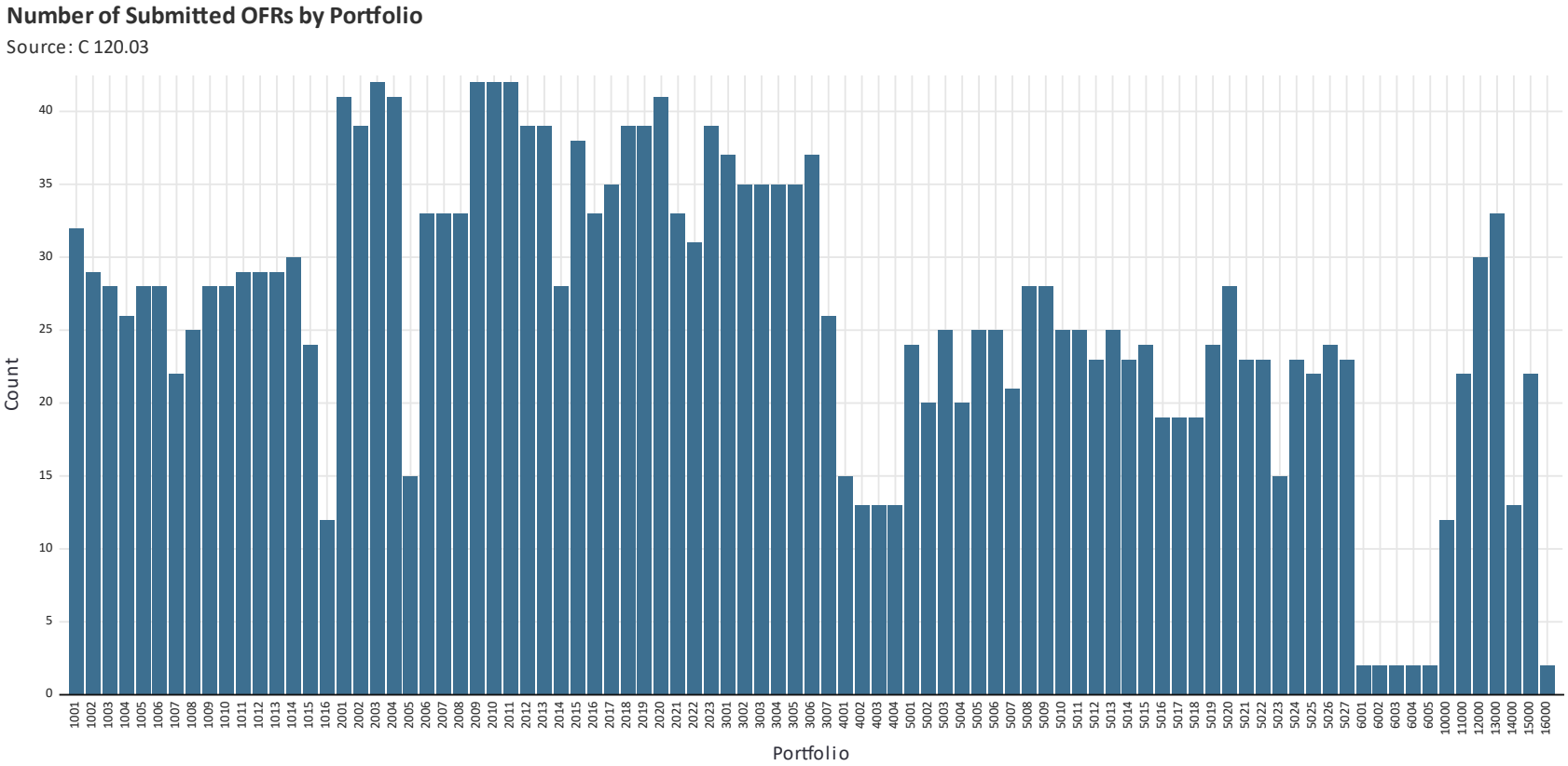
234. The high granularity number of data submissions for the sensitivities do not allow, for the moment, a concise representation. Therefore, this report focuses on the representation of the SBM OFR aggregated data.

7.1 Assessment of completeness of SBM OFR submissions

235. Overall, the submission rate for new SBM OFR data is considered broadly adequate and fairly high. Figure 18 shows the total number of SBM OFR submissions per portfolio. Overall, it can be concluded that, for each portfolio, SBM OFR figures were reported whenever the traditional risk measures (e.g., VaR or SVaR) was also reported.

236. Very few banks drive the discrepancy between the number of submissions for IMA and SBM.

Figure 18: SBM OFR total submissions by portfolio



237. This is also confirmed in Figure 42, which presents the differences in the numbers of submissions between the SBM OFR and the IMA OFR by portfolio. Almost all institutions that have submitted data for IMA, have also submitted figures for SBM. However, there are also institutions that have submitted SBM OFRs but no IMA figures for certain portfolios.

7.2 SBM Variation within Portfolios

238. As for the other risk measures, dispersion is a very important factor to consider and monitor in the benchmarking process for OFR-SBM. Average summarised statistics of dispersion can be seen in Table 4, while detailed figures for SBM OFR, such as benchmarking of the sample, quantiles of the distribution and IQD figures by portfolios, are reported in Table 46.

239. Figure 19 illustrates the variation of SBM-OFR by portfolios, where outliers are highlighted by applying the EBA market risk outlier definition[22] (median +/- two times truncated standard deviation).

240. Of course, other definitions of outliers are possible. For instance, the industry applies a simpler outlier definition[23] in its benchmarking exercise (see Figure 43). Alternatively, the Median Absolute Deviation, i.e., MAD[24] concept could be applied (see Figure 44) or the traditional boxplot outlier definition[25] (see Figure 45).

241. To achieve a harmonious appearance, all portfolio-OFRs are standardised by the respective portfolio median and the ordinate is log-2-transformed. In addition, the standardised OFR are top-coded at 1,600%. In Figure 19, Figure 43 and Figure 44, the cyan bars represent the standardised Interquartile Range of the respective portfolio, i.e. the distance between the ratio of the respective portfolio's first quartile to its median and the ratio of the third quartile to the portfolio's median. In all figures only portfolios are included for which at least 10 OFR observations are available.

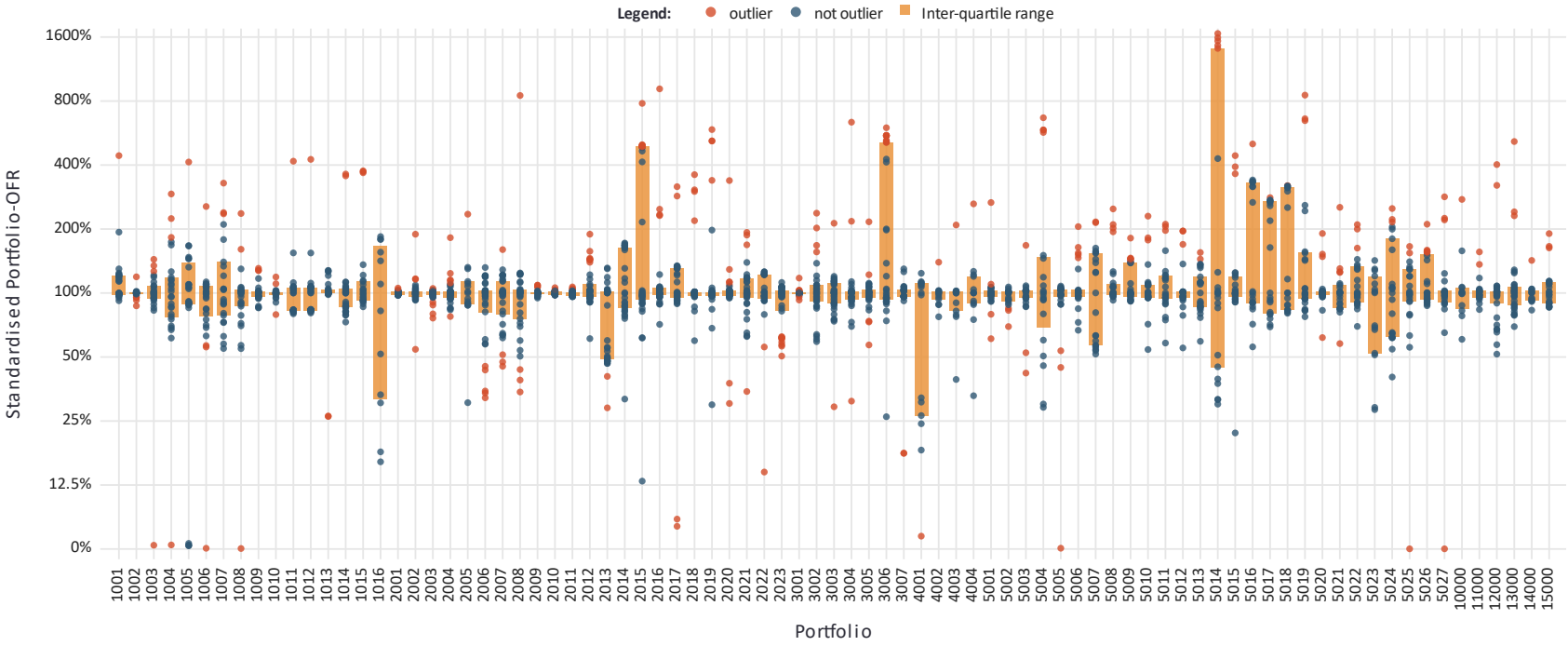
[22] EBA Outliers are defined as values outside the interval [ex − 2 ⋅ TSD, ex + 2 ⋅ TSD]. Where "ex" is the median of portfolio-OFRs., and TSD (truncated standard deviation) is the standard deviation of the portfolio-OFRs between the 5-th and the 95-th percentile.

[23] (50%-150% outlier definition) - Industry outliers are defined as values outside the interval [0.5 · ex, 1.5 · ex], where ex is the median of portfolio-OFRs.

[24] Median Absolute Deviation (MAD) defines outliers as values outside the interval [ex − 2 ·MAD, ex + 2 ·MAD], where MAD is the Median Absolute Deviation, i.e., MAD = median(|xi − ex|), where xi are the OFR observations of the respective portfolio and ex is their median.

[25] Outliers are defined as values outside the interval [Q25 − 1.5 · IQR,Q75 + 1.5 · IQR]. IQR is the Interquartile Range, i.e. IQR = Q75 − Q25.

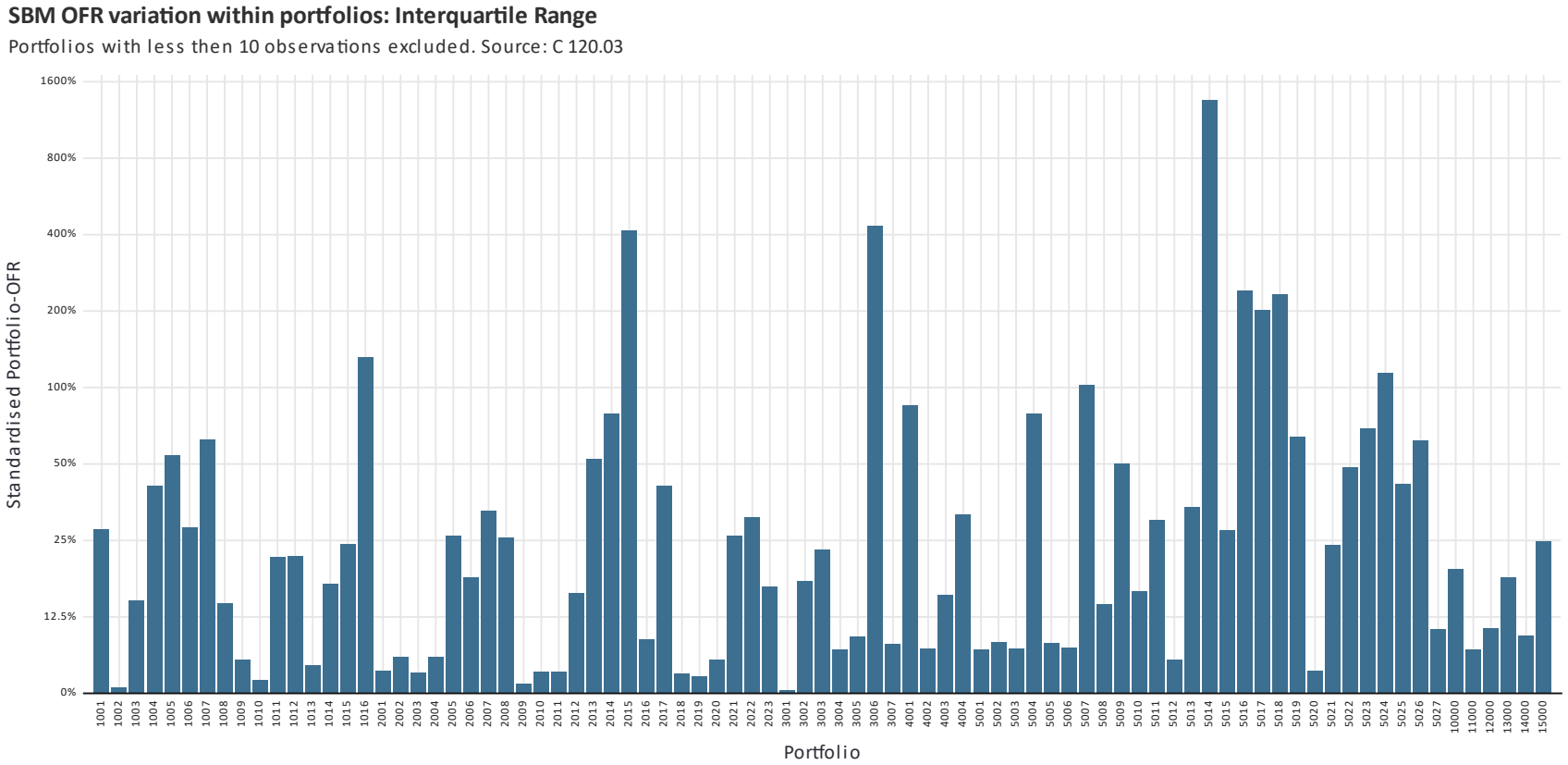
Figure 19: SBM OFR variation within portfolios (EBA outliers' definition)



242. Figure 19 shows that for about half of the portfolios the reported OFR values are concentrated around the respective median. However, there are also several portfolios where a large dispersion is apparent, often in the form of clusters of observations. The varying dispersion can be observed more clearly in Figure 20, which depicts the standardised Interquartile Ranges in percentage points. While for 49 portfolios the standardised Interquartile Range amounts to less than 25 percentage points, 9 portfolios show values larger than 100 percentage points.

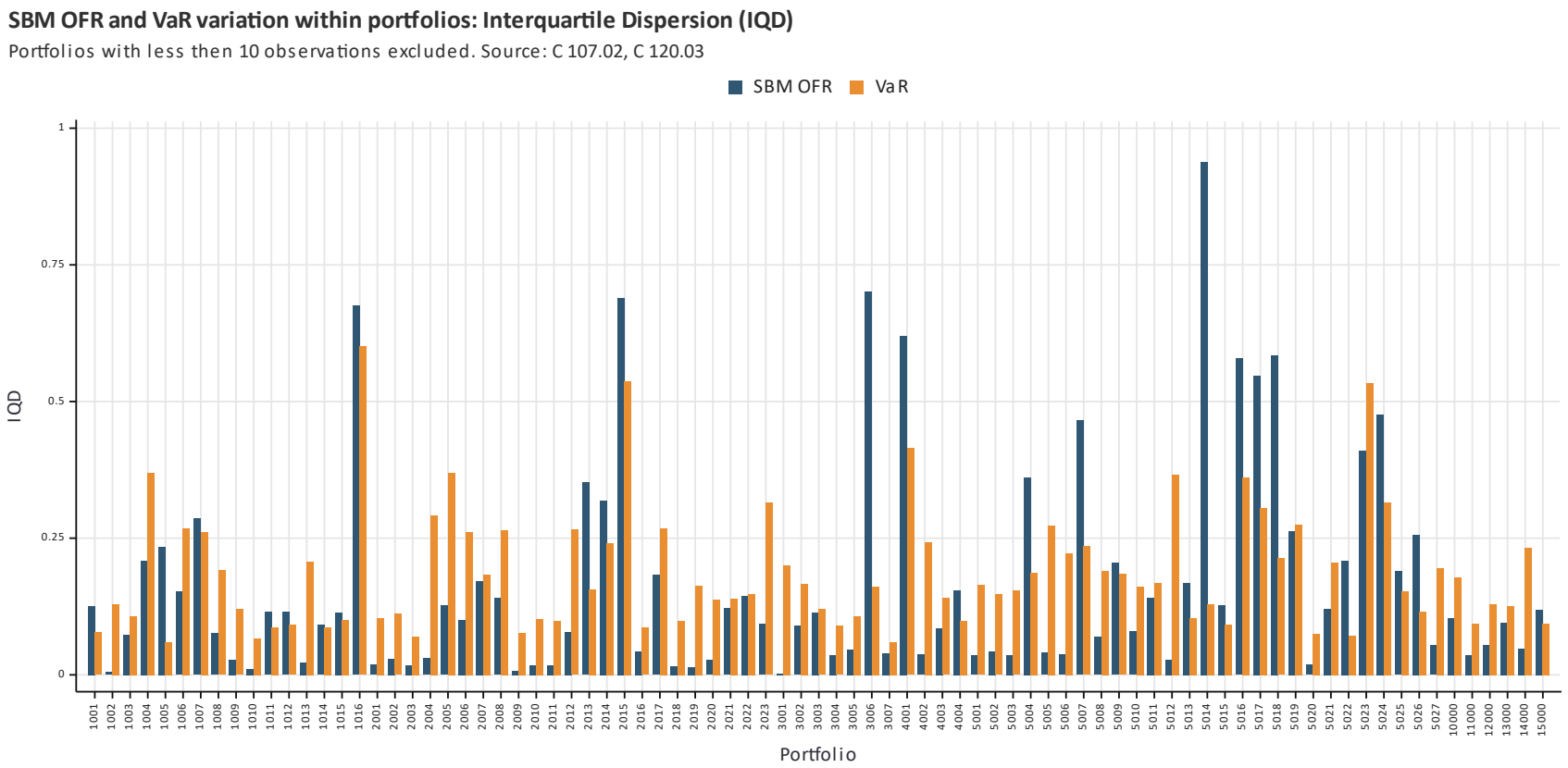
243. Figure 46, Figure 47, Figure 48, Figure 49, and Figure 50 illustrate the variations of SBM-OFR-components attributable to different risk classes, where each risk class portfolio with less than 5 observations have been excluded in the representation. Apparently, large dispersion is persistent even on the more granular risk-class level.

Figure 20: SBM OFR variation within portfolios: Interquartile Range



244. Figure 21 compares the IQDs of SBM OFR and the VaR by portfolio. As might be expected from a standardised approach, the IQDs of VaR are larger than those of SBM OFR for the majority of portfolios. Nevertheless, there are several portfolios for which the opposite holds.

Figure 21: SBM OFR and VaR variation within portfolios: Interquartile Dispersion (IQD)



245. A similar comparison, but also taking into account the IQDs of the SVaR as well can be seen in Figure 51. This comparison can be seen more clearly, when split by asset classes, as shown in Figure 53, Figure 54, Figure 55, Figure 56 and Figure 57.

246. Finally, a comparison of the dispersion of SBM OFR against VaR is informative for banks and supervisors. In general, a very low dispersion is expected for the SBM measure owing to the standardised nature of the calculation, so an increased dispersion of SBM – possibly even exceeding the dispersion observed for VaR – warrants increased attention. Figure 52 highlights several cases where IQD Ratio of SBM-OFR to VaR unexpectedly exceeds 1.

7.3 Comparison of SBM OFR by portfolio across risk class/component

247. Aside from the dispersion of the portfolio OFR, as presented in the previous section, the collected data allows the EBA and the supervisors to present the actual composition of these requirements, splitting each instrument and portfolio by the risk class and components (Delta, Curvature, Vega). In this context, it should be noted that under the SBM, total OFR are calculated as the simple sum of OFR across the relevant risk classes and components.

248. Looking at single portfolios, it appears that the reported Risk classes are to some degree heterogeneous across submissions, and this possibly reflects different interpretations of the ASA rules for modelling of these instruments.

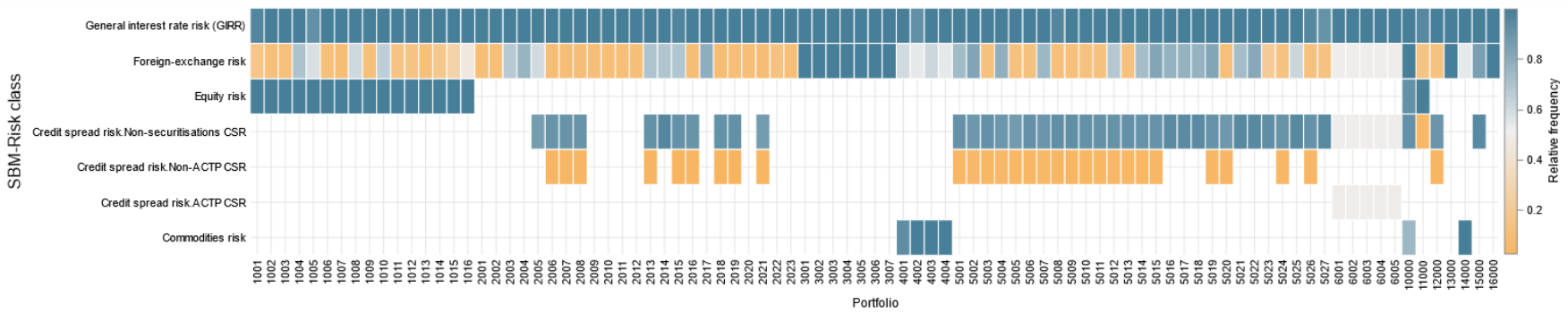
249. This is shown in Figure 22, where the frequency of SBM submission by risk classes relative to the total number of submissions per portfolio is shown. The plot shows the relative frequency of banks who reported a non-zero figure in a given risk class for the given portfolio with respect to the total number of submissions.

250. Most banks reported values in the same risk category in line with the expectation according to the asset class of the portfolio (e.g., for EQ portfolios, EQ risk expected). Nonetheless, for some EQ portfolios, not all banks submitted an EQ risk component. Interest rate risk is present across all portfolios with the majority of banks submitting OFR relating to interest rate risk for all portfolios.

251. Some banks reported additional FX components for some portfolios (portfolios 2001 and 2006-2009, which are just EUR IRS), where their reporting currency should be just Euro.

252. The plot does not necessarily allow for concluding whether deviating submissions are wrong, but identifies portfolios where bank-specific investigations are meaningful.

Figure 22: Frequency of SBM risk classes relative to the total number of submissions per portfolio



253. Furthermore, the frequency analysis was performed per risk component.

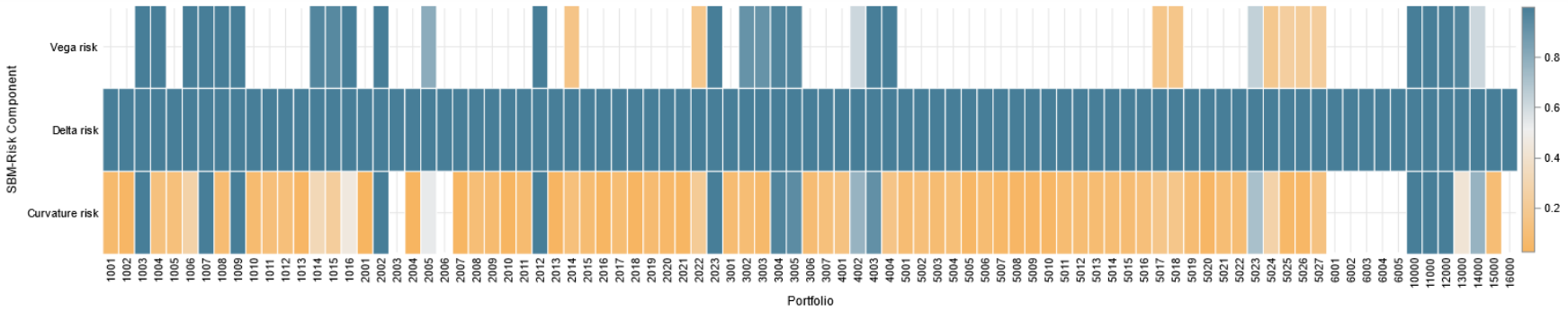
254. Figure 23 presents the frequency of SBM risk component relative to total number of submissions per portfolio.

255. Not surprisingly, most banks reported values in the same risk component. As expected, Delta risk for at least one risk class was reported by all banks in nearly all portfolios.

256. But differences are recognisable with respect to the other risk components.

257. The chart in Figure 23 does not immediately allow for the conclusion of whether deviating submissions are wrong but indicates portfolios where bank specific investigations are meaningful. Justified deviations may result from the use of methodological alternatives available to banks after supervisory approval (e.g., the inclusion of linear instruments in Curvature calculation).

Figure 23: Frequency of SBM risk component relative to the total number of submissions per portfolio



258. An overlapping of these two previous analyses can be seen in Figure 58, where the frequency of SBM risk component within SBM risk classes relative to the total number of submissions per portfolio is represented.

259. Within GIRR, delta risk is reported for nearly all portfolios, while only in some cases additionally Vega and Curvature risk are reported. From this analysis we can see that within EQ, some banks reported risk components for interest rate risk.

260. Most banks reported values in the same risk category in line with expectations (e.g., for EQ Pfs, Delta-EQ risk is expected).

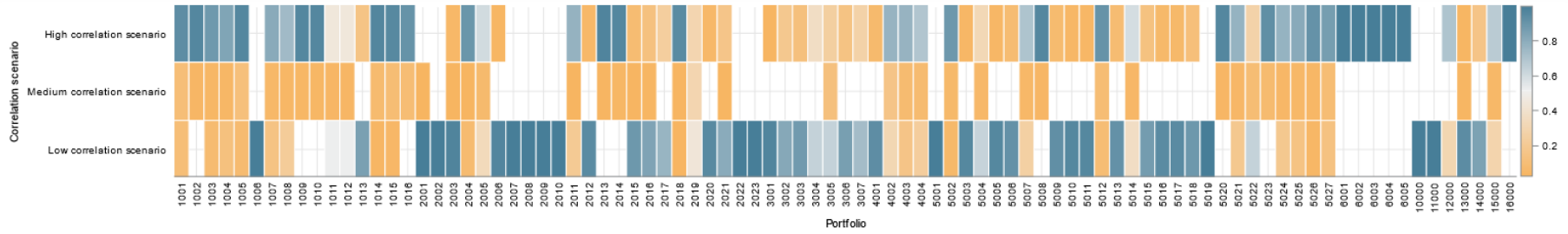
261. Additional FX components for some portfolios (pf 2001 and 2005-2009, EUR IR-) mentioned above fall within Delta risk.

262. The data submitted allow the EBA and the supervisor to check, for each portfolio, which scenario is the one that maximises the SBM-OFR. From this analysis it is clear that the scenario maximising the OFR is not identical for all banks.

263. This is represented in Figure 24. For most portfolios, the high or low correlation scenario leads to the highest OFR. Very rarely the medium correlation scenario yields the highest OFR. For none of the portfolios the same scenario is chosen across all banks. Due to the simplicity of the calculation, it can be expected that the implementation of the correlation scenario logic in itself is not a driver of variability. Instead, the fact that differing correlation scenarios are observed for the same portfolio may result from differences in the portfolio's interpretation, the risk classes and components considered, or the regulatory buckets that risk factors that have been allocated.

264. Nonetheless, as shown in the Figure 59 – where the median OFR per correlation scenario is represented - only in some portfolios there is a significant difference in OFR with respect to scenario (for instance, portfolios 2010, 3001, 4001, 5003, 5005). Therefore, the impact of correlation scenarios is limited for submitted median OFR in most cases. It should be noted that the impact of the correlation scenario follows the design of the EBA hypothetical portfolio and is not indicative of impacts that can be observed for real trading portfolios.

Figure 24: Relative frequency of OFR relevant scenario



7.4 Sensitivities of SBM OFR by portfolio across risk class/component

265. Even if only an aggregated representation of the sensitivities submitted is available, it nonetheless possible to make a series of observations on same specific portfolios, which could be considered sufficiently general, and provide some useful guidance for banks and competent authorities.

266. The 2023 exercise provide the submission of two set of sensitivities, one at the IMV submission, and one at Risk measures submissions. The observations provided here reflects the sensitivities provided by the banks at Risk Measures submission reference date, which are generally of better quality (more homogenous results) of the sensitivities observed at the IMV references dates; this means that on average, the control and resubmission of the data during the exercise was beneficial for the better understanding and representation of the data.

267. In the following, a series of observations, for low dispersion portfolios and high dispersion portfolios will be provided, separately by assets classes, with particular attention to high IQD OFR porfolios. It should be recalled that the aggregated representations of all sensitivities were reported by EBA to the competent authorities, which should pay great attention to them, especially in the cases where the bank report sensitivities very divergent from the benchmark observed.

7.4.1 Equity portfolios sensitivities submission

268. In the following we will provide some observation for the sensitivities provide for portfolio 1010 and 1014.

269. Portfolio 1010 – is composed of 3 futures (instruments 106 – 107 – 108). IQD of this portfolio is extremely low (1% - ASA OFR) compared to the average of the equity asset class (13%).

Figure 25: Portfolio 1010 – Sensitivities snapshot

							Other stats							Percentiles								Extreme Values range (w.r.t. median)[2]		
Table	Group	Portfolio	Instrument	RiskFactor	Bucket	Additional Identifier	Min	Max	Ave	STDev	MAD (median absolute deviation)	Coefficient of variation (STDev/Ave)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	STDev_trunc	-2 STDev_trunc	+2 STDev_trunc	Interquantile range
C 120.01	Equity	1010	106	EQ_D_REPO	8	[All]	8,025	8,212	8,122	58	51	0.72%	20	8,025	8,057	8,085	8,097	8,175	8,197	8,212	3,431	1,234	14,959	1%
C 120.01	Equity	1010	107	EQ_D_REPO	8	[All]	-35	47,960	39,538	18,129	363	45.85%	21	-35	5	47,026	47,292	47,716	47,798	47,960	26,651	-6,010	100,594	1%
C 120.01	Equity	1010	108	EQ_D_REPO	8	[All]	38,988	42,079	41,242	1,041	233	2.52%	21	38,988	39,524	40,174	41,554	41,925	41,998	42,079	17,201	7,151	75,957	2%
C 120.01	Equity	1010	106	EQ_D_SPOT	8	[All]	-21,557	-21,005	-21,403	176	59	0.82%	27	-21,549	-21,544	-21,527	-21,487	-21,370	-21,085	-21,067	579	-22,645	-20,329	0%
C 120.01	Equity	1010	107	EQ_D_SPOT	8	[All]	-125,074	-123,060	-124,359	535	210	0.43%	28	-124,809	-124,786	-124,741	-124,401	-124,293	-123,418	-123,173	857	-126,116	-122,686	0%
C 120.01	Equity	1010	108	EQ_D_SPOT	8	[All]	-111,079	-109,011	-110,341	601	155	0.54%	28	-110,834	-110,791	-110,715	-110,571	-109,706	-109,491	-109,158	2,999	-116,570	-104,572	0%
C 120.01	Equity	1010	106	FX_D	GBP	[All]	-28,116	19,096	-9,470	12,275	8,315	129.62%	19	-28,116	-22,798	-20,852	-4,283	-1,334	-382	19,096	13,785	-31,853	23,287	88%
C 120.01	Equity	1010	107	GIRR_D_00.25	EUR	[All]	-46,936	6,368	-21,659	12,374	2,597	57.13%	29	-46,138	-43,907	-23,453	-21,500	-17,901	-31	-16	17,617	-56,733	13,733	13%
C 120.01	Equity	1010	108	GIRR_D_00.25	EUR	[All]	-41,187	4,310	-17,871	10,467	2,357	58.57%	29	-38,723	-32,318	-20,000	-18,617	-15,756	-28	-15	15,557	-49,732	12,498	12%
C 120.01	Equity	1010	106	GIRR_D_00.25	GBP	[All]	-7,981	-4	-3,360	1,741	356	51.81%	28	-7,750	-4,943	-3,683	-3,423	-3,013	-1,864	-87	4,281	-11,985	5,139	10%
C 120.01	Equity	1010	107	GIRR_D_00.50	EUR	[All]	-34,463	-11,000	-24,530	5,175	1,696	21.10%	26	-29,124	-28,767	-27,558	-25,615	-24,250	-18,101	-17,082	8,534	-42,683	-8,547	6%
C 120.01	Equity	1010	108	GIRR_D_00.50	EUR	[All]	-30,352	-6,141	-20,924	5,310	1,505	25.38%	27	-25,545	-25,355	-23,534	-22,196	-18,972	-15,816	-9,556	8,150	-38,497	-5,896	11%
C 120.01	Equity	1010	106	GIRR_D_00.50	GBP	[All]	-6,172	-3,339	-4,695	722	245	15.38%	26	-6,134	-6,016	-4,909	-4,572	-4,356	-3,824	-3,746	1,466	-7,504	-1,641	6%

270. From the figures (Figure 25) we can see how in general the sensitivities provided are quite homogenous. Equity delta spot sensitivities is 0% IQD, and Equity delta repo is 1-2% IQD. IR sensitivities as well is fairly aligned, and not much higher than 10% IQD. Some dispersion is reported for FX delta, but with very limited impact in terms of dispersion for OFR.

271. On the contrary, for portfolio 1014 (Figure 26), the SBM OFR is slightly higher (9% IQD). The portfolio is composed solely of an option on EURO STOXX 50 (instrument 119).

Figure 26: Portfolio 1014 – Sensitivities snapshot

							Other stats							Percentiles								Extreme Values range (w.r.t. median)[2]		
Table	Group	Portfolio	Instrument	RiskFactor	Bucket	Additional Identifier	Min	Max	Ave	STDev	MAD (median absolute deviation)	Coefficient of variation (STDev/Ave)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	STDev_trunc	-2 STDev_trunc	+2 STDev_trunc	Interquantile range
C 120.01	Equity	1014	119	EQ_CD	12	[All]	-1,111,000	108,382	-146,510	299,170	50,466	204.20%	16	-1,111,000	-438,008	-122,410	-103,627	-19,639	107,573	108,382	881,356	-1,866,340	1,659,086	72%
C 120.01	Equity	1014	119	EQ_CD	5	[All]	-22,142	1,171	-5,135	6,553	3,743	127.60%	12	-22,142	-9,906	-7,503	-3,607	178	191	1,171	47,855	-99,317	92,103	105%
C 120.01	Equity	1014	119	EQ_CD	6	[All]	-12,044	707	-3,590	3,737	1,766	104.11%	12	-12,044	-8,076	-4,957	-3,463	-1,347	102	707	28,605	-60,672	53,747	57%
C 120.01	Equity	1014	119	EQ_CD	7	[All]	-16,779	1,217	-4,358	4,904	2,189	112.54%	12	-16,779	-7,639	-6,485	-3,422	-1,600	235	1,217	37,383	-78,187	71,344	60%
C 120.01	Equity	1014	119	EQ_CD	8	[All]	-44,011	3,647	-10,980	12,786	5,609	116.44%	13	-44,011	-23,459	-15,475	-9,071	-3,978	712	3,647	104,052	-217,174	199,032	59%
C 120.01	Equity	1014	119	EQ_CU	12	[All]	-2,299,816	588,457	-161,538	623,936	24,383	386.25%	16	-2,299,816	-434,000	-46,679	-36,696	-14,833	40,093	588,457	1,269,962	-2,576,621	2,503,229	52%
C 120.01	Equity	1014	119	EQ_CU	5	[All]	-22,142	1,171	-5,050	6,560	3,535	129.89%	12	-22,142	-9,200	-7,233	-3,283	175	459	1,171	12,381	-28,045	21,478	105%
C 120.01	Equity	1014	119	EQ_CU	6	[All]	-8,076	9,378	-1,373	4,359	1,810	317.54%	12	-8,076	-4,645	-3,321	-2,272	97	707	9,378	7,411	-17,094	12,550	106%
C 120.01	Equity	1014	119	EQ_CU	7	[All]	-6,124	11,056	-1,039	4,567	1,784	439.46%	12	-6,124	-4,936	-3,791	-2,140	214	1,217	11,056	8,786	-19,712	15,432	112%
C 120.01	Equity	1014	119	EQ_CU	8	[All]	-23,459	26,811	-3,818	12,117	4,527	317.39%	13	-23,459	-13,902	-9,942	-4,446	252	3,647	26,811	22,207	-48,860	39,968	105%
C 120.01	Equity	1014	119	EQ_D_REPO	5	[All]	-647,418	311	-373,234	230,689	30,270	61.81%	13	-647,418	-514,824	-496,942	-478,248	-216,911	-47	311	355,876	-1,190,000	233,504	39%
C 120.01	Equity	1014	119	EQ_D_REPO	6	[All]	-246,980	153	-150,977	99,552	38,317	65.94%	12	-246,980	-237,852	-227,142	-198,716	-45,499	-25	153	99,552	-397,819	387	67%
C 120.01	Equity	1014	119	EQ_D_REPO	7	[All]	-406,768	181	-185,363	140,893	84,257	76.01%	12	-406,768	-401,650	-238,737	-215,341	-42,123	-20	181	140,893	-497,127	66,446	70%
C 120.01	Equity	1014	119	EQ_D_REPO	8	[All]	-443,353	-261,929	-388,691	63,264	6,732	16.28%	12	-443,353	-443,353	-413,497	-408,138	-404,824	-261,929	-261,929	183,599	-775,336	-40,940	1%
C 120.01	Equity	1014	119	EQ_D_SPOT	12	[All]	3,596,347	3,903,380	3,669,873	90,536	20,049	2.47%	15	3,596,347	3,602,923	3,625,111	3,650,506	3,670,856	3,824,340	3,903,380	10,868,966	-18,087,426	########	1%
C 120.01	Equity	1014	119	EQ_D_SPOT	5	[All]	1,139,121	1,714,183	1,358,443	165,632	98,776	12.19%	13	1,139,121	1,190,235	1,240,083	1,297,170	1,471,843	1,526,765	1,714,183	387,979	521,212	2,073,128	9%
C 120.01	Equity	1014	119	EQ_D_SPOT	6	[All]	234,737	784,305	578,403	143,003	45,924	24.72%	13	234,737	454,109	540,390	560,334	636,947	767,940	784,305	202,554	155,226	965,441	8%
C 120.01	Equity	1014	119	EQ_D_SPOT	7	[All]	47,678	1,073,553	544,172	299,269	84,656	55.00%	13	47,678	170,545	396,803	576,401	614,869	1,052,331	1,073,553	299,269	-22,136	1,174,938	22%
C 120.01	Equity	1014	119	EQ_D_SPOT	8	[All]	686,259	1,238,649	1,034,029	168,181	53,948	16.26%	13	686,259	790,877	956,371	1,077,341	1,135,706	1,194,120	1,238,649	307,709	461,924	1,692,758	9%
C 120.01	Equity	1014	119	EQ_V_00.50	12	[All]	6,901	531,748	134,810	146,105	31,957	108.38%	19	6,901	45,905	66,724	87,361	125,183	520,971	531,748	345,342	-603,323	778,045	30%
C 120.01	Equity	1014	119	GIRR_CD	EUR	[All]	-47	62	19	41	18	213.15%	10	-47	-47	-3	44	50	62	62	4,105	-8,166	8,254	113%
C 120.01	Equity	1014	119	GIRR_CU	EUR	[All]	-30	61	22	30	26	135.62%	10	-30	-30	0	18	45	61	61	4,118	-8,218	8,255	100%
C 120.01	Equity	1014	119	GIRR_D_00.25	EUR	[All]	390	1,470,352	576,910	332,574	100,278	57.65%	31	753	10,058	439,761	534,342	654,556	1,108,749	1,126,505	912,874	-1,291,406	2,360,090	20%
C 120.01	Equity	1014	119	GIRR_D_00.50	EUR	[All]	-1,306	1,138,778	541,095	282,147	64,445	52.14%	29	0	461	460,971	616,382	663,205	866,674	895,344	1,461,510	-2,306,638	3,539,402	18%
C 120.01	Equity	1014	119	GIRR_D_01.00	EUR	[All]	-33,711	17,896	-420	12,744	583	3034.17%	12	-33,711	-3,223	-583	0	2,300	12,372	17,896	17,693	-35,386	35,386	168%

272. It should ne noticed that on average the Equity delta sensitivity is fairly convergent, especially for banks that decided to opt for represent the index synthetically in bucket 12 (1% IQD); the banks that represented the single component of the index in general provided more dispersed results. The volatility sensitivity and interest rates sensitivities present some level of dispersion (IQD between 18 and 30%).

7.4.2 IR portfolios sensitivities submission

273. In the following we will provide some observation for the sensitivities provide for portfolio 2010 and 2013.

274. Portfolio 2010 – is composed of 2 IRS (instruments 201 –219). IQD of this portfolio is extremely low (2% - SBM OFR) compared to the average of the equity asset class (8%).

Figure 27: Portfolio 2010 – Sensitivities snapshot

							Other stats							Percentiles								Extreme Values range (w.r.t. median)[2]		
Table	Group	Portfolio	Instrument	RiskFactor	Bucket	Additional Identifier	Min	Max	Ave	STDev	MAD (median absolute deviation)	Coefficient of variation (STDev/Ave)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	STDev_trunc	-2 STDev_trunc	+2 STDev_trunc	Interquantile range
C 120.01	Interest Rate	2010	201	GIRR_D_00.25	EUR	[All]	1,120,894	1,793,011	1,330,712	135,957	79,453	10.22%	42	1,149,491	1,195,541	1,262,103	1,291,166	1,420,500	1,462,846	1,647,674	334,799	621,568	1,960,763	6%
C 120.01	Interest Rate	2010	201	GIRR_D_00.50	EUR	[All]	-334,133	-80	-121,033	61,201	28,699	50.57%	42	-226,116	-193,696	-140,846	-117,759	-101,190	-56,982	-103	262,447	-642,652	407,135	16%
C 120.01	Interest Rate	2010	201	GIRR_D_01.00	EUR	[All]	-168,484	154,492	-22,354	125,322	129,222	560.63%	42	-167,859	-165,237	-160,266	-53	98,655	114,343	154,212	123,542	-247,137	247,031	420%
C 120.01	Interest Rate	2010	201	GIRR_D_02.00	EUR	[All]	-1,049,124	176,070	-168,416	284,590	248,470	168.98%	42	-424,672	-421,800	-413,792	-291,076	98,549	128,000	136,405	398,852	-1,088,780	506,627	163%
C 120.01	Interest Rate	2010	201	GIRR_D_03.00	EUR	[All]	-9,452,408	-4,477,399	-7,319,863	1,269,224	831,005	17.34%	41	-8,753,959	-8,567,533	-8,286,918	-7,449,753	-6,702,569	-5,521,626	-5,008,948	1,598,845	-10,647,443	########	11%
C 120.01	Interest Rate	2010	201	GIRR_D_05.00	EUR	[All]	-38,724,438	-33,111,431	-35,508,008	1,486,391	693,604	4.19%	42	-38,209,730	-37,718,459	-37,045,768	-35,094,411	-34,504,446	-33,999,516	-33,274,576	1,978,523	-39,051,457	########	4%
C 120.01	Interest Rate	2010	201	GIRR_D_10.00	EUR	[All]	-60,257	1,539,387	694,923	493,068	167,566	70.95%	20	-60,257	0	425,649	656,862	824,989	1,405,354	1,539,387	461,669	-266,476	1,580,200	32%
C 120.01	Interest Rate	2010	201	GIRR_D_15.00	EUR	[All]	-3,329	0	-617	1,082	0	175.51%	10	-3,329	-3,329	-637	0	0	0	0	36,372	-72,745	72,745	100%

275. From the figures (Figure 27) we can see (only for instrument 201 for simplicity) that the most relevant interest rate delta sensitivities (3 months and five years) are very homogeneous (6% and 4% of IQD). This justifies indeed the low dispersion of OFR for this portfolio.

276. On the contrary, for portfolio 2013 (Figure 28), the SBM OFR is substantially higher (35% IQD). The portfolio is composed solely of an UK Gov Bond (instrument 213).

Figure 28: Portfolio 2013 – Sensitivities snapshot

Table	Group	Portfolio	Instrument	RiskFactor	Bucket	Additional Identifier	Min	Max	Ave	STDev	MAD (median absolute deviation	Coefficient of variation (STDev/Ave	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	STDev_trunc	-2 STDev_trunc	+2 STDev_trunc	Interquantile range
C 120.01	Interest Rate	2013	213	CSR_NON_SEC_D_00.50_DEBT	1	[All]	-14,562	2,197	-9,719	7,429	792	76.44%	8	-14,562	-14,562	-14,360	-13,954	0	2,197	2,197	53,362	-120,679	92,771	100%
C 120.01	Interest Rate	2013	213	CSR_NON_SEC_D_00.50_DEBT	2	[All]	-126,195	1,110	-15,750	30,333	6,632	192.58%	17	-126,195	-20,263	-14,225	-13,680	-5	1,010	1,110	76,161	-166,001	138,641	100%
C 120.01	Interest Rate	2013	213	CSR_NON_SEC_D_01.00_DEBT	1	[All]	-100,106	5,492	-64,568	41,961	2,747	64.99%	9	-100,106	-100,106	-86,224	-85,475	-40,609	5,492	5,492	301,475	-688,425	517,475	36%
C 120.01	Interest Rate	2013	213	CSR_NON_SEC_D_01.00_DEBT	2	[All]	-95,362	0	-41,545	36,030	34,158	86.73%	19	-95,362	-86,333	-79,987	-40,566	-9,204	-64	0	238,979	-518,524	437,393	79%
C 120.01	Interest Rate	2013	213	CSR_NON_SEC_D_03.00_DEBT	1	[All]	-267,111	0	-198,289	115,217	5,745	58.11%	9	-267,111	-267,111	-263,039	-262,465	-137,906	0	0	920,311	-2,103,087	1,578,157	31%
C 120.01	Interest Rate	2013	213	CSR_NON_SEC_D_03.00_DEBT	2	[All]	-263,601	0	-135,324	109,945	85,600	81.25%	19	-263,601	-259,818	-256,881	-180,654	-42,600	-195	0	728,929	-1,638,513	1,277,205	72%
C 120.01	Interest Rate	2013	213	CSR_NON_SEC_D_05.00_DEBT	1	[All]	-1,860,476	1,187,916	-1,218,083	1,022,679	74,263	83.96%	11	-1,860,476	-1,844,295	-1,827,354	-1,771,253	-1,201,594	593,899	1,187,916	5,846,545	-13,464,343	9,921,838	21%
C 120.01	Interest Rate	2013	213	CSR_NON_SEC_D_05.00_DEBT	2	[All]	-4,165,427	-1,354	-1,756,697	923,145	331,573	52.55%	27	-3,667,407	-3,667,407	-1,859,781	-1,765,425	-1,235,833	-1,202,090	-1,109,879	2,816,617	-7,398,658	3,867,808	20%
C 120.01	Interest Rate	2013	213	CSR_NON_SEC_D_10.00_DEBT	1	[All]	-8,861,155	8,196,790	-4,968,678	5,260,285	191,147	105.87%	11	-8,861,155	-8,227,489	-7,468,124	-7,456,078	-4,590,000	4,097,988	8,196,790	24,273,592	-56,003,262	########	24%
C 120.01	Interest Rate	2013	213	CSR_NON_SEC_D_10.00_DEBT	2	[All]	-16,863,306	-5,534	-7,523,419	2,715,159	511,522	36.09%	26	-8,834,400	-8,610,751	-8,178,965	-7,858,472	-7,215,332	-5,483,272	-4,519,545	9,505,756	-26,869,984	########	6%
C 120.01	Interest Rate	2013	213	FX_D	GBP	[All]	198,831	1,328,349	1,159,733	255,556	1,439	22.04%	27	198,831	994,114	1,223,757	1,223,757	1,230,725	1,231,448	1,328,349	593,346	37,066	2,410,449	0%
C 120.01	Interest Rate	2013	213	GIRR_CD	GBP	[All]	-6,593	0	-4,332	3,356	107	77.47%	7	-6,593	-6,593	-6,510	-6,412	0	0	0	46,451	-99,314	86,491	100%
C 120.01	Interest Rate	2013	213	GIRR_CU	GBP	[All]	-6,172	0	-4,278	2,925	140	68.37%	8	-6,172	-6,172	-6,048	-5,962	0	0	0	35,925	-77,811	65,887	100%
C 120.01	Interest Rate	2013	213	GIRR_D_00.25	GBP	[All]	-14,717	12,316	-2,496	5,228	547	209.45%	39	-8,917	-5,048	-4,712	-4,549	-5	5,406	12,289	13,450	-31,449	22,351	100%
C 120.01	Interest Rate	2013	213	GIRR_D_00.50	GBP	[All]	-10,042	1,400	-6,711	3,797	669	56.59%	40	-9,573	-9,475	-9,155	-8,914	-5,709	-8	529	10,601	-30,115	12,288	23%
C 120.01	Interest Rate	2013	213	GIRR_D_01.00	GBP	[All]	-40,834	11,647	-19,829	19,083	18,262	96.24%	40	-40,566	-40,434	-39,021	-32,851	-470	1,602	2,334	48,198	-129,248	63,546	98%
C 120.01	Interest Rate	2013	213	GIRR_D_02.00	GBP	[All]	-90,698	19,620	-49,333	39,888	43,523	80.85%	40	-90,684	-90,668	-89,173	-84,370	-13,775	-5,492	-39	106,578	-297,526	128,785	73%
C 120.01	Interest Rate	2013	213	GIRR_D_03.00	GBP	[All]	-218,240	67,511	-119,548	98,809	88,929	82.65%	39	-217,846	-217,448	-214,656	-208,500	-36,302	-26,454	49,452	440,409	-1,089,318	672,318	71%
C 120.01	Interest Rate	2013	213	GIRR_D_05.00	GBP	[All]	-1,904,485	-1,239	-1,386,458	503,423	400,695	36.31%	40	-1,839,273	-1,828,309	-1,779,531	-1,727,561	-1,238,260	-715,174	-1,354	1,987,665	-5,702,892	2,247,769	18%
C 120.01	Interest Rate	2013	213	GIRR_D_10.00	GBP	[All]	-9,297,133	-5,534	-7,429,989	1,874,379	331,248	25.23%	40	-8,957,224	-8,633,133	-8,090,845	-7,896,157	-7,425,156	-7,210,541	-8,041	7,572,246	-23,040,649	7,248,335	4%
C 120.01	Interest Rate	2013	213	GIRR_D_15.00	GBP	[All]	-83,085	165,382	47,434	62,286	50,076	131.31%	17	-83,085	-5,052	-1,808	57,397	79,081	122,495	165,382	242,835	-428,272	543,067	105%
C 120.01	Interest Rate	2013	213	GIRR_D_20.00	GBP	[All]	-13,459	4,846	276	5,537	1,797	2005.80%	10	-13,459	-13,459	0	205	3,878	4,846	4,846	76,341	-152,476	152,887	100%

277. It should be noticed that on average the IR delta sensitivity is fairly convergent, for the 10 years tenor (4% IQD); same goes for the credit spread 10-years component, but in this case we may notice a problem of bucketing, since banks are split between bucket 1 and bucket 2. This was quite likely the cause of the OFR dispersion.

7.4.3 FX portfolios sensitivities submission

278. In the following we will provide some observation for the sensitivities provide for portfolio 3003.

279. Portfolio 3003 – is composed of three Call option on EUR/USD (instruments 304 – 305 - 306). IQD of this portfolio is the highest in the asset class (11% - SBM OFR) compared to the average of the FX asset class (5%).

Figure 29: Portfolio 3003 – Sensitivities snapshot

							Other stats							Percentiles								Extreme Values range (w.r.t. median)[2]		
Table	Group	Portfolio	Instrument	RiskFactor	Bucket	Additional Identifier	Min	Max	Ave	STDev	MAD (median absolute deviation	Coefficient of variation (STDev/Ave)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	STDev_trunc	-2 STDev_trunc	+2 STDev_trunc	Interquantile range
C 120.01	FX	3003	306	FX_CD	USD	[All]	-56,889	634,000	69,475	130,859	8,962	188.35%	29	-55,965	-44,834	44,052	50,391	59,353	166,626	195,730	312,716	-575,041	675,824	15%
C 120.01	FX	3003	306	FX_CU	USD	[All]	-153,525	740,582	118,819	180,701	27,739	152.08%	29	-149,768	-145,815	108,303	144,921	172,538	222,693	225,882	333,020	-521,119	810,960	23%
C 120.01	FX	3003	306	FX_D	USD	[All]	-9,146,321	9,723,939	6,604,378	5,087,533	92,989	77.03%	32	-8,126,828	4,161	7,995,649	8,120,135	8,189,621	9,080,754	9,112,709	15,441,223	-22,762,312	########	1%
C 120.01	FX	3003	306	FX_V_00.50	EUR_USD	[All]	-142,048	-7,756	-69,930	28,454	13,146	40.69%	22	-123,113	-95,797	-83,465	-69,726	-61,092	-33,229	-9,860	176,714	-423,154	283,702	15%
C 120.01	FX	3003	306	FX_V_01.00	EUR_USD	[All]	-41,486	-2,252	-25,132	10,361	4,545	41.23%	20	-41,486	-37,818	-30,879	-29,616	-20,110	-3,807	-2,252	14,837	-59,290	58	21%
C 120.01	FX	3003	306	GIRR_D_00.25	EUR	[All]	-98,672	144,806	-19,261	71,282	67,514	370.08%	22	-98,672	-92,324	-88,614	-5,560	10,384	109,425	144,806	81,628	-168,816	157,696	127%
C 120.01	FX	3003	306	GIRR_D_00.25	USD	[All]	-203,911	98,210	523	87,017	83,160	16633.27%	24	-172,352	-99,795	-45,040	5,346	88,399	89,163	90,548	226,617	-447,888	458,580	308%
C 120.01	FX	3003	306	GIRR_D_00.50	EUR	[All]	-3,995,811	4,175,088	2,704,216	2,245,988	178,219	83.06%	35	-3,198,333	320	489,382	3,993,298	4,090,200	4,154,668	4,163,503	7,698,033	-11,402,769	########	79%
C 120.01	FX	3003	306	GIRR_D_00.50	USD	[All]	-5,061,097	376,336	-3,175,807	1,189,974	136,538	37.47%	32	-3,781,120	-3,730,433	-3,682,100	-3,602,506	-3,392,642	-1,375,108	-6	6,937,806	-17,478,119	########	4%
C 120.01	FX	3003	306	GIRR_D_01.00	EUR	[All]	-1,659,877	2,543,098	1,184,102	990,547	170,155	83.65%	35	-1,169,389	1,322	178,922	1,649,300	1,731,567	1,846,589	2,467,576	2,822,573	-3,995,846	7,294,446	81%
C 120.01	FX	3003	306	GIRR_D_01.00	USD	[All]	-2,242,823	98,798	-1,365,536	562,385	162,716	41.18%	32	-2,066,163	-1,924,888	-1,631,269	-1,490,657	-1,304,530	-298,272	18,120	2,518,300	-6,527,257	3,545,943	11%
C 120.01	FX	3003	306	GIRR_D_CRO_USD	EUR	[All]	5,089,851	5,779,281	5,519,095	290,321	79,361	5.26%	15	5,089,851	5,105,057	5,164,733	5,699,603	5,756,327	5,765,598	5,779,281	14,837,423	-23,975,243	########	5%

280. From the figures (Figure 29) we can see (only for instrument 306 - ATM call - for simplicity) that the most relevant sensitivities, FX rate delta (1% IQD), FX volatilities (6 months and 1 year – IQD 15% and 21%), and USD IR delta are very homogeneous (6 month - 4% of IQD). Some dispersion may be detected in the IR deta EUR sensitivities side, with 79% IQD, which could explain the higher level of dispersion of OFR for this portfolio.

7.4.4 Commodities portfolios sensitivities submission

281. In the following we will provide some observation for the sensitivities provide for portfolio 4001.

282. Portfolio 4001 – is composed of two Call option on Gold (instruments 401- 402). IQD of this portfolio is the highest in the asset class (56% - SBM OFR) compared to the average of the CO asset class (20%).

Figure 30: Portfolio 4001 – Sensitivities snapshot

							Other stats							Percentiles								Extreme Values range (w.r.t. median)[2]		
Table	Group	Portfolio	Instrument	RiskFactor	Bucket	Additional Identifier	Min	Max	Ave	STDev	MAD (median absolute deviation	Coefficient of variation (STDev/Ave)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	STDev_trunc	-2 STDev_trunc	+2 STDev_trunc	Interquantile range
C 120.01	Commodities	4001	401	CM_D_00.00	7	[All]	1,226	6,206,522	2,925,864	1,570,449	280,654	53.67%	10	1,226	1,226	2,624,923	2,945,433	3,007,834	6,206,522	6,206,522	2,438,831	-1,932,228	7,823,094	7%
C 120.01	Commodities	4001	401	CM_D_00.25	7	[All]	-2,840,531	3,726,662	2,284,823	2,230,115	273,722	97.61%	10	-2,840,531	-2,840,531	2,954,929	3,267,492	3,411,785	3,726,662	3,726,662	21,234,071	-39,200,651	########	7%
C 120.01	Commodities	4001	401	FX_D	USD	[All]	-22,883	783,450	504,745	407,755	13,275	80.78%	8	-22,883	-22,883	-20,224	369,338	765,615	783,450	783,450	3,131,075	-5,892,812	6,631,488	105%
C 120.01	Commodities	4001	401	GIRR_D_00.25	USD	[All]	-113,122	1,551,925	468,163	516,822	372,744	110.39%	16	-113,122	-106,575	-92,298	640,897	782,424	1,016,444	1,551,925	604,865	-568,833	1,850,628	127%
C 120.01	Commodities	4001	401	GIRR_D_00.50	USD	[All]	-10,087	10,216	-1,522	7,985	7,779	524.48%	6	-10,087	-10,087	-7,779	-3,889	37	10,216	10,216	126,063	-256,015	248,237	101%

283. From the figures (Figure 30) we can see (only for instrument 401- 3 months call - for simplicity) that the most relevant sensitivities, Commodity delta (7% IQD) are very homogeneous; on the other side, the IR delta component diverge quite substantially (above 100% IQD) and a majority of the banks consider also the FX delta component (in a very divergent manner – 105% IQD).This difference in the sensitivities representation explain the higher level of dispersion of OFR for this portfolio.

7.4.5 Credit spread portfolios sensitivities submission

284. In the following we will provide some observation for the sensitivities provide for portfolio 5017.

285. Portfolio 5017– is composed of a long Brazilian Gov Bond and a long CDS position (instruments 216- 505). IQD of this portfolio is the highest in the asset class (54% - SBM OFR) compared to the average of the CS asset class (18%).

Figure 31: Portfolio 5017 – Sensitivities snapshot

							Other stats							Percentiles								Extreme Values range (w.r.t. median)²		
Table	Group	Portfolio	Instrument	RiskFactor	Bucket	Additional Identifier	Min	Max	Ave	STDev	MAD (median absolute deviation)	Coefficient of variation (STDev/Ave)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	STDev_trunc	-2 STDev_trunc	+2 STDev_trunc	Interquantile range
C 120.01	Credit Spread	5017	505	CSR_NON_SEC_D_00.5	11	[All]	-4,557	0	-1,873	1,328	308	70.92%	11	-4,557	-3,490	-2,403	-2,092	-730	-73	0	1,861	-5,813	1,630	53%
C 120.01	Credit Spread	5017	505	CSR_NON_SEC_D_01.0	11	[All]	-27,526	-2	-18,111	8,358	4,745	46.15%	11	-27,526	-26,174	-23,479	-21,175	-14,345	-4,875	-2	23,070	-67,315	24,965	24%
C 120.01	Credit Spread	5017	505	CSR_NON_SEC_D_03.0	11	[All]	-80,556	344,225	86,799	171,061	99,459	197.08%	12	-80,556	-78,409	-68,873	19,977	239,095	339,774	344,225	171,061	-322,145	362,099	181%
C 120.01	Credit Spread	5017	505	CSR_NON_SEC_D_05.0	11	[All]	2,456,354	3,888,153	3,594,272	392,384	166,717	10.92%	13	2,456,354	3,474,432	3,508,290	3,593,572	3,841,997	3,875,548	3,888,153	1,065,202	1,463,168	5,723,976	5%
C 120.01	Credit Spread	5017	505	FX_D	USD	[All]	-15,740	51,357	31,413	28,995	2,300	92.30%	12	-15,740	-13,031	-11,287	47,592	50,008	50,985	51,357	41,561	-35,530	130,715	158%
C 120.01	Credit Spread	5017	505	GIRR_D_00.25	USD	[All]	-1,721	340	-592	553	429	93.52%	19	-1,721	-1,159	-993	-564	-155	254	340	1,918	-4,399	3,272	73%
C 120.01	Credit Spread	5017	505	GIRR_D_00.50	USD	[All]	-3,617	708	-1,127	1,395	1,211	123.81%	19	-3,617	-2,577	-2,430	-1,465	251	687	708	2,821	-7,108	4,177	123%
C 120.01	Credit Spread	5017	505	GIRR_D_01.00	USD	[All]	-9,965	1,022	-5,357	4,174	2,890	77.92%	19	-9,965	-9,947	-9,066	-7,309	-2	552	1,022	5,121	-17,551	2,933	100%
C 120.01	Credit Spread	5017	505	GIRR_D_02.00	USD	[All]	-22,112	-8,501	-16,655	4,084	2,973	24.52%	19	-22,112	-22,040	-19,925	-17,002	-13,759	-9,552	-8,501	5,507	-28,017	-5,987	18%
C 120.01	Credit Spread	5017	505	GIRR_D_03.00	USD	[All]	-91,575	-26,395	-59,377	20,995	10,623	35.36%	19	-91,575	-90,619	-82,165	-50,889	-45,831	-36,602	-26,395	24,524	-99,937	-1,841	28%
C 120.01	Credit Spread	5017	505	GIRR_D_05.00	USD	[All]	-82,894	-62	-47,927	23,447	11,224	48.92%	19	-82,894	-81,328	-74,371	-42,791	-41,280	-23,534	-62	26,934	-96,659	11,077	29%
C 120.01	Credit Spread	5017	505	GIRR_D_10.00	USD	[All]	-2	927	301	361	186	119.90%	10	-2	-2	0	283	412	927	927	715	-1,146	1,713	100%

Table	Group	Portfolio	Instrument	RiskFactor	Bucket	Additional Identifier	Min	Max	Ave	STDev	MAD (median absolute deviation)	Coefficient of variation (STDev/Ave)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	STDev_trunc	-2 STDev_trunc	+2 STDev_trunc	Interquantile range
C 120.01	Credit Spread	5017	216	CSR_NON_SEC_D_00.5	11	[All]	-10,910	13,646	908	8,992	8,850	990.14%	12	-10,910	-10,679	-6,223	0	9,255	13,646	13,646	8,992	-17,984	17,984	510%
C 120.01	Credit Spread	5017	216	CSR_NON_SEC_D_01.0	11	[All]	-70,902	29,846	-15,200	35,635	20,107	234.44%	13	-70,902	-70,481	-27,950	-122	12,146	26,029	29,846	35,635	-71,392	71,147	254%
C 120.01	Credit Spread	5017	216	FX_D	USD	[All]	-88,703	899,436	399,123	471,954	101,500	118.25%	11	-88,703	-2,941	0	12,797	894,988	895,706	899,436	471,954	-931,110	956,705	100%
C 120.01	Credit Spread	5017	216	GIRR_D_00.25	USD	[All]	-14,815	8,602	-2,496	6,151	1,323	246.42%	19	-14,815	-11,078	-2,784	-1,493	-170	8,176	8,602	9,061	-19,615	16,629	88%
C 120.01	Credit Spread	5017	216	GIRR_D_01.00	USD	[All]	-40,950	4,129	-16,645	16,209	10,954	97.38%	19	-40,950	-36,758	-34,784	-10,966	-2,834	0	4,129	19,005	-48,976	27,044	85%
C 120.01	Credit Spread	5017	216	GIRR_D_02.00	USD	[All]	-91,103	-7	-39,327	33,431	28,384	85.01%	19	-91,103	-82,786	-74,210	-29,226	-4,962	-56	-7	38,873	-106,972	48,520	87%
C 120.01	Credit Spread	5017	216	GIRR_D_05.00	USD	[All]	-3,769,465	-2,871,498	-3,501,345	262,442	159,851	7.50%	19	-3,769,465	-3,753,656	-3,722,350	-3,430,096	-3,403,768	-3,066,404	-2,871,498	1,332,726	-6,095,548	-764,644	4%

286. From the figures (Figure 31) we can see that for the bond (instrument 2016), the main component (IR delta sensitivity for the 5 years tenor is well represented (IQD 4%). On the other side, the FX delta component is represented in a fairly dispersed manner (100% of IQD).

287. For instrument 505 (CSD) it is reassuring that at least the main component (delta CS – 5 years) is well represented with a 5% IQD. It cannot be said the same for the IR components (IQDs above 30%) and Fx component (158% IQD).

288. These substantial differences in the secondary component of the OFR explain the higher level of dispersion of OFR for this portfolio.

8. Conclusion

289. 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.

290. 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.

291. However, the analysis might 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.

292. The objective of the benchmarking exercise was not to reach a final judgement on the 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.

293. 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 in particular, not encompassed in the IRC models.

294. Moreover, the conclusions reached in regular supervisory model monitoring activities will take into account the outcome of the supervisory benchmarking exercises to achieve greater alignment between CAs' targeted internal model reviews and the EU's benchmarking analysis.

295. Overall, this exercise exhibits a significant reduction in the IMV variability for IR and EQ asset class. CO IQDs remain subtidal , even if lower than 2022, and for FX a an increase of IQD in IMV may be due to a change in the instruction that was not uniformly interpreted by the institutions; it should be recalled also that a few new instruments, slightly less vanilla compared to the average instruments required, had the effect to increase the average IQD. All considered, the booking of the instruments for the 2023 exercise was good in general. The variability of risk measures, especially the VaR, is significantly 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 compethent 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 18% (it was 11% in 2022, and 16% in 2021). Aggregated by asset class, the portfolio IQD of the others is 12% (vs 9% in 2022 and 15%

in 2021) on average and never above 23%. The usual analysis carried out in the 2019-2022 exercise – relating to the considerations of the level of approval, size of banks, business model adopted and stress period – was repeated in the 2023 exercise and should now be considered a consolidated piece of information in the benchmarking report. The 2023 Market Risk benchmarking report also provides an analysis of the SBM OFR. Th SBM OFRs see an improvement overall in terms of data quality and exhibit, as they are supposed to do, a lower level of dispersion with respect to the IMA Risk measures (Table 4). 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.

296. Finally, this report provides a framework that can be considered useful for the purpose of future benchmarking exercises under Article 78 of the CRD. Therefore, 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 these issues.

9. Annex

Table 17: Banks participating in the 2023 EBA MR benchmarking exercise

Country	Bank name
AT	Erste Group Bank AG
AT	Raiffeisen Bank International AG
BE	Belfius Bank
BE	Dexia
BE	KBC Groep
DE	Citigroup Global Markets Europe AG
DE	COMMERZBANK Aktiengesellschaft
DE	DekaBank Deutsche Girozentrale
DE	DEUTSCHE BANK AKTIENGESELLSCHAFT
DE	DZ BANK AG Deutsche Zentral-Genossenschaftsbank, Frankfurt am Main
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.
ES	Credit Suisse Bank (Europe), S.A.
FI	Nordea Bank Abp
FR	BNP Paribas
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 Holdings Ireland Limited
IT	BANCO BPM SOCIETA' PER AZIONI
IT	Intesa Sanpaolo S.p.A.
IT	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.
PT	Banco Comercial Português, SA
SE	Skandinaviska Enskilda Banken - gruppen
SE	Swedbank - Grupp

Country	AT	BE	DE	DK	ES	FI	FR	GR	IE	IT	NL	PT	SE
N.banks	*2*	*3*	*11*	*2*	*4*	*1*	*5*	*3*	*2*	*3*	*5*	*1*	*2*

Table 18: 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: Xetra
Base 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

109. 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

110. 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

114. 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

120. 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 USD

Expiry date: June Year T

Base 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 2030
Base 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 2027
Base 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+2

Base 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 2029
Base currency: USD

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

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

520. Long position on Volkswagen Group notes EUR 1 000 000 (ISIN XS1944390597).
Maturity: 31 July 2026
Base 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+5
Base 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 2030
Base currency: EUR

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

CTP

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.

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

Portfolio	Combination of instruments:	Currency	Portfolio	Combination of instruments:	Currency
1001	101 – 1 instrument	EUR	4001	401 – 1 instrument	USD
1002	103 – 1 instrument	EUR		402 – 1 instrument	
	104 – 1 instrument		4002	403 – 1 instrument	USD
	105 – 1 instrument			404 – 1 instrument	
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
	116 – 1 instrument		5001	501 – 1 instrument	USD
1005	117 – 1 instrument	JPY		502 – 1 instrument	
1006	109 – 1 instrument	EUR		503 – 1 instrument	
	110 – 1 instrument		5002	504 – 1 instrument	USD
1007	118 – 1 instrument	EUR		505 – 1 instrument	
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		512 – 1 instrument	
	103 – 1 instrument			514 – 1 instrument	
1012	101 – 1 instrument	EUR		515 – 1 instrument	
	103 – 1 instrument			516 – 1 instrument	
	104 – 1 instrument		5007	517 – 1 instrument	USD
1013	102– 1 instrument	EUR		518 – 1 instrument	
	104 – 1 instrument		5008	519 – 1 instrument	EUR
1014	119 – 1 instrument	EUR		520 – 1 instrument	
1015	120 – 1 instrument	EUR		522 – 1 instrument	
1016	121 – 1 instrument	EUR	5009	520 – 1 instrument	EUR
2001	201 – 1 instrument	EUR		521 – 1 instrument	
2002	202 – 1 instrument	EUR	5010	519 – 1 instrument	EUR
2003	203 – 1 instrument	USD		508 – 1 instrument	
2004	204 – 1 instrument	GBP	5011	515 – 1 instrument	EUR
2005	205 – 1 instrument	USD		522 – 1 instrument	
2006	206 – 1 instrument	EUR	5012	513 – 1 instrument	USD
	207 – 1 instrument		5013	520 – 1 instrument	EUR
2007	206 – 1 instrument	EUR		521 – 1 instrument	
	207 – 1 instrument			516 – 1 instrument	
	208 – 1 instrument		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

	217 – 1 instrument			526 – 1 instrument	
2015	203 – 1 instrument	USD		528 – 1 instrument	
	215 – 1 instrument		5022	523 – 1 instrument	EUR
2016	208 – 1 instrument	EUR		524 – 1 instrument	
	209 – 1 instrument			525 – 1 instrument	
	210 – 1 instrument			526 – 1 instrument	
	214 – 1 instrument			527 – 1 instrument	
2017	220 – 1 instrument	EUR		528 – 1 instrument	
2018	209 – 1 instrument	EUR	5023	529 – 1 instrument	EUR
				530 – 1 instrument	
2019	209 – 1 instrument	EUR	5024	531 – 1 instrument	EUR
	219 – 1 instrument		5025	532 – 1 instrument	USD
2020	221 – 1 instrument	EUR	5026	533 – 1 instrument	EUR
2021	222 – 1 instrument	EUR	5027	534 – 1 instrument	EUR
2022	201 – 1 instrument	EUR	6001	601 – 1 instrument	EUR
	223 – 1 instrument			602 – 1 instrument	
2023	224 – 1 instrument	EUR	6002	603 – 1 instrument	EUR
3001	301 – 1 instrument	EUR		604 – 1 instrument	
	302 – 1 instrument		6003	605 – 1 instrument	EUR
3002	303 – 1 instrument	EUR		606 – 1 instrument	
	304 – 1 instrument		6004	607 – 1 instrument	EUR
3003	304 – 1 instrument	EUR		608 – 1 instrument	
	305 – 1 instrument		6005	609 – 1 instrument	EUR
	306 – 1 instrument			610 – 1 instrument	
3004	307 – 1 instrument	EUR			
	308 – 1 instrument				
3005	309 – 1 instrument	EUR			
3006	310 – 1 instrument	EUR			
3007	311 – 1 instrument	EUR			

Aggreg. Portfolio	Description	Combination of Individual Portfolios (individual portfolios as stated by their numbers as referred to in Section 3 of this Annex)	Base Currency
10000	ALL-IN no-CTP	1001, 1002, 1006, 1007, 1009, 2001, 2002, 2008, 2011, 3001, 3002, 3003, 3004, 4001, 4002, 5003, 5006, 5008, 5022	EUR
11000	EQUITY Cumulative	1001, 1002, 1006, 1007, 1009	EUR
12000	IR Cumulative	2001, 2002, 2008, 2011	EUR

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/regulation-and-policy/supervisory-benchmarking-exercises/its-package-2023-benchmarking-exercise

Adopted as:

Commission Implementing Regulation (EU) 2023/313 of 15 December 2022 amending Implementing Regulation (EU) 2016/2070 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)

https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02016R2070-20230306

Table 19: VaR cluster analysis – number of banks by range

2023 VaR cluster analysis: number of banks by range

(X = ratio with the median)

100

	Port. ID	300% < X	300% ≥ X >200%	200% ≥ X >150%	150% ≥ X >100%	100% ≥ X >50%	50% ≥ X >0	Num obs.
Equity	1001				13	16		29
	1002				13	13		26
	1003				14	12		26
	1004		2	3	5	12	2	24
	1005				12	14		26
	1006			3	10	12	1	26
	1007		1		7	10	1	19
	1008			1	8	11		20
	1009				14	12		26
	1010				12	12		24
	1011				12	15		27
	1012				12	15		27
	1013				15	12		27
	1014				13	14		27
	1015				12	10		22
	1016		3		1	3	3	10
Interest Rate	2001				16	19		35
	2002				16	19		35
	2003				16	19		35
	2004			2	17	20		39
	2005			2	6	6	2	16
	2006				15	15		30
	2007				16	13		29
	2008				16	15		31
	2009				18	19		37
	2010				16	19		35
	2011				18	19		37
	2012		2	2	8	19		31
	2013				18	17		35
	2014				13	12	1	26
	2015	1	2	4	7	13	6	33
	2016				15	12		27
	2017	3		2	8	17		30
	2018				18	16		34
	2019				17	15		32
	2020				16	19		35
	2021				16	15		31
	2022				13	14		27
	2023			2	17	14	1	34
FX	3001				18	16		34
	3002				15	16		31
	3003				16	16		32
	3004				13	17		30
	3005				15	16		31
	3006	2	1	3	9	18		33
	3007				12	10		22
Commodities	4001			3	3	6	1	13
	4002				7	7		14
	4003				6	5	1	12
	4004				6	6		12
Credit Spread	5001				11	11		22
	5002				8	11		19
	5003				13	11		24
	5004				8	11		19
	5005			4	6	13		23
	5006				10	10	3	23
	5007			3	6	11		20
	5008			1	10	14		25
	5009			1	11	14		26
	5010			1	8	13		22
	5011			2	7	13		22
	5012		2	3	3	12		20
	5013				10	13		23
	5014				10	11		21
	5015				8	13		21
	5016		1	4	3	10		18
	5017			2	6	10		18
	5018			1	7	10		18
	5019				9	12		21
	5020				12	13		25
	5021				9	10	1	20
	5022				9	11		20
	5023		2	1	2	7	2	14
	5024			3	5	12		20
	5025				10	10		20
	5026				9	11		20
	5027			2	7	11	1	21
CTP	6001							0
	6002							0
	6003							0
	6004							0
	6005							0
ALL-IN no-CTP	10000				5	6		11
Equity Cumulative	11000				11	9		20
IR Cumulative	12000				15	11		26
FX Cumulative	13000				15	16		31
Commodity Cumulative	14000				6	7		13
CS Cumulative	15000				9	11		20
CTP Cumulative	16000							0

Table 20: VaR statistics

EU Statistics for VaR

		Main statistics								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
Equity	1001	385,140	577,601	472,957	45,731	53,266	36,680	10%	30	434,893	483,743	509,000	8%
	1002	277,489	426,069	366,396	44,244	47,073	37,049	12%	27	333,069	367,394	410,839	10%
	1003	7,624	18,809	13,179	2,322	2,973	1,195	18%	26	11,910	13,134	14,452	10%
	1004	14	1,982	986	498	591	286	51%	25	712	917	1,290	29%
	1005	44,528,539	62,687,319	53,636,993	4,802,803	4,977,240	3,579,974	9%	27	50,311,285	53,894,269	57,008,479	6%
	1006	1,644	5,683	3,586	1,135	1,135	909	32%	27	2,587	3,578	4,487	27%
	1007	1,528	55,097	25,785	11,257	16,303	6,303	44%	20	19,593	26,804	32,138	24%
	1008	5,333	11,991	8,281	1,983	3,116	1,358	24%	20	6,901	7,870	9,535	16%
	1009	41,981	85,858	62,342	10,834	12,933	4,256	17%	26	58,760	61,925	67,198	7%
	1010	34,581	51,719	42,288	3,745	4,772	2,078	9%	25	40,235	42,313	43,784	4%
	1011	359,889	507,145	431,838	43,066	45,952	28,861	10%	28	399,071	429,935	468,580	8%
	1012	343,511	495,028	412,279	40,513	42,501	28,366	10%	28	378,479	411,771	445,433	8%
	1013	50,640	122,288	90,012	18,691	24,421	12,372	21%	27	71,753	92,595	105,557	19%
	1014	301,745	423,285	370,998	36,360	46,918	30,529	10%	27	348,406	363,093	406,703	8%
	1015	227,827	345,602	295,445	34,090	36,094	28,590	12%	23	266,771	296,106	328,581	10%
	1016	964	322,113	146,168	113,632	127,161	77,985	78%	11	50,670	119,175	288,030	70%
Interest Rate	2001	206,696	315,516	252,261	29,196	36,746	11,404	12%	37	237,195	247,522	257,899	4%
	2002	132,253	210,467	167,040	21,546	22,089	14,121	13%	36	152,874	168,743	183,656	9%
	2003	22,436	31,217	26,418	2,145	2,464	1,100	8%	37	25,109	26,543	27,218	4%
	2004	75,199	220,880	146,699	43,137	42,062	34,806	29%	39	103,607	144,115	188,867	29%
	2005	0	74,067	38,530	20,244	20,244	14,393	53%	17	23,203	37,596	50,382	37%
	2006	28,730	79,878	50,940	13,947	15,397	11,363	27%	32	36,945	54,588	61,842	25%
	2007	75,454	167,586	130,030	26,064	29,102	19,018	20%	30	107,005	132,924	151,187	17%
	2008	67,335	169,979	119,423	30,598	30,598	27,960	26%	32	93,345	122,397	150,357	23%
	2009	190,543	293,518	243,226	26,566	26,566	15,302	11%	39	230,635	243,244	264,972	7%
	2010	186,675	284,233	228,039	25,715	32,506	9,596	11%	37	214,286	224,057	232,412	4%
	2011	381,204	629,203	511,390	68,903	68,903	47,027	14%	39	469,000	495,948	567,196	9%
	2012	130,089	338,818	176,408	52,955	91,859	13,974	30%	33	144,217	155,251	218,575	20%
	2013	48,607	98,195	70,041	14,438	14,438	11,681	21%	36	57,693	71,301	77,883	15%
	2014	23,129	70,822	48,626	14,204	14,204	11,033	29%	27	37,641	50,976	61,509	24%
	2015	1,591	27,014	6,978	4,957	10,356	2,450	71%	35	3,385	6,459	9,252	46%
	2016	143,618	225,107	189,062	17,420	26,709	11,497	9%	28	181,430	189,131	201,748	5%
	2017	20,987	115,029	38,464	27,474	73,788	3,031	71%	32	24,534	26,751	37,230	21%
	2018	24,114	36,378	30,384	3,242	3,582	2,151	11%	35	27,551	30,596	32,798	9%
	2019	9,734	20,233	15,859	2,782	3,645	2,077	18%	33	13,988	16,486	18,001	13%
	2020	25,700	56,155	39,970	6,861	8,205	3,233	17%	37	35,903	39,790	42,358	8%
	2021	41,539	90,537	66,003	12,886	12,886	10,342	20%	32	57,734	65,542	75,905	14%
	2022	238,203	485,422	363,502	62,062	73,562	50,641	17%	28	310,848	369,097	413,301	14%
	2023	85,315	348,302	232,924	66,375	72,934	50,622	29%	35	192,298	225,106	283,739	19%
FX	3001	410,212	869,104	652,000	133,212	129,775	120,948	20%	36	537,342	650,686	776,315	18%
	3002	130,058	254,893	184,635	34,223	35,040	29,636	19%	33	155,764	186,932	211,362	15%
	3003	157,194	238,550	195,952	25,051	25,051	22,483	13%	33	171,680	194,163	215,263	11%
	3004	490,226	707,577	596,634	62,166	66,774	52,899	10%	32	535,613	612,562	633,631	8%
	3005	296,901	483,491	380,628	51,470	55,388	42,205	14%	32	340,031	373,044	416,597	10%
	3006	5,900	46,297	16,258	8,772	16,539	2,557	54%	35	12,127	13,632	16,740	16%
	3007	648,835	941,645	807,878	69,937	83,725	39,983	9%	23	764,076	807,753	844,959	5%
Commodities	4001	9,043	47,103	25,798	11,507	22,359	4,876	45%	14	17,569	24,365	27,320	22%
	4002	297,147	779,543	511,957	153,198	153,198	119,031	30%	14	383,547	531,463	629,001	24%
	4003	261,170	814,356	594,078	150,086	183,889	84,582	25%	12	519,999	570,313	692,807	14%
	4004	341,677	609,319	484,053	80,471	147,918	27,718	17%	12	445,806	492,939	520,009	8%
Credit Spread	5001	8,144	18,163	14,091	2,708	2,980	2,335	19%	22	11,867	13,507	16,446	16%
	5002	22,098	45,759	34,786	6,786	11,591	2,937	20%	19	31,345	34,460	39,898	12%
	5003	4,805	8,131	6,548	1,057	1,167	990	16%	24	5,536	6,489	7,345	14%
	5004	10,946	22,951	16,084	3,443	3,684	2,692	21%	19	13,858	15,853	19,650	17%
	5005	3,274	9,833	6,593	1,977	2,112	1,148	30%	23	5,191	6,190	8,329	23%
	5006	4,129	19,357	11,738	3,896	5,091	2,382	33%	23	7,677	13,153	14,055	29%
	5007	32,378	89,252	53,115	16,705	19,805	10,128	32%	20	39,236	52,966	61,940	22%
	5008	57,678	128,724	79,047	18,325	29,050	13,732	23%	25	64,737	78,064	89,744	16%
	5009	14,855	26,308	19,771	3,871	5,017	1,888	20%	25	16,870	19,191	23,717	17%
	5010	23,598	46,625	31,621	6,316	8,518	3,444	20%	22	27,163	30,946	33,543	11%
	5011	14,679	38,395	20,725	6,057	13,099	3,105	29%	22	16,415	19,875	22,804	16%
	5012	1,574	4,836	2,582	1,049	2,230	468	41%	20	1,874	2,237	3,272	27%
	5013	16,102	29,545	20,717	3,266	4,894	2,558	16%	23	17,656	20,718	22,881	13%
	5014	4,138	7,216	5,749	901	901	636	16%	21	5,027	5,904	6,429	12%
	5015	21,980	32,124	27,204	2,769	3,822	1,843	10%	21	25,317	27,393	28,874	7%
	5016	15,615	55,568	29,012	11,542	15,546	6,240	40%	18	18,944	25,274	39,548	35%
	5017	19,023	54,753	34,628	11,636	14,653	8,921	34%	18	24,344	34,704	45,181	30%
	5018	31,845	95,000	53,579	15,568	26,887	9,628	29%	18	43,097	51,705	66,397	21%
	5019	9,104	20,463	13,864	3,756	5,495	3,037	27%	21	10,504	13,769	16,716	23%
	5020	175,819	237,074	205,369	17,030	17,030	14,235	8%	25	191,210	205,423	220,289	7%
	5021	15,542	46,308	31,670	7,388	9,044	4,563	23%	20	26,584	32,065	35,331	14%
	5022	174,562	231,428	197,882	15,599	17,669	12,296	8%	20	185,386	197,844	210,634	6%
	5023	25,469	176,035	80,419	48,804	57,482	23,196	61%	14	44,436	75,660	90,828	34%
	5024	26,930	91,399	53,879	18,150	26,676	9,648	34%	20	41,308	50,632	68,362	25%
	5025	48,189	91,732	68,494	12,492	12,492	8,690	18%	20	57,825	71,469	77,755	15%
	5026	26,918	47,236	37,433	5,423	7,470	3,896	15%	20	34,476	37,486	41,861	10%
	5027	6,776	32,467	18,773	5,560	8,728	2,855	30%	21	15,813	17,900	21,460	15%
CTP	6001								3				
	6002								3				
	6003								3				
	6004								3				
	6005								3				
ALL-IN no-CTP **	10000	743,314	1,149,049	902,851	152,945	188,567	107,558	17%	11	764,797	870,077	1,099,771	18%
Equity Cumulative **	11000	246,586	350,067	305,696	31,475	33,967	26,383	10%	20	280,006	300,363	333,083	9%
IR Cumulative **	12000	255,384	492,096	377,429	52,719	82,591	32,832	14%	27	340,117	391,058	408,796	9%
FX Cumulative **	13000	565,591	1,035,822	794,391	139,369	130,502	101,773	18%	33	685,224	813,996	882,062	13%
Commodity Cumulative **	14000	316,392	791,636	518,960	155,103	155,103	138,981	30%	13	391,999	530,980	629,804	23%
CS Cumulative **	15000	219,993	316,890	258,962	29,916	32,350	24,086	12%	20	236,964	257,699	279,589	8%
CTP Cumulative **	16000								2				

[1] *STDev trunc* is the standard deviation computed excluding values below the *5th* and above the *95th* percentile

[2] Refers to the number of banks included in the computation of the statistics

*** For the aggregated portfolios (60 to 66), banks that reported at least a missing portfolio IMV among the ones composing the aggregate are not included in the computation of the benchmarks for that particular aggregate portfolio.*

Table 21: sVaR statistics

EU Statistics for SVaR

		Main statistics								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
Equity	1001	639,346	1,123,456	878,100	116,731	152,475	80,553	13%	29	788,113	885,825	950,107	9%
	1002	400,813	1,382,437	963,045	321,752	325,176	285,462	33%	28	731,060	951,147	1,315,264	29%
	1003	6,208	26,895	17,971	5,037	6,007	3,976	28%	25	16,048	17,947	21,747	15%
	1004	58	4,181	1,477	1,118	1,693	439	76%	25	848	1,087	2,138	43%
	1005	50,762,865	155,557,845	122,846,559	28,216,841	37,499,369	17,906,412	23%	24	107,620,213	121,744,517	147,389,147	16%
	1006	8	10,872	5,200	2,765	2,891	1,962	53%	27	2,899	5,579	6,527	38%
	1007	818	118,747	57,900	31,816	35,045	24,964	55%	22	31,193	56,972	89,733	48%
	1008	6,509	19,291	11,875	3,499	4,166	2,813	30%	22	8,597	11,041	14,186	25%
	1009	57,102	133,715	100,424	19,967	25,401	11,823	20%	24	91,061	100,133	112,185	10%
	1010	55,894	144,878	109,246	27,359	29,674	20,986	25%	26	92,054	110,733	134,026	19%
	1011	560,229	980,145	773,369	99,760	129,731	57,384	13%	27	714,819	764,692	838,736	8%
	1012	529,599	941,922	746,230	99,362	130,126	57,602	13%	27	690,047	732,915	810,855	8%
	1013	48,460	163,202	107,079	31,750	32,377	22,193	30%	28	78,859	106,279	131,794	25%
	1014	348,987	794,472	593,732	115,659	130,427	78,948	20%	28	518,968	593,891	685,087	14%
	1015	263,669	652,161	488,855	110,082	117,704	94,645	23%	23	396,299	480,477	588,044	19%
	1016	994	523,357	246,634	169,601	169,601	145,092	69%	12	102,544	247,636	390,006	58%
Interest Rate	2001	149,856	263,791	210,036	30,571	33,782	18,150	15%	38	187,310	212,667	230,840	10%
	2002	86,910	184,116	135,575	22,676	25,569	17,534	17%	34	116,711	133,453	152,347	13%
	2003	19,246	51,186	35,911	6,687	8,926	4,543	19%	36	31,424	33,822	40,417	13%
	2004	24,682	141,778	90,151	29,785	36,119	17,165	33%	36	75,456	96,032	109,445	18%
	2005	1,065	147,566	70,056	47,581	65,657	34,011	68%	15	40,308	61,067	127,985	52%
	2006	15,289	91,608	47,968	16,918	22,830	10,968	35%	32	35,431	46,081	59,850	26%
	2007	28,317	184,646	103,938	37,439	44,454	23,975	36%	31	76,067	105,699	127,731	25%
	2008	45,223	228,313	94,678	41,378	74,513	22,617	44%	29	61,136	100,594	110,123	29%
	2009	150,961	350,048	253,932	45,302	54,215	26,750	18%	36	227,233	252,937	282,470	11%
	2010	134,938	239,219	189,878	27,939	30,863	15,529	15%	38	168,559	193,863	208,559	11%
	2011	292,958	522,960	424,557	59,699	80,117	28,035	14%	36	395,021	419,961	488,367	11%
	2012	56,490	278,989	140,788	46,204	71,284	36,085	33%	33	105,999	145,232	176,982	25%
	2013	26,273	72,962	49,206	10,940	13,908	6,423	22%	36	42,147	49,082	54,616	13%
	2014	21,521	194,416	96,839	57,252	56,371	51,417	59%	28	41,811	89,026	149,382	56%
	2015	5,670	42,388	17,865	8,825	12,659	5,867	49%	36	11,074	17,120	22,912	35%
	2016	81,182	305,976	140,055	62,204	94,220	18,407	44%	32	101,824	117,754	145,891	18%
	2017	527	421,815	186,070	93,661	123,915	49,657	50%	33	133,856	185,606	245,601	29%
	2018	10,982	45,660	21,118	6,710	13,910	2,098	32%	34	16,929	20,883	22,206	13%
	2019	8,200	36,805	16,979	6,045	15,339	1,866	36%	34	13,658	16,321	17,640	13%
	2020	6,200	194,635	96,241	54,294	72,197	33,059	56%	35	59,689	96,990	148,902	43%
	2021	50	107,142	45,837	20,388	31,979	8,861	45%	30	34,385	44,406	52,184	21%
	2022	94,346	335,238	239,143	55,227	76,554	27,298	23%	28	213,934	244,193	279,351	13%
	2023	64,444	244,247	162,077	51,701	54,975	41,643	32%	35	118,338	169,553	200,919	26%
FX	3001	409,453	1,213,157	837,996	217,518	217,518	141,717	26%	35	696,337	833,098	1,023,825	19%
	3002	135,618	400,867	270,029	74,470	80,453	48,082	28%	32	218,393	280,204	326,801	20%
	3003	184,844	453,615	310,361	59,661	71,033	41,119	19%	31	274,107	314,958	360,187	14%
	3004	671,710	1,475,838	1,064,180	194,270	242,928	84,079	18%	31	975,046	1,094,668	1,186,177	10%
	3005	450,517	1,136,474	920,926	188,198	266,565	128,853	20%	29	847,624	950,018	1,080,586	12%
	3006	6,043	125,357	36,024	24,667	67,845	14,804	69%	34	18,665	35,241	45,538	42%
	3007	794,123	2,277,904	1,466,453	388,015	380,320	210,992	27%	25	1,163,966	1,550,868	1,599,099	16%
Commodities	4001	24,930	48,206	35,961	8,414	11,918	6,792	23%	14	28,322	35,512	44,107	22%
	4002	311,757	1,038,868	677,440	213,271	284,248	177,714	32%	13	578,293	676,247	837,947	18%
	4003	946,462	1,757,415	1,321,749	247,576	409,615	92,607	19%	11	1,175,906	1,263,436	1,572,746	14%
	4004	461,753	1,268,320	1,028,505	255,825	350,103	115,992	25%	12	927,447	1,108,399	1,219,165	14%
Credit Spread	5001	10,717	42,133	19,136	7,079	16,924	4,586	37%	22	14,452	19,491	22,592	22%
	5002	37,373	158,251	91,380	39,961	44,268	37,651	44%	19	53,392	91,182	140,859	45%
	5003	5,479	19,778	12,850	3,641	3,991	1,839	28%	24	10,613	12,981	14,592	16%
	5004	16,135	71,555	36,003	15,855	19,418	8,494	44%	19	22,147	35,042	46,808	36%
	5005	4,782	33,942	16,743	9,525	9,983	5,445	57%	24	9,902	15,194	21,973	38%
	5006	14,127	53,321	29,446	12,870	21,323	6,723	44%	23	18,328	26,680	38,957	36%
	5007	27,902	133,468	72,355	33,623	45,070	23,048	47%	19	43,347	72,894	104,972	42%
	5008	33,934	157,089	80,688	33,539	51,728	18,857	42%	25	56,254	75,855	106,976	31%
	5009	11,900	47,557	22,290	10,128	13,588	6,548	45%	25	13,712	21,515	26,492	32%
	5010	19,581	68,772	36,949	13,873	20,999	8,915	38%	21	24,980	35,844	43,774	27%
	5011	9,882	55,171	25,073	12,846	17,499	4,130	51%	23	16,910	21,860	29,528	27%
	5012	2,092	20,203	8,051	4,674	9,283	2,159	58%	22	4,971	8,086	8,824	28%
	5013	13,547	63,304	36,137	14,414	15,154	7,759	40%	23	25,456	33,836	48,931	32%
	5014	5,545	31,563	12,258	6,245	10,739	3,452	51%	21	7,470	10,953	13,921	30%
	5015	15,223	54,735	27,307	9,329	15,024	5,136	34%	21	22,161	25,850	31,356	17%
	5016	21,024	78,895	39,571	16,244	24,672	8,692	41%	17	28,123	37,078	45,108	23%
	5017	22,633	120,154	56,461	27,603	33,668	15,301	49%	17	35,549	55,325	65,405	30%
	5018	44,181	162,667	85,401	33,774	51,142	16,264	40%	17	61,657	86,192	91,802	20%
	5019	10,366	47,055	20,758	8,121	15,394	2,067	39%	21	16,509	18,684	22,347	15%
	5020	137,813	294,087	211,173	39,211	46,436	28,791	19%	25	184,652	216,761	242,512	14%
	5021	36,253	255,905	112,555	67,930	82,543	58,228	60%	20	47,498	109,975	160,944	54%
	5022	154,582	369,286	235,690	58,837	69,172	31,778	25%	20	182,207	241,260	260,210	18%
	5023	63,909	415,141	166,276	100,989	157,258	36,758	61%	14	90,012	124,707	248,629	47%
	5024	25,471	147,329	86,743	37,307	47,882	32,541	43%	21	58,119	92,518	114,017	32%
	5025	46,601	184,374	101,875	35,433	48,650	20,405	35%	18	81,793	102,555	120,242	19%
	5026	17,557	66,200	38,092	14,284	22,393	11,125	38%	20	27,198	37,504	51,221	31%
	5027	9,548	57,694	26,484	13,994	22,486	6,102	53%	21	16,791	24,756	30,137	28%
CTP	6001								3				
	6002								3				
	6003								3				
	6004								3				
	6005								3				
ALL-IN no-CTP **	10000	818,857	2,174,445	1,465,915	411,784	552,258	146,547	28%	11	1,155,746	1,357,717	1,838,116	23%
Equity Cumulative **	11000	358,326	815,625	584,091	100,775	122,516	34,868	17%	19	551,599	585,505	649,317	8%
IR Cumulative **	12000	165,267	613,392	375,805	107,495	134,330	50,112	29%	30	319,309	378,752	410,853	13%
FX Cumulative **	13000	746,655	2,015,672	1,325,948	326,231	347,181	220,096	25%	30	1,104,530	1,354,758	1,548,299	17%
Commodity Cumulative **	14000	340,903	1,038,080	705,616	194,578	272,395	144,578	28%	12	594,336	671,382	860,997	18%
CS Cumulative **	15000	179,139	410,236	285,859	70,323	80,298	46,612	25%	21	229,619	279,159	355,003	21%
CTP Cumulative **	16000								2				

[1] *STDev trunc* is the standard deviation computed excluding values below the *5th* and above the *95th* percentile

[2] Refers to the number of banks included in the computation of the statistics

*** For the aggregated portfolios (60 to 66), banks that reported at least a missing portfolio IMV among the ones composing the aggregate are not included in the computation of the benchmarks for that particular aggregate portfolio.*

Table 22: P&L VaR statistics

EU Statistics for PnL VaR

		Main statistics								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
Equity	1001	444,920	507,142	475,623	16,514	20,277	4,712	4%	20	467,756	483,386	484,991	2%
	1002	335,021	411,382	374,522	22,883	27,594	3,460	6%	17	347,453	381,930	385,229	5%
	1003	11,074	16,049	13,666	1,494	1,422	1,210	11%	20	12,378	13,474	14,975	9%
	1004	218	2,511	1,041	535	1,211	273	51%	19	731	1,002	1,358	30%
	1005	53,461,855	59,172,442	55,820,533	1,252,699	1,671,420	301,497	2%	18	55,584,857	55,914,264	56,318,742	1%
	1006	2,249	6,521	4,075	1,046	1,488	550	26%	19	3,187	4,466	4,819	20%
	1007	810	67,205	28,534	17,165	29,936	4,318	60%	16	21,160	22,380	31,832	20%
	1008	5,969	11,321	7,743	1,390	2,148	912	18%	16	6,730	7,677	8,547	12%
	1009	55,122	61,317	58,798	1,739	2,482	1,371	3%	17	57,807	59,179	60,354	2%
	1010	38,762	43,290	41,586	1,494	1,877	1,108	4%	18	40,452	41,753	42,868	3%
	1011	383,053	441,984	410,248	13,211	18,481	2,892	3%	19	407,735	409,920	413,130	1%
	1012	373,155	425,080	395,330	14,466	16,877	4,857	4%	19	384,188	398,221	402,128	2%
	1013	83,178	91,610	88,139	2,299	3,706	393	3%	17	87,687	87,984	89,121	1%
	1014	342,108	440,618	395,045	27,988	28,799	8,377	7%	20	384,309	396,685	406,984	3%
	1015	250,118	364,655	310,323	32,148	72,600	16,445	10%	17	296,416	309,406	326,377	5%
	1016	117	189,117	94,792	68,044	68,044	57,150	72%	7	27,109	84,259	159,640	71%
Interest Rate	2001	208,900	291,673	245,098	17,564	34,680	11,219	7%	24	234,898	246,644	254,322	4%
	2002	139,222	195,043	163,733	15,703	18,516	12,308	10%	25	151,214	164,316	175,250	7%
	2003	21,916	32,124	26,503	2,664	4,277	1,692	10%	26	24,826	26,428	28,120	6%
	2004	96,551	170,670	132,580	16,469	21,072	4,049	12%	26	125,695	128,529	140,496	6%
	2005	9,882	64,167	33,745	15,748	18,739	10,665	47%	12	22,294	33,052	42,396	31%
	2006	31,372	77,144	51,723	14,404	13,608	9,216	28%	23	34,930	56,903	64,035	29%
	2007	75,171	195,822	131,438	34,465	34,211	20,156	26%	22	100,831	140,599	153,554	21%
	2008	76,037	186,478	129,005	30,520	32,053	14,849	24%	21	98,752	134,600	148,820	20%
	2009	201,165	277,898	243,639	21,336	26,016	19,121	9%	26	226,938	244,950	265,385	8%
	2010	197,575	262,336	221,758	15,196	30,648	9,604	7%	24	211,492	223,165	230,029	4%
	2011	509,581	656,906	569,717	45,267	44,538	42,618	8%	28	527,569	575,989	603,733	7%
	2012	99,883	257,862	165,051	34,662	93,607	10,863	21%	22	147,835	162,911	169,375	7%
	2013	47,199	82,301	65,485	8,615	10,365	3,059	13%	24	63,958	67,372	70,029	5%
	2014	22,365	77,433	50,522	15,663	15,663	8,846	31%	19	38,596	46,498	66,341	26%
	2015	1,895	25,970	7,337	5,759	11,049	2,408	79%	23	3,159	5,988	8,968	48%
	2016	130,757	234,061	174,914	26,295	27,550	14,805	15%	22	157,476	180,519	189,814	9%
	2017	18,676	218,331	39,062	41,616	97,193	2,610	107%	23	23,904	26,755	31,104	13%
	2018	24,773	38,309	29,920	3,703	4,569	2,462	12%	23	26,878	29,567	31,960	9%
	2019	12,399	19,163	16,274	1,755	2,731	1,353	11%	23	15,382	16,193	17,567	7%
	2020	28,666	64,602	41,443	8,251	13,148	2,512	20%	26	37,333	39,238	42,468	6%
	2021	46,984	94,871	69,615	13,009	13,137	11,065	19%	22	56,567	69,279	79,620	17%
	2022	338,512	473,121	402,532	37,497	59,983	21,117	9%	19	371,356	407,331	426,438	7%
	2023	89,202	417,939	242,564	79,067	82,993	23,633	33%	24	172,758	252,580	283,348	24%
FX	3001	558,757	839,621	723,945	72,531	87,210	47,521	10%	24	688,403	703,164	764,900	5%
	3002	137,610	246,950	192,238	28,053	51,558	18,613	15%	24	175,344	191,432	211,961	9%
	3003	165,035	234,692	193,957	20,979	29,004	14,411	11%	24	176,838	190,257	212,240	9%
	3004	513,456	685,257	588,132	49,274	49,274	33,797	8%	24	532,152	595,385	618,489	8%
	3005	310,596	447,896	360,991	39,604	46,981	27,900	11%	23	326,701	354,064	389,414	9%
	3006	10,850	32,287	15,575	5,200	16,896	1,733	33%	25	12,614	14,239	16,002	12%
	3007	653,640	831,943	750,860	49,657	53,633	35,145	7%	18	723,955	744,342	792,765	5%
Commodities	4001	15,543	37,763	26,492	8,024	9,296	8,001	30%	10	23,040	24,090	34,824	20%
	4002	425,203	743,651	563,098	102,593	102,593	57,776	18%	10	490,624	548,085	606,177	11%
	4003	570,952	641,218	596,661	23,974	143,285	12,016	4%	7	571,038	592,155	605,086	3%
	4004	441,974	611,939	496,517	51,352	160,514	21,522	10%	8	469,530	479,654	505,858	4%
Credit Spread	5001	7,969	18,021	13,223	3,064	6,718	2,387	23%	18	11,130	14,765	15,930	18%
	5002	28,989	52,254	37,899	7,227	7,227	6,789	19%	15	30,216	38,224	44,789	19%
	5003	3,611	7,371	5,644	965	1,087	705	17%	17	5,075	5,525	6,251	10%
	5004	13,911	22,700	18,793	3,177	3,601	1,836	17%	14	14,939	19,894	21,517	18%
	5005	5,081	10,575	7,785	1,862	2,391	1,821	24%	16	5,919	7,959	9,247	22%
	5006	1,606	13,968	8,972	3,119	5,613	2,166	35%	18	6,552	9,653	11,537	28%
	5007	32,948	84,478	51,787	16,743	35,173	14,057	32%	15	36,025	52,734	64,137	28%
	5008	50,618	100,585	73,488	15,626	14,656	13,405	21%	20	60,405	72,615	86,856	18%
	5009	14,647	26,721	19,083	4,363	4,632	2,550	23%	19	15,618	17,722	23,695	21%
	5010	22,600	38,798	27,749	4,954	6,505	2,903	18%	18	23,744	25,872	29,985	12%
	5011	13,469	28,530	17,559	3,647	6,512	2,195	21%	17	14,711	17,361	19,720	15%
	5012	1,466	7,191	2,616	1,421	3,535	577	54%	17	1,600	2,306	3,133	32%
	5013	15,194	28,302	20,727	3,865	6,780	2,687	19%	18	17,082	21,263	22,876	15%
	5014	4,073	8,174	5,680	958	1,352	528	17%	16	4,885	5,762	6,137	11%
	5015	22,528	37,073	26,695	4,428	5,706	2,099	17%	17	23,439	25,815	28,503	10%
	5016	14,758	55,321	26,017	12,718	17,105	4,227	49%	12	18,043	22,435	26,085	18%
	5017	17,516	62,394	28,748	11,941	19,213	2,992	42%	11	23,001	27,104	28,234	10%
	5018	31,001	73,419	50,272	12,349	27,067	4,637	25%	12	43,437	47,533	57,162	14%
	5019	8,894	26,541	13,110	4,033	8,444	1,348	31%	16	10,773	13,481	13,781	12%
	5020	170,791	205,937	186,375	9,861	12,954	5,985	5%	17	180,159	187,118	192,131	3%
	5021	25,045	53,354	34,131	9,412	12,888	4,321	28%	15	26,584	32,041	38,519	18%
	5022	167,249	220,914	184,677	14,535	21,511	5,437	8%	15	174,950	182,341	185,483	3%
	5023	35,074	208,068	111,470	61,947	61,947	60,004	56%	10	52,940	110,622	172,947	53%
	5024	26,517	86,955	49,681	17,124	22,052	7,370	35%	16	39,436	46,210	57,889	19%
	5025	46,169	88,217	66,409	9,962	11,947	6,277	15%	15	60,564	66,302	73,053	9%
	5026	26,367	46,186	33,835	5,471	8,982	2,562	16%	16	29,520	33,586	35,645	9%
	5027	4,780	29,217	17,574	5,730	8,826	2,363	33%	16	14,687	16,611	20,569	17%
CTP	6001								2				
	6002								2				
	6003								2				
	6004								2				
	6005								2				
ALL-IN no-CTP **	10000	747,123	1,246,011	949,805	172,189	172,189	113,857	18%	8	814,379	928,236	1,060,039	13%
Equity Cumulative **	11000	236,857	341,202	288,516	25,110	33,858	12,268	9%	15	275,488	288,176	306,007	5%
IR Cumulative **	12000	332,064	514,246	388,508	46,063	90,394	20,476	12%	18	358,852	368,328	408,762	7%
FX Cumulative **	13000	570,880	1,060,027	798,535	143,238	137,528	103,939	18%	23	696,770	794,051	897,847	13%
Commodity Cumulative **	14000	425,137	758,668	575,564	107,871	107,871	69,918	19%	9	508,681	578,599	612,747	9%
CS Cumulative **	15000	213,340	277,204	239,332	21,531	28,505	14,612	9%	16	221,027	233,911	257,908	8%
CTP Cumulative **	16000												

[1] *STDev trunc* is the standard deviation computed excluding values below the *5th* and above the *95th* percentile

[2] Refers to the number of banks included in the computation of the statistics

*** For the aggregated portfolios (60 to 66), banks that reported at least a missing portfolio IMV among the ones composing the aggregate are not included in the computation of the benchmarks for that particular aggregate portfolio.*

Table 23: Empirical expected shortfall statistics

EU Statistics for empirical expected shortfall

		Main statistics								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
Equity	1001	446,135	503,194	479,723	15,434	18,480	7,340	3%	20	471,654	479,200	487,532	2%
	1002	348,314	412,620	388,516	21,529	26,514	5,259	6%	18	367,817	396,990	406,448	5%
	1003	11,264	15,826	13,667	1,419	1,361	906	10%	20	12,477	13,879	14,611	8%
	1004	216	2,386	1,122	577	1,441	221	52%	19	794	1,175	1,252	22%
	1005	50,990,932	58,238,682	54,685,991	1,688,406	1,937,922	467,312	3%	19	54,330,757	54,856,646	55,077,655	1%
	1006	2,283	6,185	4,284	1,221	1,454	1,078	29%	19	3,150	4,539	5,213	25%
	1007	752	69,271	29,371	17,328	29,052	4,315	59%	16	21,747	23,627	31,995	19%
	1008	5,742	9,552	7,526	1,198	2,098	927	16%	16	6,762	7,450	8,701	13%
	1009	58,277	65,509	61,853	1,838	2,020	1,135	3%	19	60,360	62,092	63,051	2%
	1010	39,142	45,369	42,780	2,253	2,504	1,564	5%	18	40,548	43,613	44,708	5%
	1011	401,948	460,313	438,035	15,572	20,004	8,727	4%	18	423,145	439,415	448,979	3%
	1012	379,348	443,636	413,547	17,017	19,423	9,089	4%	18	398,940	413,861	423,060	3%
	1013	84,629	88,967	87,168	1,225	1,398	954	1%	18	86,316	86,951	88,247	1%
	1014	337,183	421,718	387,782	26,625	29,038	19,383	7%	20	371,750	389,916	411,317	5%
	1015	241,477	342,892	301,428	27,819	69,425	16,922	9%	17	294,836	301,051	322,996	5%
	1016	115	188,260	95,565	67,715	67,715	59,792	71%	7	27,341	87,133	160,887	71%
Interest Rate	2001	167,153	295,266	239,235	24,541	37,689	5,977	10%	26	232,044	237,986	243,997	3%
	2002	133,920	178,144	156,820	11,702	18,598	6,463	8%	25	149,872	156,663	163,843	4%
	2003	22,576	30,021	26,169	1,947	3,816	1,299	7%	26	24,758	26,780	27,693	6%
	2004	118,826	177,443	148,728	12,050	18,640	3,626	8%	26	144,608	148,800	151,861	2%
	2005	9,298	63,789	33,339	15,616	17,959	10,924	47%	12	22,007	30,084	43,156	32%
	2006	31,333	79,732	51,618	14,036	12,925	9,403	27%	23	35,282	55,416	60,920	27%
	2007	76,561	189,226	129,834	29,349	30,403	12,610	23%	21	101,510	135,441	149,184	19%
	2008	75,261	166,208	121,210	24,879	26,855	11,238	21%	21	98,343	121,867	138,300	17%
	2009	212,269	270,848	234,936	13,969	25,016	6,148	6%	27	223,811	233,903	239,361	3%
	2010	149,638	266,179	215,615	22,109	33,827	5,042	10%	26	208,635	214,689	218,719	2%
	2011	490,050	641,962	537,713	40,768	49,153	28,895	8%	27	502,977	546,347	571,134	6%
	2012	98,633	336,794	173,482	48,405	91,049	9,284	28%	23	148,860	162,943	178,817	9%
	2013	52,636	75,408	64,141	5,624	9,731	3,007	9%	23	61,252	64,639	67,550	5%
	2014	21,504	79,421	49,814	15,401	16,928	7,724	31%	18	39,939	46,802	65,788	24%
	2015	1,780	14,354	6,639	3,845	12,090	2,352	58%	22	3,388	6,312	8,917	45%
	2016	126,539	203,709	165,044	21,754	27,859	12,054	13%	21	158,359	175,263	180,943	7%
	2017	18,993	193,593	37,421	37,723	98,198	2,906	101%	23	22,398	25,405	32,693	19%
	2018	22,685	38,319	29,642	3,918	4,760	777	13%	24	27,773	28,997	29,636	3%
	2019	11,117	17,181	14,850	1,348	2,235	684	9%	24	14,294	14,927	15,729	5%
	2020	29,975	74,499	40,793	9,326	18,583	2,013	23%	24	36,555	38,315	42,069	7%
	2021	48,581	81,505	65,524	10,087	12,016	7,286	15%	20	56,275	68,187	72,294	12%
	2022	340,135	456,800	386,467	35,833	55,482	27,120	9%	19	354,476	372,759	413,899	8%
	2023	86,228	392,543	222,872	84,391	81,409	36,027	38%	26	159,236	245,719	274,462	27%
FX	3001	598,179	720,082	675,536	30,625	47,505	13,586	5%	23	663,602	674,223	691,230	2%
	3002	135,233	238,653	187,096	25,249	45,921	15,203	14%	24	171,819	193,139	204,925	9%
	3003	163,299	223,887	193,360	19,399	27,924	11,659	10%	24	179,620	187,452	213,125	9%
	3004	514,869	627,570	573,731	27,033	36,457	15,599	5%	21	549,434	577,084	587,626	3%
	3005	303,715	431,997	359,096	33,144	38,705	17,668	9%	24	339,496	358,183	373,915	5%
	3006	10,887	35,276	16,915	7,533	17,581	1,514	45%	25	12,323	13,856	16,183	14%
	3007	692,815	838,131	764,187	43,298	43,298	32,219	6%	19	729,804	759,793	796,899	4%
Commodities	4001	13,353	43,303	27,366	9,408	9,408	4,917	34%	11	21,154	26,071	36,288	26%
	4002	415,347	623,313	540,950	68,464	106,453	62,655	13%	9	513,954	559,244	599,748	8%
	4003	607,089	717,295	652,826	41,784	166,181	36,931	6%	7	607,839	636,741	695,484	7%
	4004	467,686	536,912	488,844	22,830	150,690	11,215	5%	8	472,981	477,807	499,396	3%
Credit Spread	5001	8,064	16,683	12,966	2,836	5,367	2,311	22%	18	10,955	13,551	15,839	18%
	5002	27,640	39,612	34,005	4,198	5,404	3,803	12%	14	29,699	36,460	37,145	11%
	5003	3,593	6,780	5,323	950	950	769	18%	18	4,634	5,143	6,231	15%
	5004	12,896	22,314	17,734	2,906	3,122	1,577	16%	14	14,812	18,636	19,902	15%
	5005	3,074	10,601	7,255	1,969	2,240	1,572	27%	17	5,801	7,503	8,448	19%
	5006	1,601	14,915	9,267	3,187	5,140	1,735	34%	18	7,051	10,618	11,253	23%
	5007	30,255	77,077	50,896	16,752	28,318	16,700	33%	15	34,057	51,238	68,429	34%
	5008	55,904	88,330	66,926	9,899	12,950	5,976	15%	17	59,305	64,421	75,862	12%
	5009	14,789	26,257	18,619	3,497	4,425	1,631	19%	18	15,975	17,522	21,078	14%
	5010	23,492	38,669	27,513	4,383	6,298	2,295	16%	18	23,945	27,320	29,266	10%
	5011	14,220	28,106	17,356	3,533	6,140	2,218	20%	17	14,596	17,189	18,900	13%
	5012	1,542	6,831	2,464	1,289	3,408	483	52%	17	1,656	2,171	2,695	24%
	5013	15,047	32,959	20,522	4,272	6,600	1,755	21%	18	18,176	20,812	21,991	9%
	5014	3,840	7,977	5,625	896	1,311	407	16%	16	5,061	5,495	6,053	9%
	5015	22,192	33,006	25,595	3,057	5,074	1,949	12%	16	23,385	25,300	27,336	8%
	5016	14,851	52,516	23,920	10,187	17,931	2,335	43%	11	17,753	21,840	24,017	15%
	5017	17,821	58,916	28,628	10,775	18,407	2,070	38%	11	23,774	26,072	29,853	11%
	5018	30,011	77,485	50,932	13,754	26,539	3,618	27%	12	44,059	47,455	55,826	12%
	5019	9,796	24,861	13,198	3,537	7,048	1,266	27%	16	10,639	13,669	14,068	14%
	5020	169,853	201,305	181,638	8,326	14,049	5,191	5%	16	174,817	181,539	185,806	3%
	5021	25,335	59,897	33,770	9,261	14,814	4,287	27%	15	26,997	32,587	39,471	19%
	5022	139,307	185,267	174,232	10,971	20,743	2,942	6%	14	172,826	176,360	180,398	2%
	5023	35,240	189,714	108,071	58,580	58,580	54,372	54%	10	52,181	108,705	160,926	51%
	5024	26,733	89,873	48,482	16,517	22,620	7,617	34%	16	37,322	46,136	55,540	20%
	5025	45,413	86,935	65,773	9,745	13,701	6,671	15%	15	59,375	67,725	71,631	9%
	5026	26,244	45,546	33,448	4,637	8,178	3,077	14%	16	30,316	33,401	35,874	8%
	5027	5,347	27,346	17,240	5,163	8,170	2,025	30%	16	14,758	16,405	19,648	14%
CTP	6001								2				
	6002								2				
	6003								2				
	6004								2				
	6005								2				
ALL-IN no-CTP **	10000	774,959	1,117,522	929,541	109,225	109,225	71,221	12%	8	850,473	926,138	995,314	8%
Equity Cumulative **	11000	247,967	322,680	291,031	18,831	27,110	7,662	7%	15	287,004	294,517	301,943	3%
IR Cumulative **	12000	299,893	467,571	354,071	40,316	82,023	13,852	11%	17	332,996	336,622	357,829	4%
FX Cumulative **	13000	567,946	1,029,140	784,085	129,859	123,857	98,669	17%	23	684,435	803,902	860,337	11%
Commodity Cumulative **	14000	419,005	632,763	547,444	72,648	111,967	44,805	13%	8	498,818	588,391	602,700	9%
CS Cumulative **	15000	212,622	258,296	228,679	12,872	24,186	6,882	6%	15	218,615	225,497	233,906	3%
CTP Cumulative **	16000								2				

[1] *STDev trunc* is the standard deviation computed excluding values below the *5th* and above the *95th* percentile

[2] Refers to the number of banks included in the computation of the statistics

*** For the aggregated portfolios (60 to 66), banks that reported at least a missing portfolio IMV among the ones composing the aggregate are not included in the computation of the benchmarks for that particular aggregate portfolio.*

Table 24: sVaR/VaR statistics

EU Statistics for sVaR/VaR

		Main statistics								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
Equity	1001	0.60	2.29	1.73	0.36			21%	30	1.69	1.77	1.90	6%
	1002	1.17	4.32	2.97	0.74			25%	23	2.67	3.04	3.34	11%
	1003	0.97	2.35	1.58	0.39			25%	25	1.34	1.48	1.87	16%
	1004	0.33	5.21	1.78	1.17			65%	22	1.12	1.41	2.18	32%
	1005	0.70	3.68	2.16	0.74			34%	24	1.74	2.38	2.59	20%
	1006	0.69	4.62	1.51	0.78			51%	23	1.06	1.31	1.63	21%
	1007	0.54	4.53	2.09	1.10			53%	21	1.35	1.89	2.38	28%
	1008	0.79	2.83	1.50	0.47			31%	21	1.21	1.35	1.58	13%
	1009	0.83	3.08	1.74	0.46			27%	24	1.57	1.69	1.79	7%
	1010	1.10	5.22	2.63	0.85			32%	26	2.13	2.53	3.16	19%
	1011	0.79	2.21	1.70	0.31			18%	27	1.59	1.72	1.89	9%
	1012	0.77	2.24	1.71	0.31			18%	28	1.63	1.73	1.85	7%
	1013	0.36	2.68	1.33	0.51			38%	29	1.06	1.33	1.49	17%
	1014	0.88	2.68	1.68	0.34			20%	26	1.50	1.68	1.80	9%
	1015	0.95	2.23	1.71	0.29			17%	19	1.51	1.86	1.88	11%
	1016	0.85	3.80	1.69	0.88			52%	9	1.19	1.32	1.68	17%
Interest Rate	2001	0.43	1.67	0.83	0.23			28%	36	0.70	0.84	0.96	16%
	2002	0.41	1.71	0.84	0.25			30%	38	0.69	0.80	0.94	15%
	2003	0.39	2.64	1.23	0.42			34%	38	1.13	1.26	1.45	13%
	2004	0.10	2.45	0.76	0.41			54%	35	0.52	0.77	0.93	28%
	2005	0.80	5.12	2.42	1.11			46%	13	1.91	1.99	3.25	26%
	2006	0.34	1.48	0.99	0.23			24%	30	0.91	1.00	1.11	10%
	2007	0.53	1.40	0.86	0.18			21%	28	0.73	0.83	0.96	14%
	2008	0.44	2.63	0.97	0.54			55%	28	0.65	0.80	1.07	24%
	2009	0.49	2.02	1.04	0.33			32%	35	0.84	0.99	1.20	18%
	2010	0.36	1.67	0.82	0.25			31%	38	0.69	0.82	0.96	16%
	2011	0.45	2.14	0.84	0.31			37%	40	0.67	0.81	0.91	15%
	2012	0.26	1.38	0.84	0.30			36%	35	0.60	0.83	1.03	27%
	2013	0.28	1.32	0.78	0.25			32%	32	0.60	0.79	0.95	23%
	2014	0.50	6.22	2.18	1.38			64%	26	1.23	1.67	3.02	42%
	2015	0.37	11.36	3.22	2.19			68%	31	2.03	2.85	4.02	33%
	2016	0.36	1.41	0.68	0.23			33%	24	0.55	0.61	0.70	12%
	2017	0.02	12.82	5.92	3.04			51%	25	3.39	5.76	7.92	40%
	2018	0.33	2.04	0.81	0.36			44%	34	0.64	0.68	0.83	13%
	2019	0.55	4.33	1.46	0.91			63%	33	0.94	1.14	1.45	21%
	2020	0.16	7.20	2.81	1.88			67%	34	1.59	2.25	3.73	40%
	2021	0.40	2.23	0.89	0.50			55%	32	0.60	0.69	0.89	20%
	2022	0.37	1.58	0.78	0.30			38%	29	0.60	0.74	0.79	14%
	2023	0.41	1.62	0.84	0.26			31%	36	0.63	0.84	0.98	22%
FX	3001	0.52	2.44	1.36	0.42			31%	32	1.13	1.36	1.61	18%
	3002	0.79	2.26	1.50	0.37			25%	28	1.19	1.48	1.71	18%
	3003	0.76	2.17	1.58	0.33			21%	31	1.50	1.63	1.76	8%
	3004	0.87	2.75	1.74	0.37			21%	29	1.66	1.75	1.86	6%
	3005	0.93	4.85	2.39	0.87			36%	33	1.83	2.37	2.82	21%
	3006	0.21	35.01	3.55	5.91			167%	36	1.41	1.96	3.12	38%
	3007	0.75	2.75	1.78	0.50			28%	26	1.44	1.87	2.01	16%
Commodities	4001	0.35	3.41	1.66	0.85			51%	14	1.06	1.63	2.16	34%
	4002	0.75	3.69	1.57	0.77			49%	12	1.10	1.41	1.76	23%
	4003	1.54	3.08	2.22	0.58			26%	10	1.69	2.09	2.76	24%
	4004	1.30	4.40	2.25	0.71			32%	12	1.97	2.12	2.30	8%
Credit Spread	5001	0.92	4.48	1.86	1.04			56%	21	1.19	1.25	2.31	32%
	5002	0.67	4.89	2.86	1.35			47%	19	1.84	2.85	4.11	38%
	5003	1.10	4.09	2.17	0.72			33%	23	1.70	2.22	2.41	17%
	5004	0.73	4.59	2.40	1.04			43%	17	1.90	2.09	3.20	26%
	5005	0.79	5.80	2.70	1.39			51%	22	1.76	2.41	3.78	37%
	5006	1.30	7.61	2.85	1.36			48%	22	1.76	2.76	3.48	33%
	5007	0.31	3.18	1.47	0.72			49%	18	1.03	1.39	1.80	27%
	5008	0.37	2.38	1.06	0.44			41%	25	0.78	0.96	1.33	26%
	5009	0.49	1.78	1.05	0.35			33%	24	0.75	1.02	1.29	27%
	5010	0.48	2.91	1.27	0.59			46%	21	0.86	1.18	1.57	29%
	5011	0.45	2.91	1.26	0.58			46%	22	0.95	1.13	1.41	20%
	5012	1.17	5.43	3.17	1.37			43%	19	2.14	2.75	4.21	33%
	5013	0.63	3.30	1.77	0.70			40%	22	1.36	1.61	2.09	21%
	5014	0.95	9.31	2.92	2.31			79%	20	1.21	2.04	3.39	47%
	5015	0.64	2.84	1.06	0.47			45%	21	0.79	0.93	1.09	16%
	5016	0.65	2.21	1.46	0.44			30%	16	1.17	1.35	1.87	23%
	5017	0.74	3.40	1.70	0.77			45%	17	1.16	1.49	1.93	25%
	5018	0.85	2.85	1.71	0.63			37%	15	1.22	1.62	2.01	24%
	5019	0.99	3.95	1.64	0.68			42%	20	1.27	1.50	1.67	14%
	5020	0.71	2.54	1.10	0.38			35%	25	0.86	1.04	1.20	17%
	5021	1.05	14.19	4.49	3.70			83%	19	1.96	3.29	5.20	45%
	5022	0.78	2.57	1.38	0.53			38%	17	1.08	1.21	1.45	15%
	5023	1.09	8.04	2.79	1.88			67%	10	1.87	1.95	2.94	22%
	5024	0.79	4.01	1.77	0.77			44%	20	1.21	1.80	2.07	26%
	5025	0.78	3.76	1.74	0.70			40%	19	1.32	1.65	1.87	17%
	5026	0.53	2.28	1.18	0.42			35%	21	0.89	1.17	1.44	24%
	5027	0.58	10.41	1.87	2.07			110%	20	0.97	1.21	1.77	29%
CTP	6001												
	6002												
	6003								2				
	6004								3				
	6005								3				
ALL-IN no-CTP **	10000	1.09	2.34	1.61	0.31			19%	11	1.48	1.50	1.70	7%
Equity Cumulative **	11000	0.80	3.39	1.93	0.57			30%	21	1.75	1.81	2.35	15%
IR Cumulative **	12000	0.60	1.83	1.12	0.28			25%	28	0.92	1.08	1.34	18%
FX Cumulative **	13000	0.45	2.51	1.69	0.46			27%	31	1.45	1.82	1.95	15%
Commodity Cumulative **	14000	0.75	3.63	1.58	0.73			46%	13	1.11	1.49	1.83	24%
CS Cumulative **	15000	0.65	2.44	1.24	0.48			39%	23	0.90	1.11	1.38	21%
CTP Cumulative **	16000								1				

[1] *STDev trunc* is the standard deviation computed excluding values below the *5th* and above the *95th* percentile

[2] Refers to the number of banks included in the computation of the statistics

*** For the aggregated portfolios (60 to 66), banks that reported at least a missing portfolio IMV among the ones composing the aggregate are not included in the computation of the benchmarks for that particular aggregate portfolio.*

Table 25: P&L VaR/VaR statistics

EU Statistics for P&L VaR/VaR

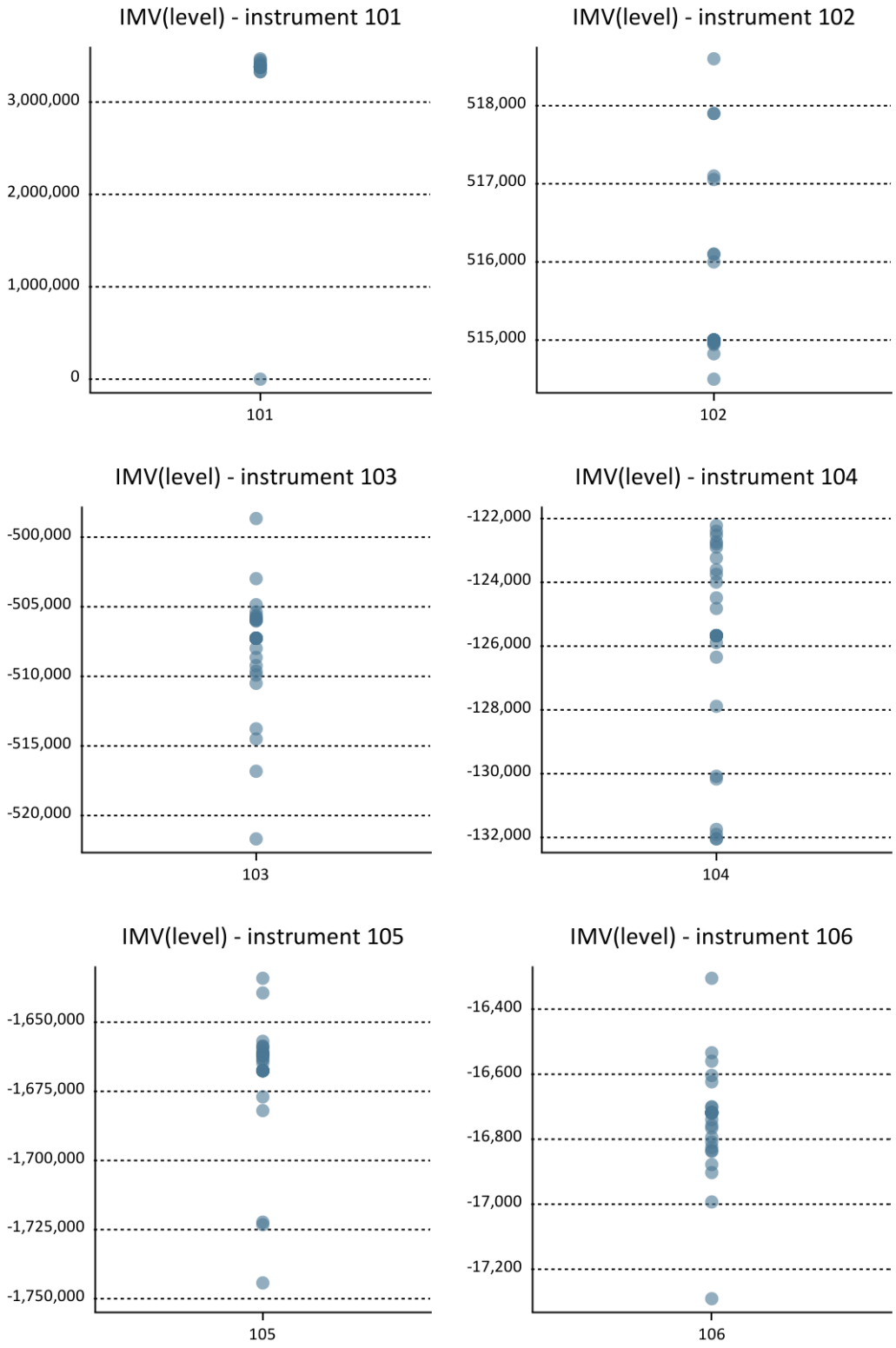
		Main statistics								Percentiles		
	Port. ID	Min	Max	Ave.	STDev	STDev_trunc[1]	MAD (median absolute deviation)	Coefficient of variation (STDev/Mean)	Num obs.[2]	25th	50th	75th
Equity	1001	0.82	1.21	1.01	0.10			10%	21	0.98	1.03	1.07
	1002	0.87	1.21	1.03	0.09			9%	19	0.99	1.06	1.10
	1003	0.67	1.36	0.97	0.12			13%	20	0.94	0.98	1.02
	1004	0.09	2.50	1.03	0.51			49%	18	0.80	1.09	1.24
	1005	0.85	1.25	1.02	0.08			8%	20	0.98	1.01	1.03
	1006	0.21	1.45	0.89	0.27			31%	19	0.78	0.94	1.04
	1007	0.98	1.89	1.22	0.27			22%	13	1.06	1.10	1.16
	1008	0.27	1.53	0.99	0.29			30%	16	0.83	1.02	1.14
	1009	0.73	1.30	1.02	0.16			15%	20	0.99	1.02	1.10
	1010	0.48	1.32	1.01	0.16			15%	19	0.96	1.03	1.08
	1011	0.87	1.23	1.06	0.10			10%	19	0.99	1.05	1.15
	1012	0.89	1.19	1.05	0.09			9%	19	0.99	1.06	1.14
	1013	0.63	1.39	1.05	0.20			19%	20	1.00	1.09	1.18
	1014	0.75	1.11	0.95	0.11			11%	19	0.88	0.99	1.04
	1015	0.73	10.12	1.51	2.23			147%	16	0.85	0.99	1.02
	1016	0.82	8.24	2.30	2.67			116%	6	0.91	1.18	1.45
Interest Rate	2001	0.79	1.45	1.06	0.14			13%	22	1.01	1.02	1.04
	2002	0.78	1.22	1.04	0.12			11%	25	0.95	1.07	1.12
	2003	0.32	1.20	1.00	0.17			17%	23	1.01	1.03	1.09
	2004	0.66	1.71	1.22	0.29			23%	26	1.01	1.30	1.40
	2005	0.91	1.74	1.14	0.21			18%	13	1.01	1.08	1.18
	2006	0.77	1.14	0.99	0.09			9%	21	0.98	1.01	1.04
	2007	0.73	1.55	1.01	0.16			16%	19	0.92	1.01	1.04
	2008	0.75	1.37	1.00	0.15			15%	21	0.89	1.01	1.03
	2009	0.73	1.15	0.98	0.13			14%	24	0.85	1.02	1.09
	2010	0.79	1.49	1.06	0.15			14%	22	1.01	1.02	1.05
	2011	0.71	1.07	0.92	0.13			15%	24	0.76	0.99	1.04
	2012	0.92	1.60	1.10	0.23			21%	21	0.95	0.97	1.30
	2013	0.77	1.66	1.12	0.21			19%	24	1.01	1.09	1.18
	2014	0.57	1.55	1.01	0.22			22%	16	0.91	1.02	1.12
	2015	0.22	1.15	0.89	0.25			28%	23	0.78	1.03	1.05
	2016	0.86	1.22	1.07	0.08			7%	17	1.03	1.07	1.11
	2017	0.00	1.36	0.98	0.28			28%	23	1.02	1.05	1.08
	2018	0.17	1.24	1.01	0.21			21%	23	0.99	1.05	1.12
	2019	0.55	1.37	0.98	0.18			18%	23	0.88	1.03	1.06
	2020	0.52	1.61	1.08	0.22			20%	23	1.02	1.06	1.17
	2021	0.78	1.22	1.00	0.11			11%	21	0.97	1.01	1.04
	2022	0.83	1.25	1.00	0.10			10%	19	0.95	1.01	1.05
	2023	0.67	1.56	1.03	0.19			19%	24	0.90	1.05	1.09
FX	3001	0.63	1.26	0.94	0.17			19%	25	0.80	1.01	1.02
	3002	0.35	1.20	0.93	0.19			21%	23	0.77	1.01	1.05
	3003	0.69	1.13	0.97	0.10			10%	24	0.93	1.00	1.02
	3004	0.81	1.11	0.99	0.08			8%	22	0.93	1.02	1.04
	3005	0.73	1.51	1.03	0.17			16%	25	0.95	1.01	1.05
	3006	0.51	1.76	0.95	0.25			26%	24	0.83	1.00	1.04
	3007	0.98	1.18	1.06	0.06			6%	15	1.01	1.05	1.10
Commodities	4001	0.57	1.30	0.96	0.25			26%	10	0.70	1.06	1.11
	4002	0.56	1.13	0.87	0.22			26%	10	0.61	0.98	1.06
	4003	0.82	1.27	1.02	0.16			15%	8	0.86	1.02	1.16
	4004	0.74	1.04	0.94	0.12			13%	8	0.90	1.01	1.02
Credit Spread	5001	0.86	1.33	1.05	0.10			9%	17	1.02	1.03	1.05
	5002	0.74	1.07	0.96	0.11			11%	15	0.87	1.02	1.04
	5003	0.76	2.54	1.26	0.44			35%	20	1.06	1.10	1.24
	5004	0.65	1.07	0.93	0.15			16%	15	0.81	1.01	1.05
	5005	0.95	2.52	1.23	0.44			36%	17	1.03	1.03	1.06
	5006	0.92	10.11	1.82	2.14			117%	17	1.06	1.12	1.30
	5007	0.77	1.20	1.04	0.12			11%	15	0.98	1.06	1.13
	5008	0.85	8.31	1.47	1.58			108%	20	1.04	1.07	1.19
	5009	0.79	1.59	1.10	0.19			17%	19	1.01	1.03	1.18
	5010	0.84	1.55	1.15	0.17			15%	18	1.04	1.08	1.23
	5011	1.00	1.29	1.11	0.10			9%	18	1.02	1.06	1.21
	5012	0.93	1.98	1.17	0.27			23%	14	1.02	1.05	1.23
	5013	0.81	1.31	1.05	0.12			11%	17	0.98	1.04	1.11
	5014	0.84	3.68	1.23	0.66			54%	15	1.02	1.05	1.09
	5015	0.86	1.31	1.08	0.11			10%	16	1.01	1.09	1.13
	5016	0.54	1.94	1.03	0.32			31%	12	0.91	1.03	1.06
	5017	0.56	1.81	1.01	0.31			31%	12	0.90	1.06	1.08
	5018	0.56	1.62	0.99	0.26			26%	12	0.91	1.01	1.07
	5019	0.55	1.23	0.97	0.18			19%	16	0.89	1.02	1.09
	5020	1.00	1.25	1.08	0.07			7%	18	1.03	1.06	1.13
	5021	0.47	1.12	0.92	0.20			22%	15	0.82	1.01	1.07
	5022	0.97	1.22	1.05	0.06			6%	14	1.02	1.04	1.07
	5023	0.66	1.19	0.98	0.15			15%	9	0.97	0.99	1.02
	5024	0.90	1.68	1.12	0.20			18%	16	1.01	1.05	1.14
	5025	0.79	1.37	1.03	0.15			15%	15	0.95	1.03	1.07
	5026	0.82	1.57	1.09	0.17			16%	16	1.02	1.06	1.11
	5027	0.61	1.50	1.06	0.22			21%	17	1.00	1.03	1.08
CTP	6001											
	6002											
	6003											
	6004											
	6005											
ALL-IN no-CTP **	10000	0.71	1.09	0.93	0.14			15%	7	0.83	1.01	1.04
Equity Cumulative **	11000	0.78	1.27	1.05	0.13			12%	15	0.98	1.04	1.12
IR Cumulative **	12000	0.77	3.43	1.10	0.58			53%	18	0.86	1.03	1.06
FX Cumulative **	13000	0.65	1.31	0.98	0.17			17%	23	0.84	1.01	1.08
Commodity Cumulative **	14000	0.57	1.13	0.85	0.22			25%	9	0.63	0.92	1.04
CS Cumulative **	15000	1.01	1.33	1.08	0.10			9%	14	1.02	1.03	1.06
CTP Cumulative **	16000											

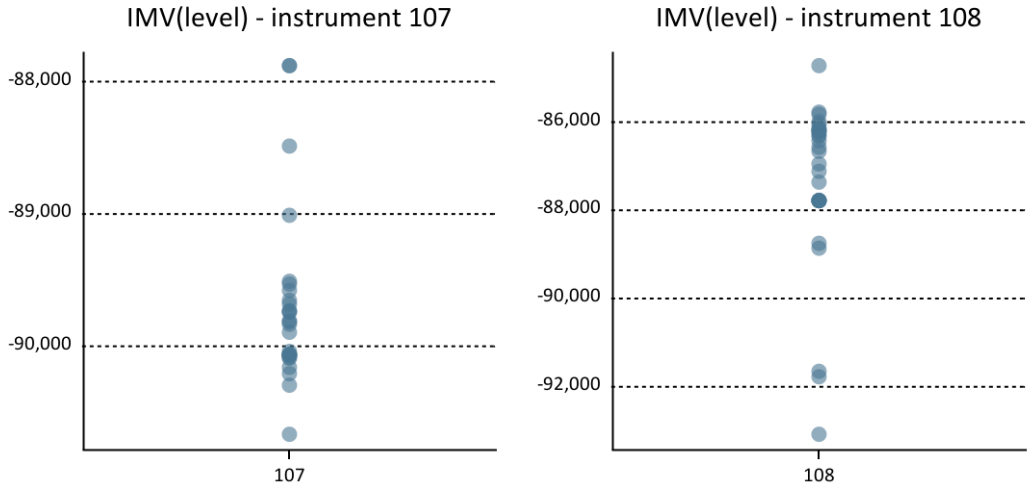
[1] *STDev trunc* is the standard deviation computed excluding values below the *5th* and above the *95th* percentile

[2] Refers to the number of banks included in the computation of the statistics

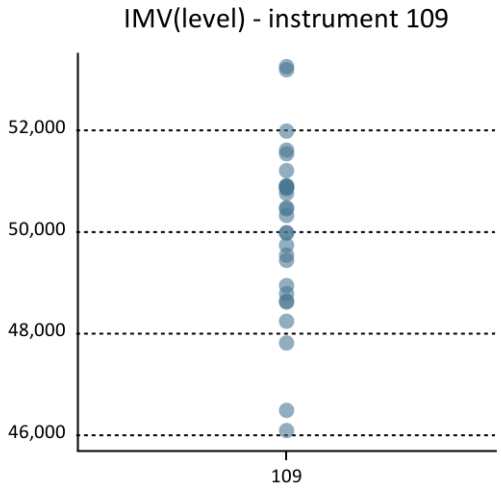
*** For the aggregated portfolios (60 to 66), banks that reported at least a missing portfolio IMV among the ones composing the aggregate are not included in the computation of the benchmarks for that particular aggregate portfolio.*

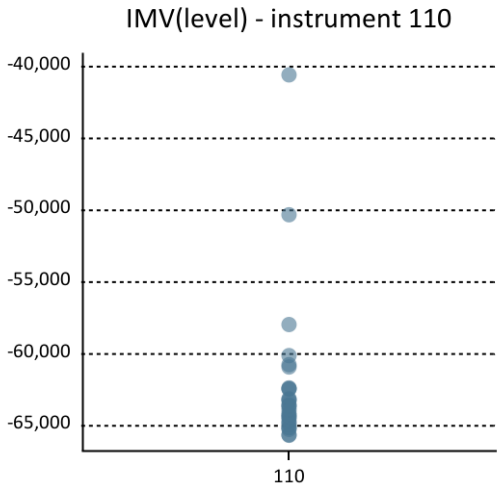
Figure 32: IMV scatter plots (all)

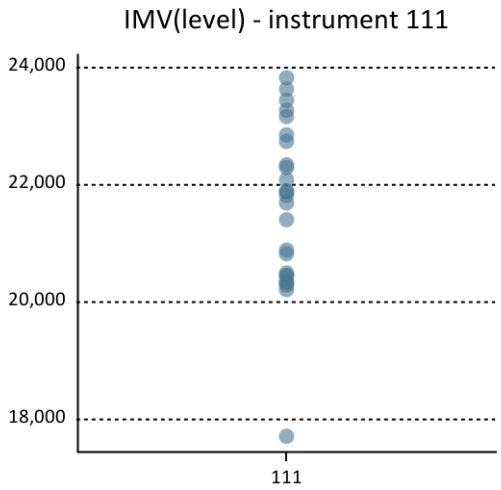


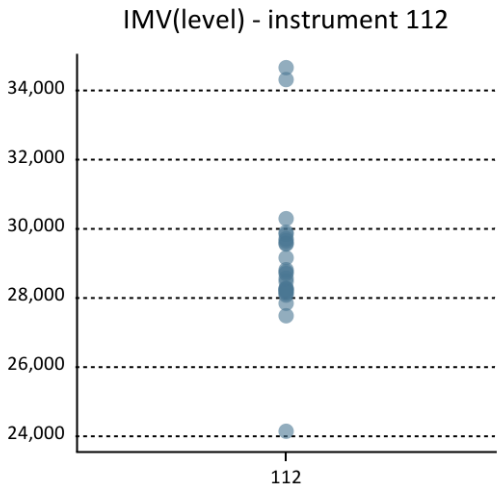

IMV(level) - instrument 107
-88,000
-89,000
-90,000
107

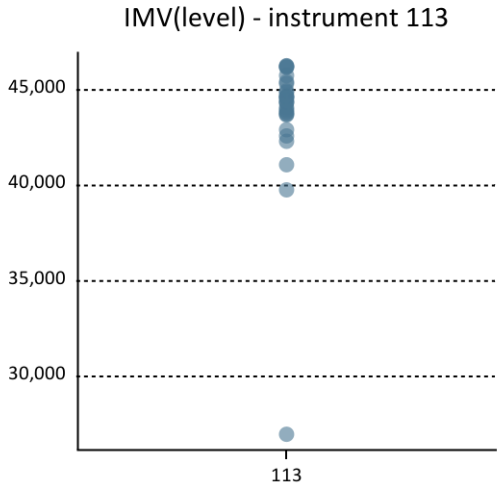
IMV(level) - instrument 108
-86,000
-88,000
-90,000
-92,000
108

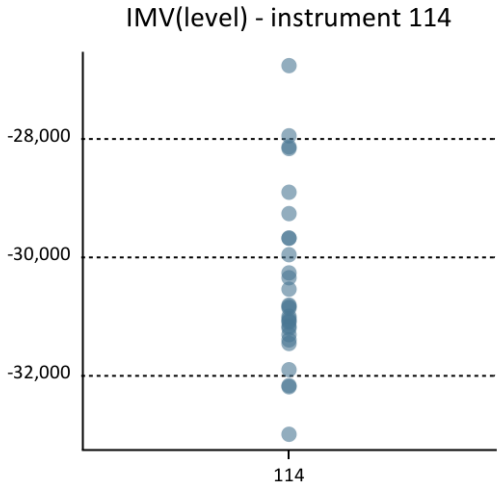

IMV(level) - instrument 109
52,000
50,000
48,000
46,000
109

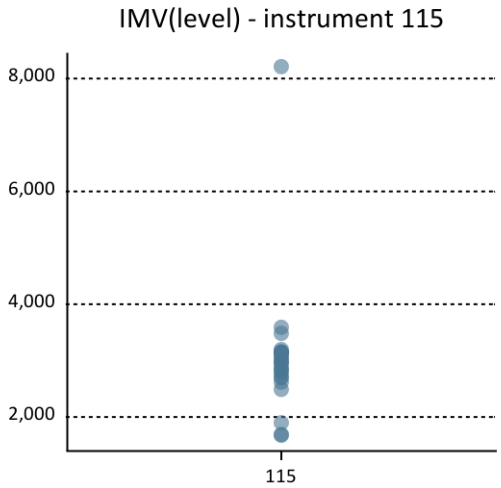

IMV(level) - instrument 110
-40,000
-45,000
-50,000
-55,000
-60,000
-65,000
110

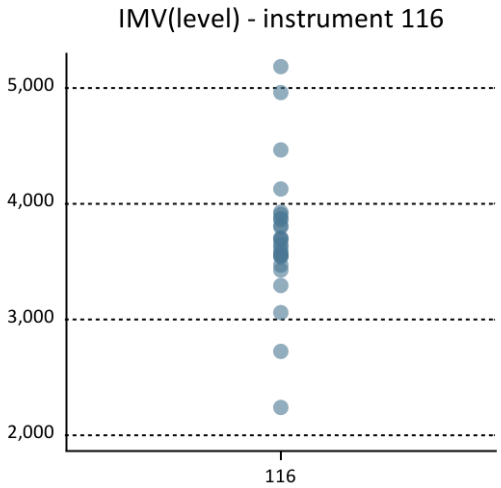

IMV(level) - instrument 111
24,000
22,000
20,000
18,000
111

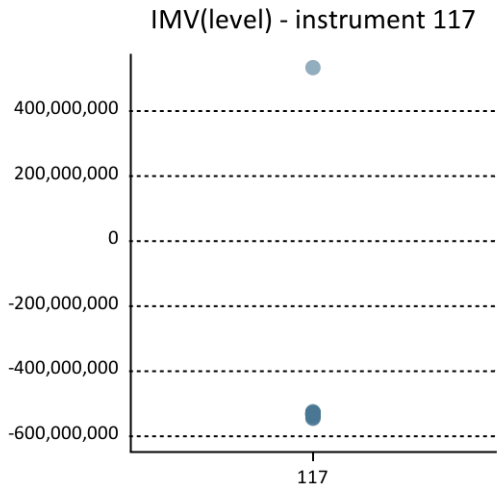

IMV(level) - instrument 112
34,000
32,000
30,000
28,000
26,000
24,000
112


IMV(level) - instrument 113
45,000
40,000
35,000
30,000
113


IMV(level) - instrument 114
-28,000
-30,000
-32,000
114


IMV(level) - instrument 115
8,000
6,000
4,000
2,000
115


IMV(level) - instrument 116
5,000
4,000
3,000
2,000
116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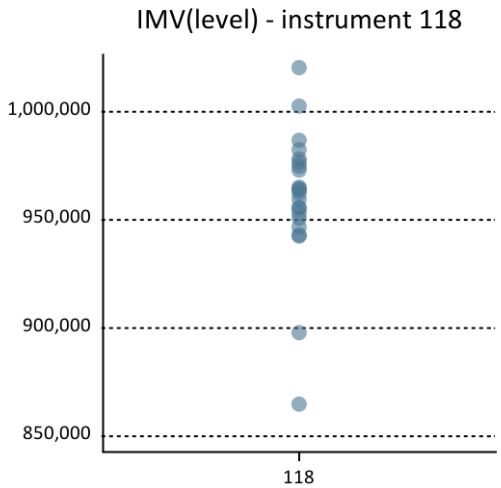
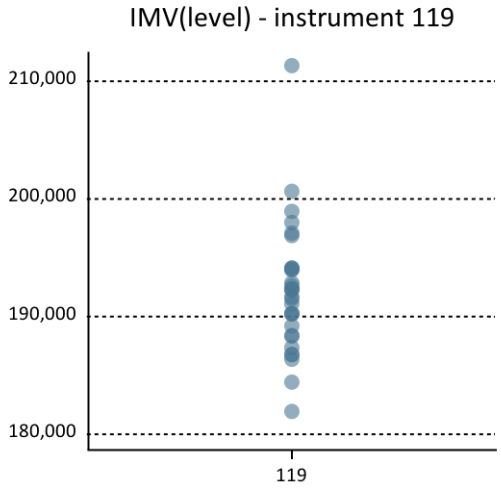
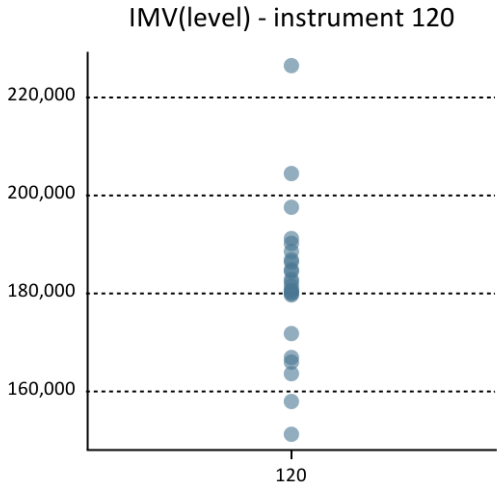
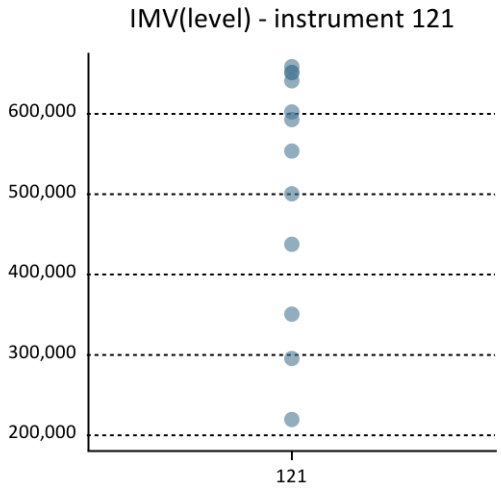
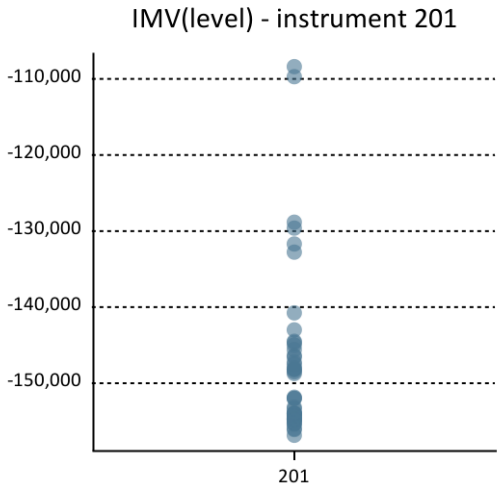
400,000,000
200,000,000
0
-200,000,000
-400,000,000
-600,000,000
117

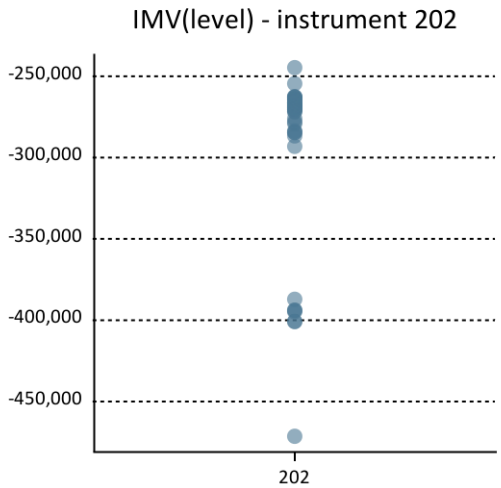

IMV(level) - instrument 118
1,000,000
950,000
900,000
850,000
118

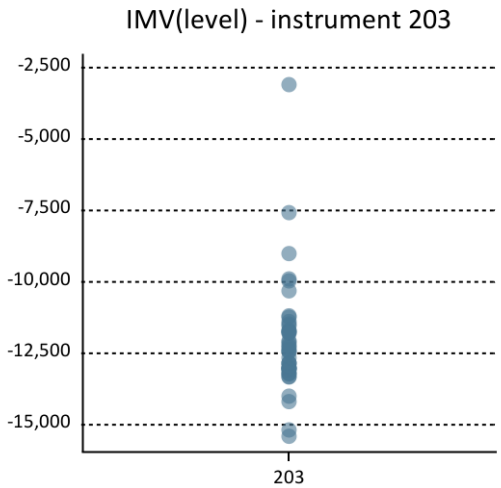

IMV(level) - instrument 119
210,000
200,000
190,000
180,000
119


IMV(level) - instrument 120
220,000
200,000
180,000
160,000
120


IMV(level) - instrument 121
600,000
500,000
400,000
300,000
200,000
121


IMV(level) - instrument 201
-110,000
-120,000
-130,000
-140,000
-150,000
201


IMV(level) - instrument 202
-250,000
-300,000
-350,000
-400,000
-450,000
202


IMV(level) - instrument 203
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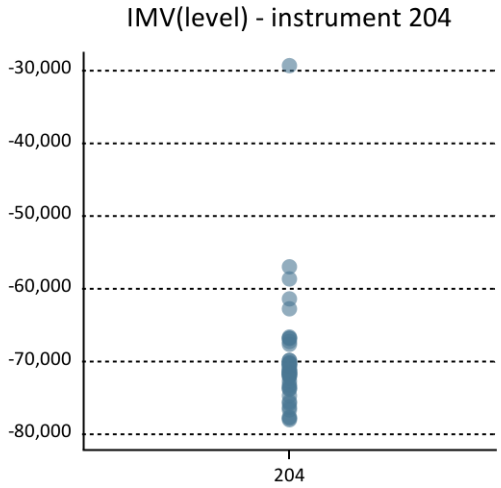
-5,000
-7,500
-10,000
-12,500
-15,000
203


IMV(level) - instrument 204
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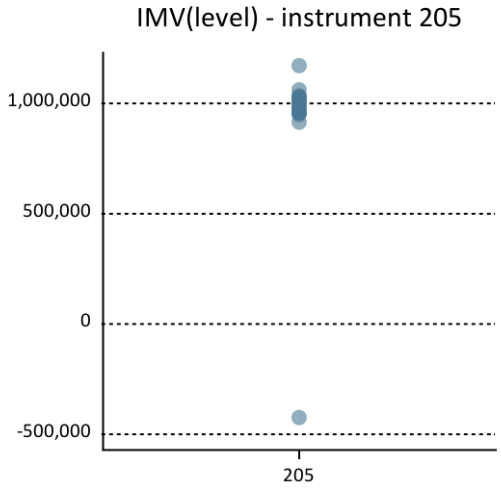
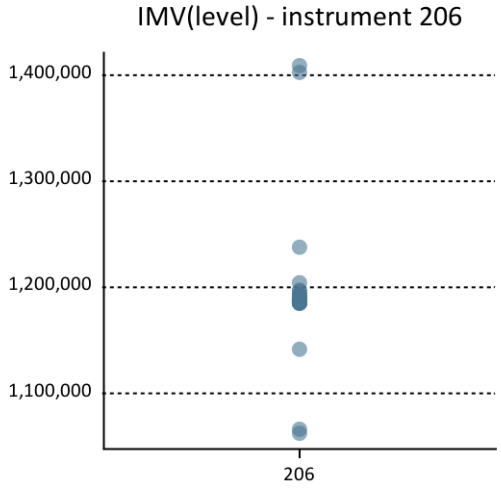
-40,000
-50,000
-60,000
-70,000
-80,000
204


IMV(level) - instrument 205
1,000,000
500,000
0
-500,000
205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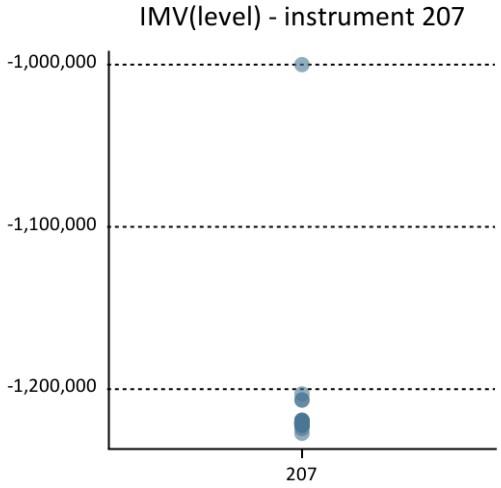
1,400,000
1,300,000
1,200,000
1,100,000
206


IMV(level) - instrument 207
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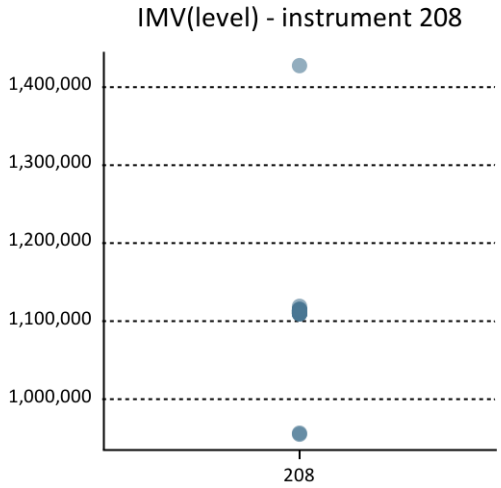
-1,100,000
-1,200,000
207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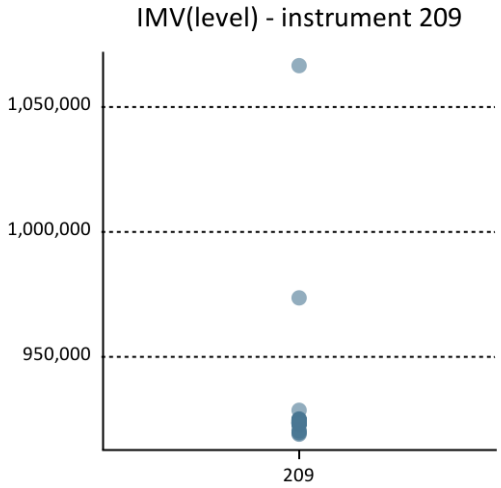
1,300,000
1,200,000
1,100,000
1,000,000
208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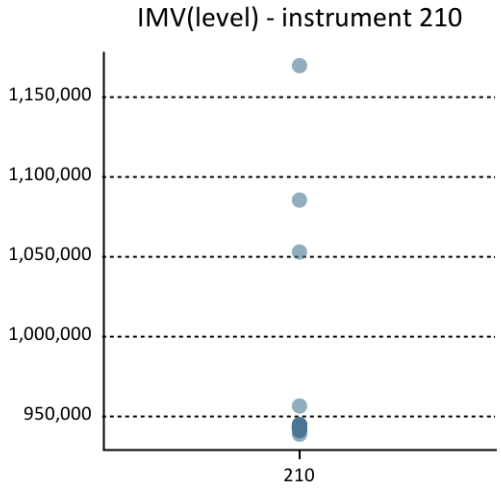
1,000,000
950,000
209


IMV(level) - instrument 210
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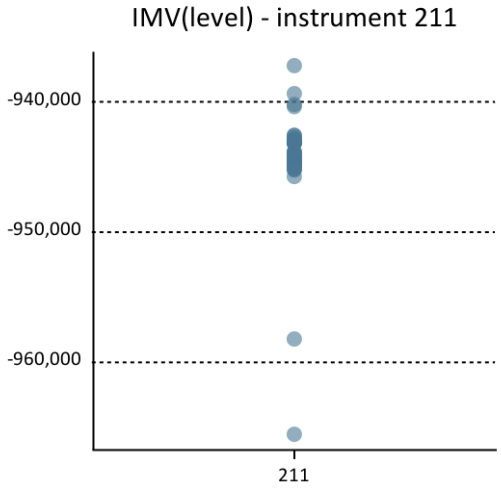
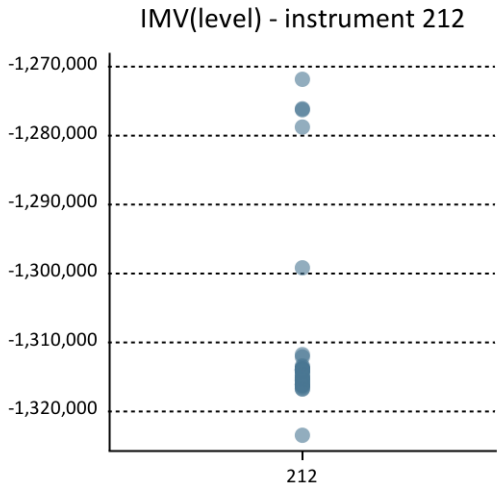
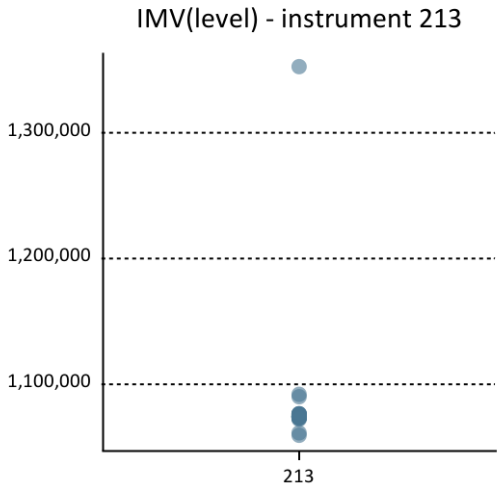
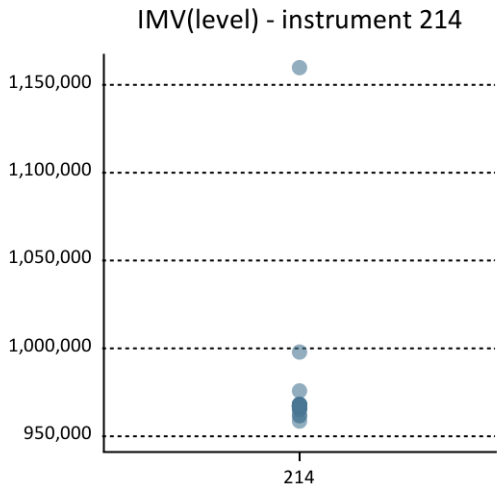
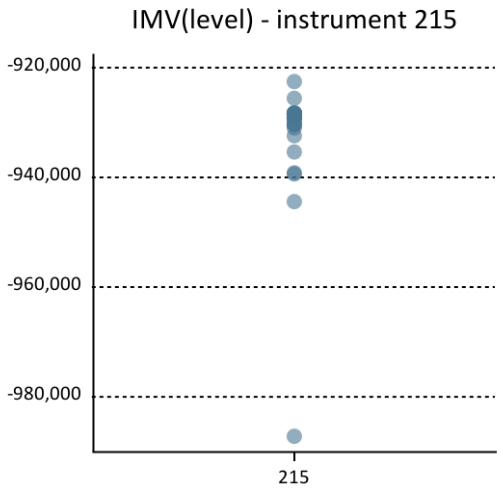
1,100,000
1,050,000
1,000,000
950,000
210

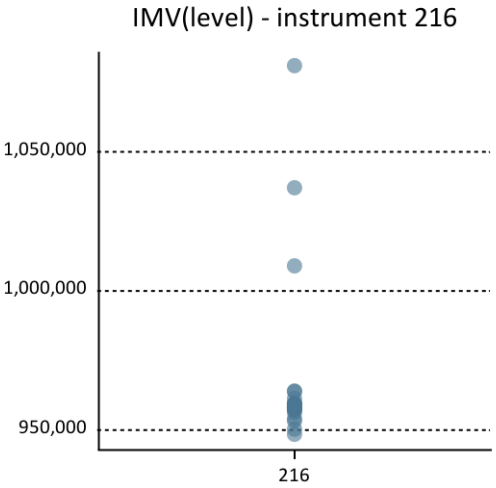

IMV(level) - instrument 211
-940,000
-950,000
-960,000
211

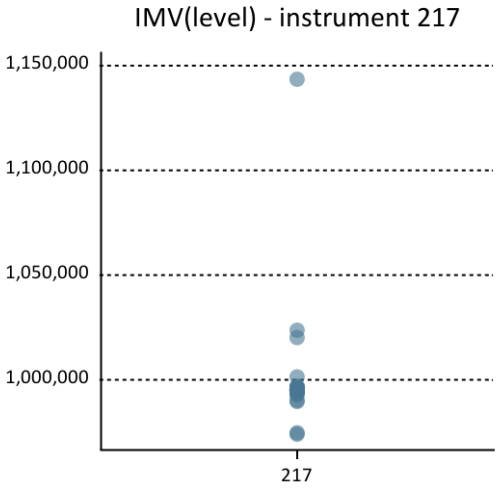

IMV(level) - instrument 212
-1,270,000
-1,280,000
-1,290,000
-1,300,000
-1,310,000
-1,320,000
212

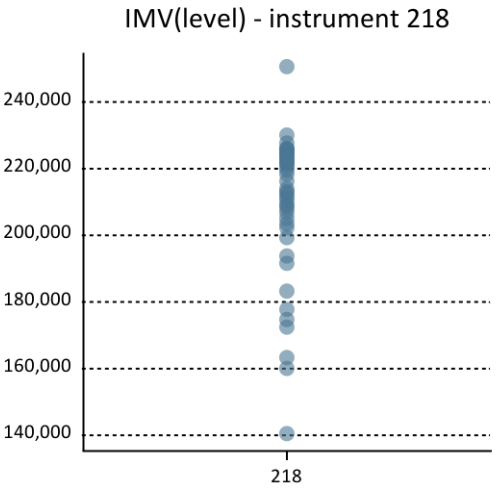

IMV(level) - instrument 213
1,300,000
1,200,000
1,100,000
213

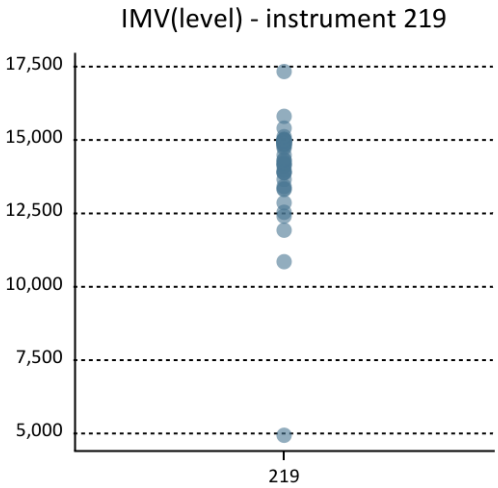

IMV(level) - instrument 214
1,150,000
1,100,000
1,050,000
1,000,000
950,000
214

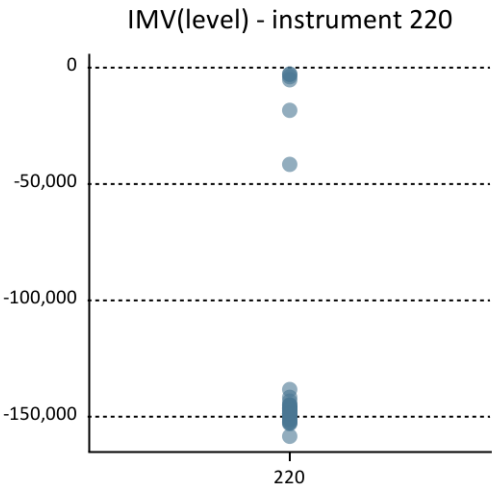

IMV(level) - instrument 215
-920,000
-940,000
-960,000
-980,000
215

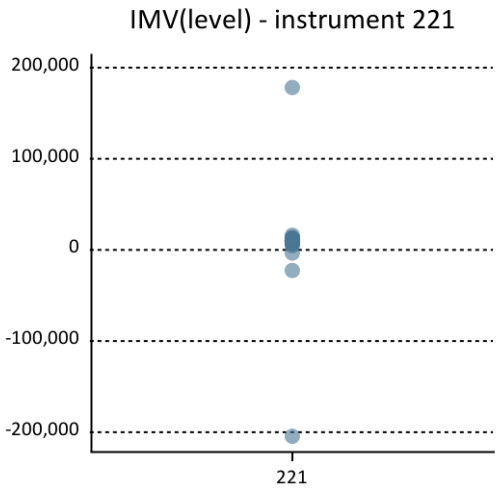

IMV(level) - instrument 216
1,050,000
1,000,000
950,000
216

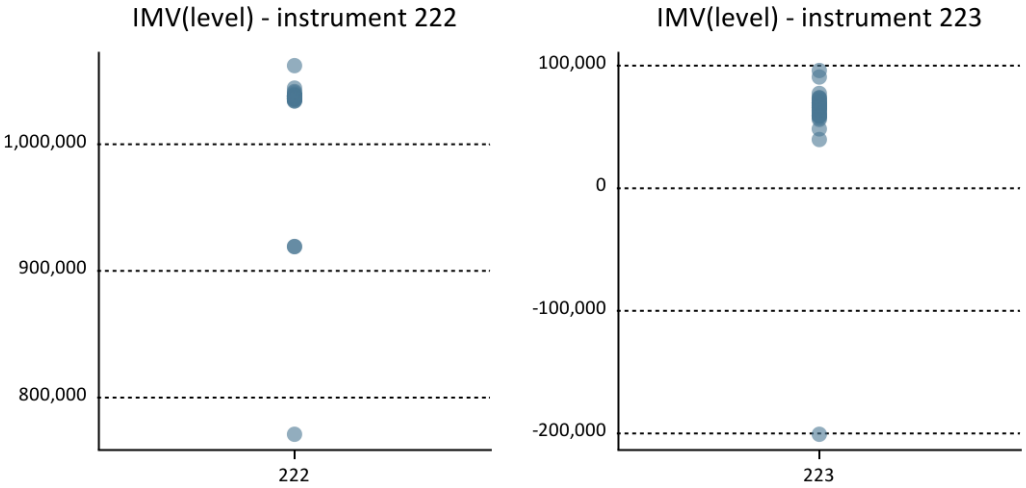

IMV(level) - instrument 217
1,150,000
1,100,000
1,050,000
1,000,000
217

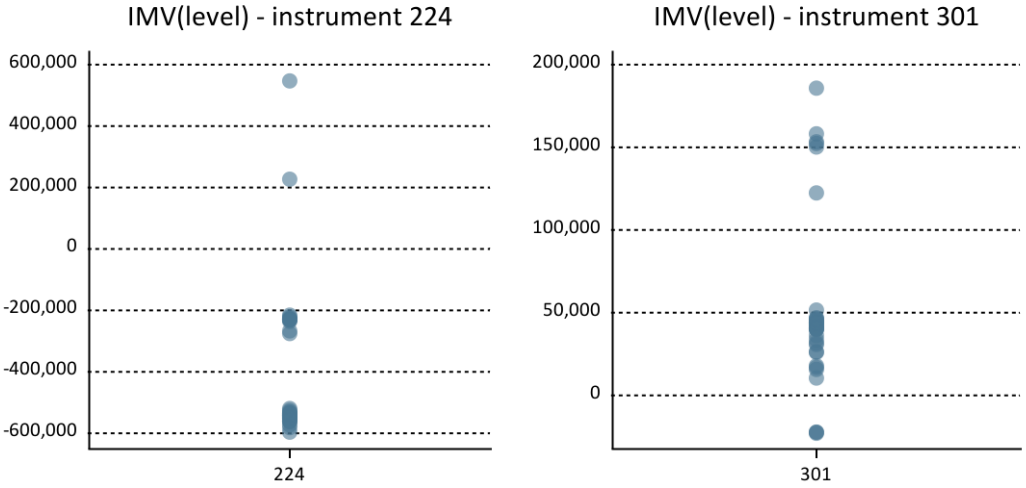

IMV(level) - instrument 218
240,000
220,000
200,000
180,000
160,000
140,000
218

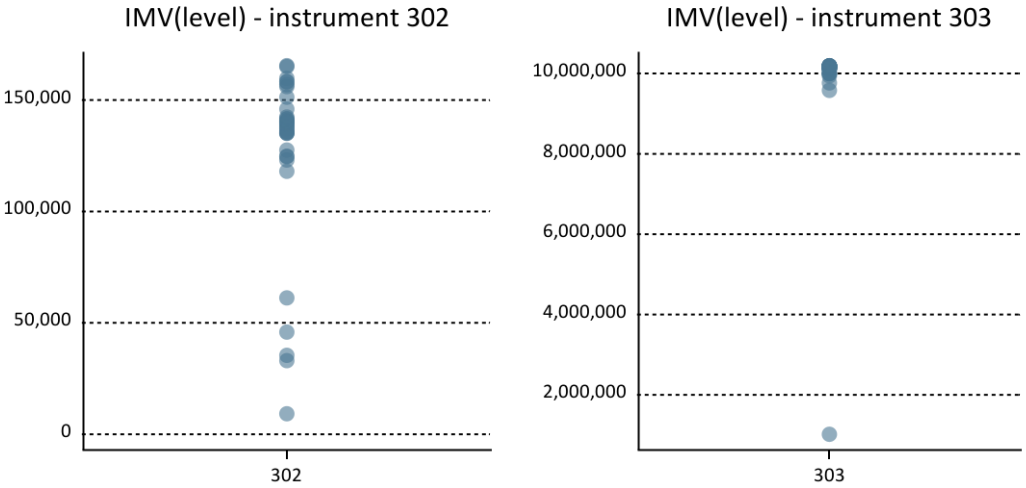

IMV(level) - instrument 219
17,500
15,000
12,500
10,000
7,500
5,000
219

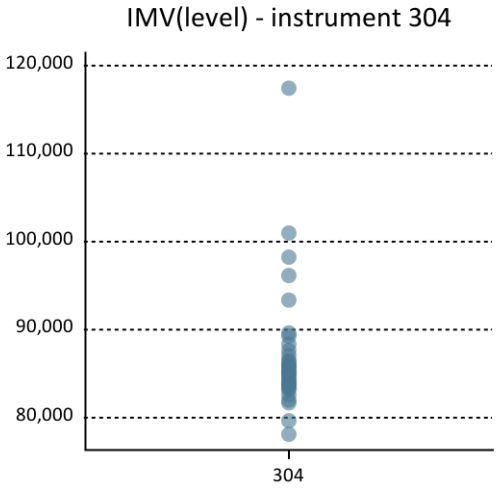

IMV(level) - instrument 220
0
-50,000
-100,000
-150,000
220

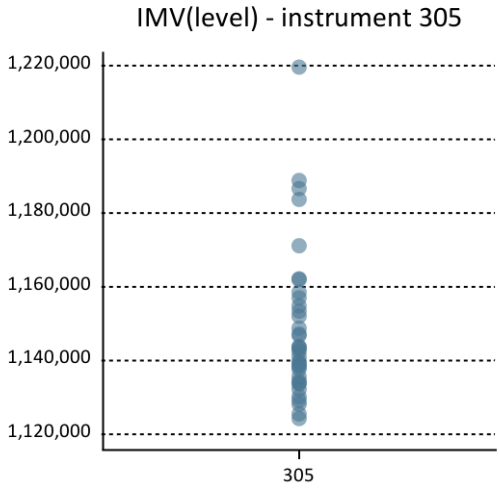

IMV(level) - instrument 221
200,000
100,000
0
-100,000
-200,000
221

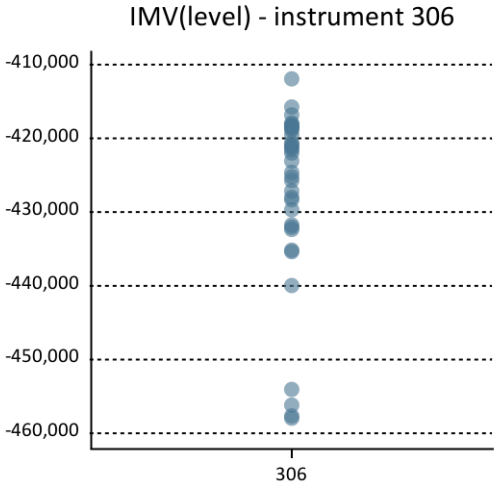

IMV(level) - instrument 222
1,000,000
900,000
800,000
222
IMV(level) - instrument 223
100,000
0
-100,000
-200,000
223

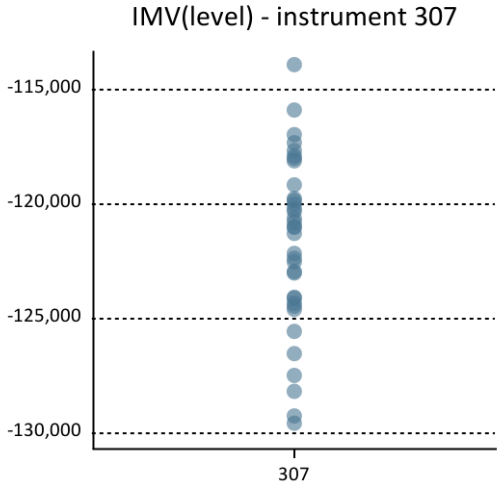

IMV(level) - instrument 224
600,000
400,000
200,000
0
-200,000
-400,000
-600,000
224
IMV(level) - instrument 301
200,000
150,000
100,000
50,000
0
301

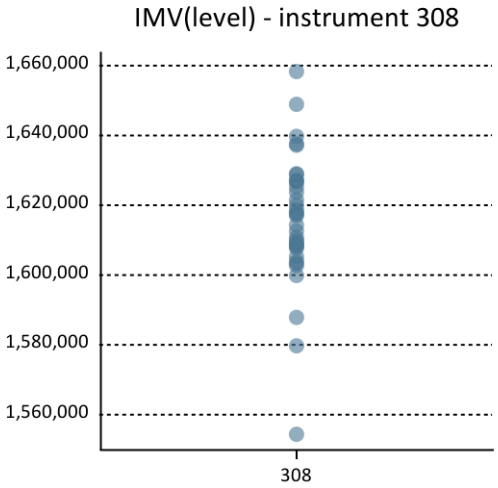

IMV(level) - instrument 302
150,000
100,000
50,000
0
302
IMV(level) - instrument 303
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
303

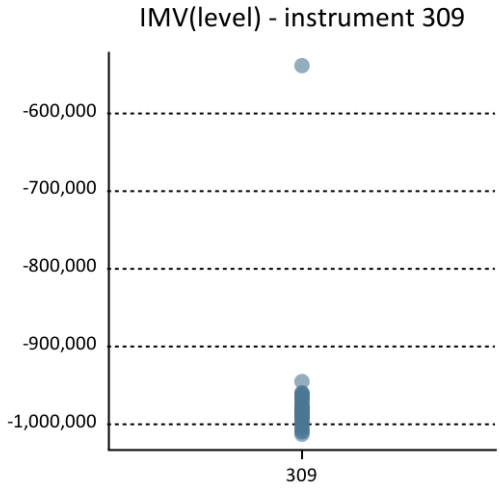

IMV(level) - instrument 304
120,000
110,000
100,000
90,000
80,000
304

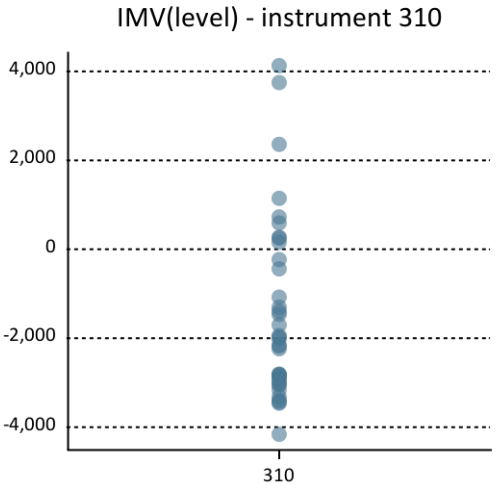

IMV(level) - instrument 305
1,220,000
1,200,000
1,180,000
1,160,000
1,140,000
1,120,000
305

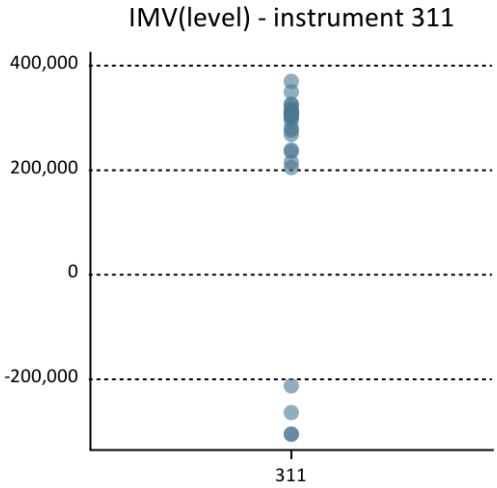

IMV(level) - instrument 306
-410,000
-420,000
-430,000
-440,000
-450,000
-460,000
306

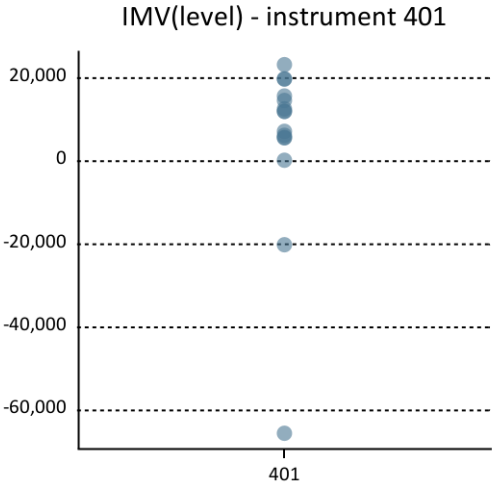

IMV(level) - instrument 307
-115,000
-120,000
-125,000
-130,000
307

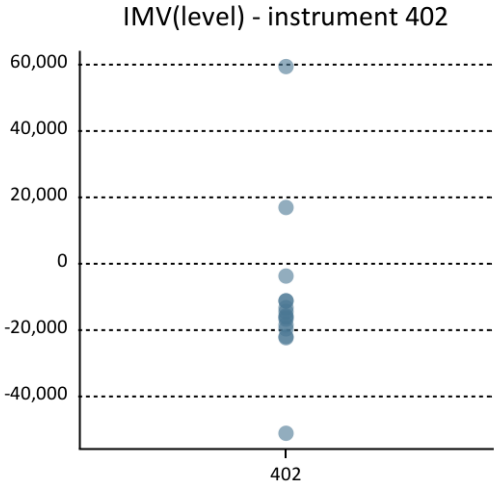

IMV(level) - instrument 308
1,660,000
1,640,000
1,620,000
1,600,000
1,580,000
1,560,000
308

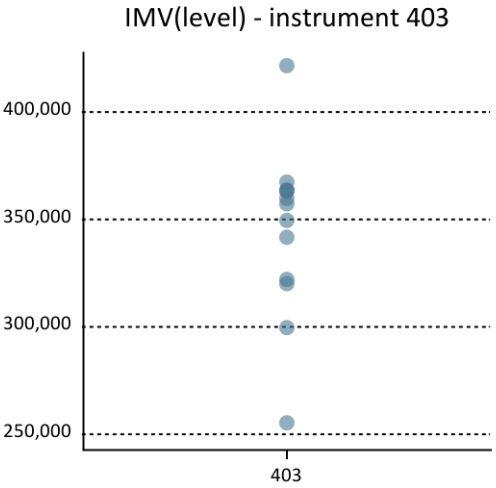

IMV(level) - instrument 309
-600,000
-700,000
-800,000
-900,000
-1,000,000
309

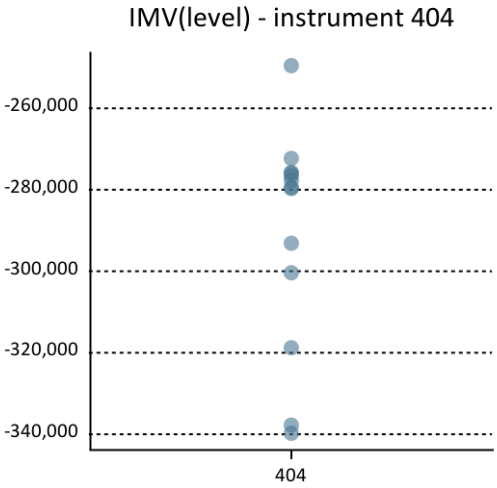

IMV(level) - instrument 310
4,000
2,000
0
-2,000
-4,000
310

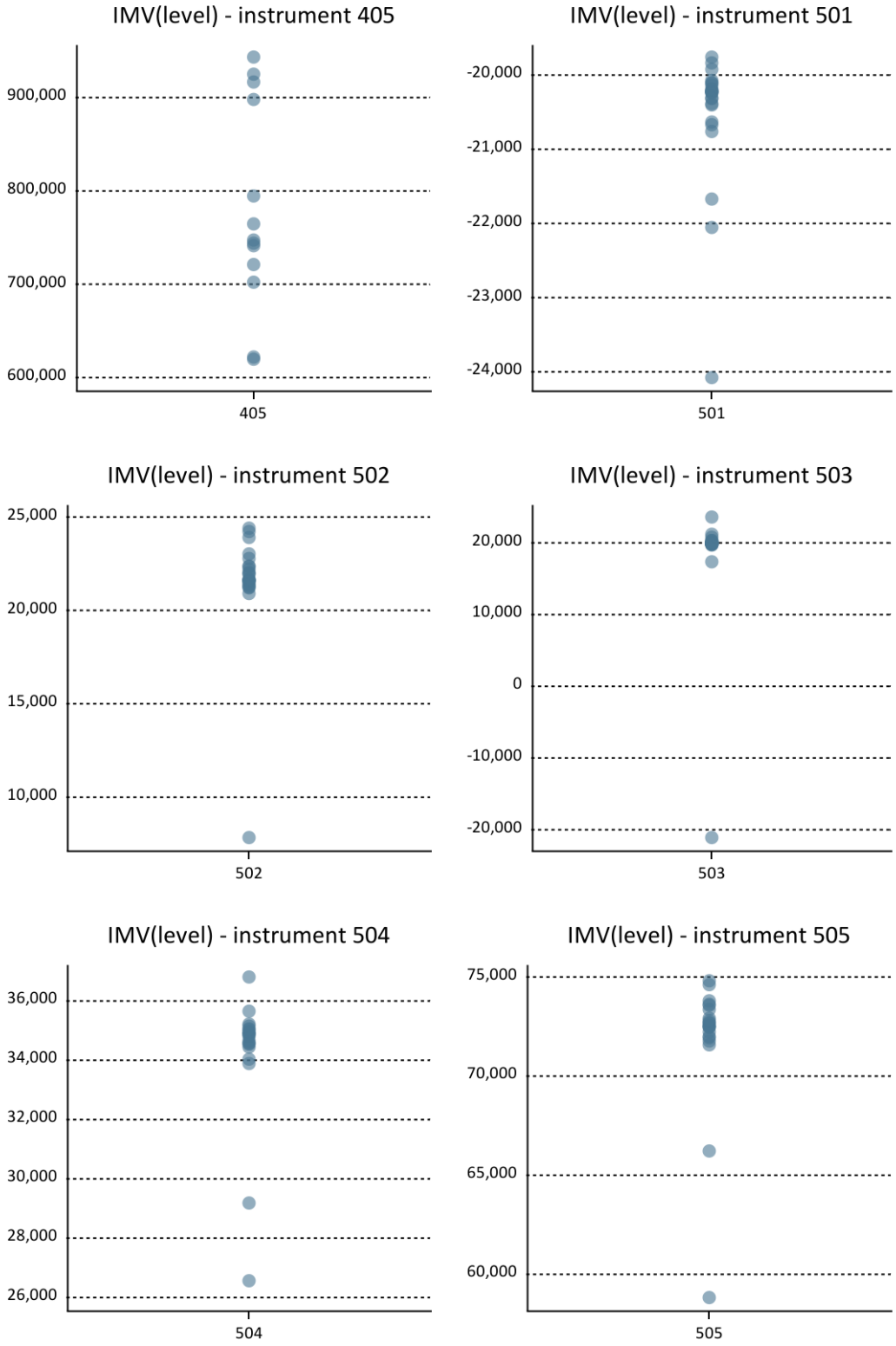

IMV(level) - instrument 311
400,000
200,000
0
-200,000
311

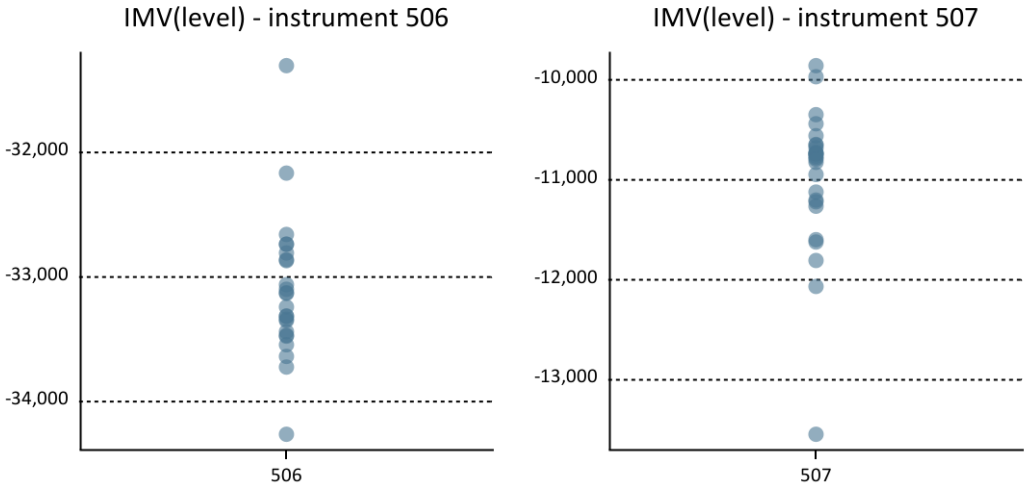

IMV(level) - instrument 401
20,000
0
-20,000
-40,000
-60,000
401


IMV(level) - instrument 402
60,000
40,000
20,000
0
-20,000
-40,000
402

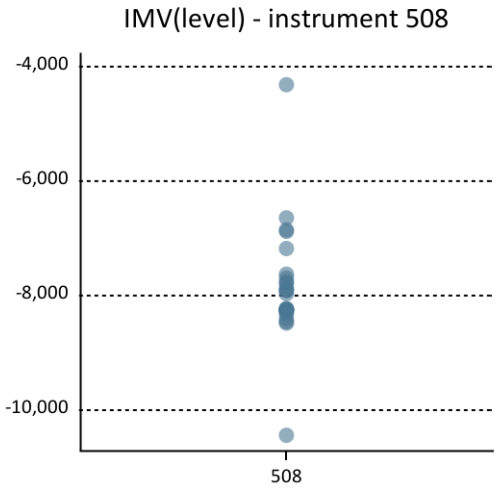

IMV(level) - instrument 403
400,000
350,000
300,000
250,000
403

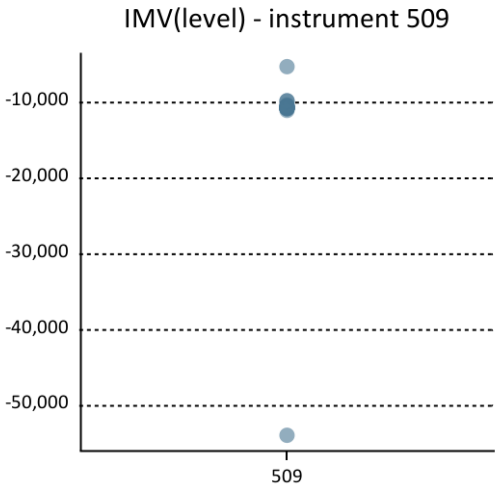

IMV(level) - instrument 404
-260,000
-280,000
-300,000
-320,000
-340,000
404

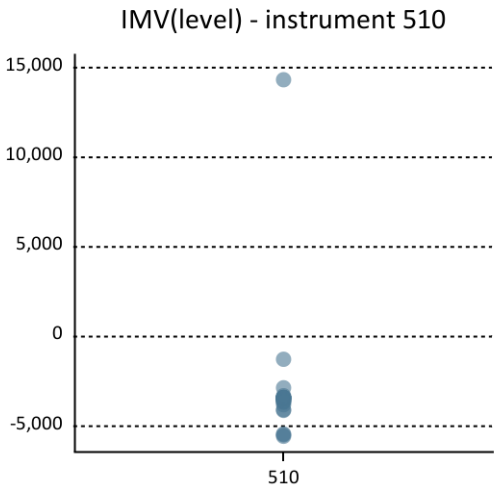

IMV(level) - instrument 405
900,000
800,000
700,000
600,000
405
IMV(level) - instrument 501
-20,000
-21,000
-22,000
-23,000
-24,000
501
IMV(level) - instrument 502
25,000
20,000
15,000
10,000
502
IMV(level) - instrument 503
20,000
10,000
0
-10,000
-20,000
503
IMV(level) - instrument 504
36,000
34,000
32,000
30,000
28,000
26,000
504
IMV(level) - instrument 505
75,000
70,000
65,000
60,000
505

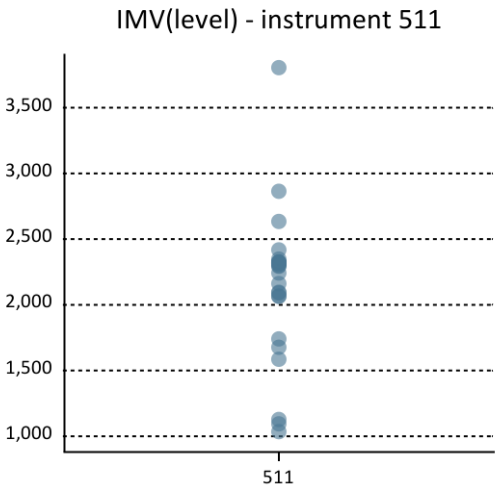

IMV(level) - instrument 506
-32,000
-33,000
-34,000
506

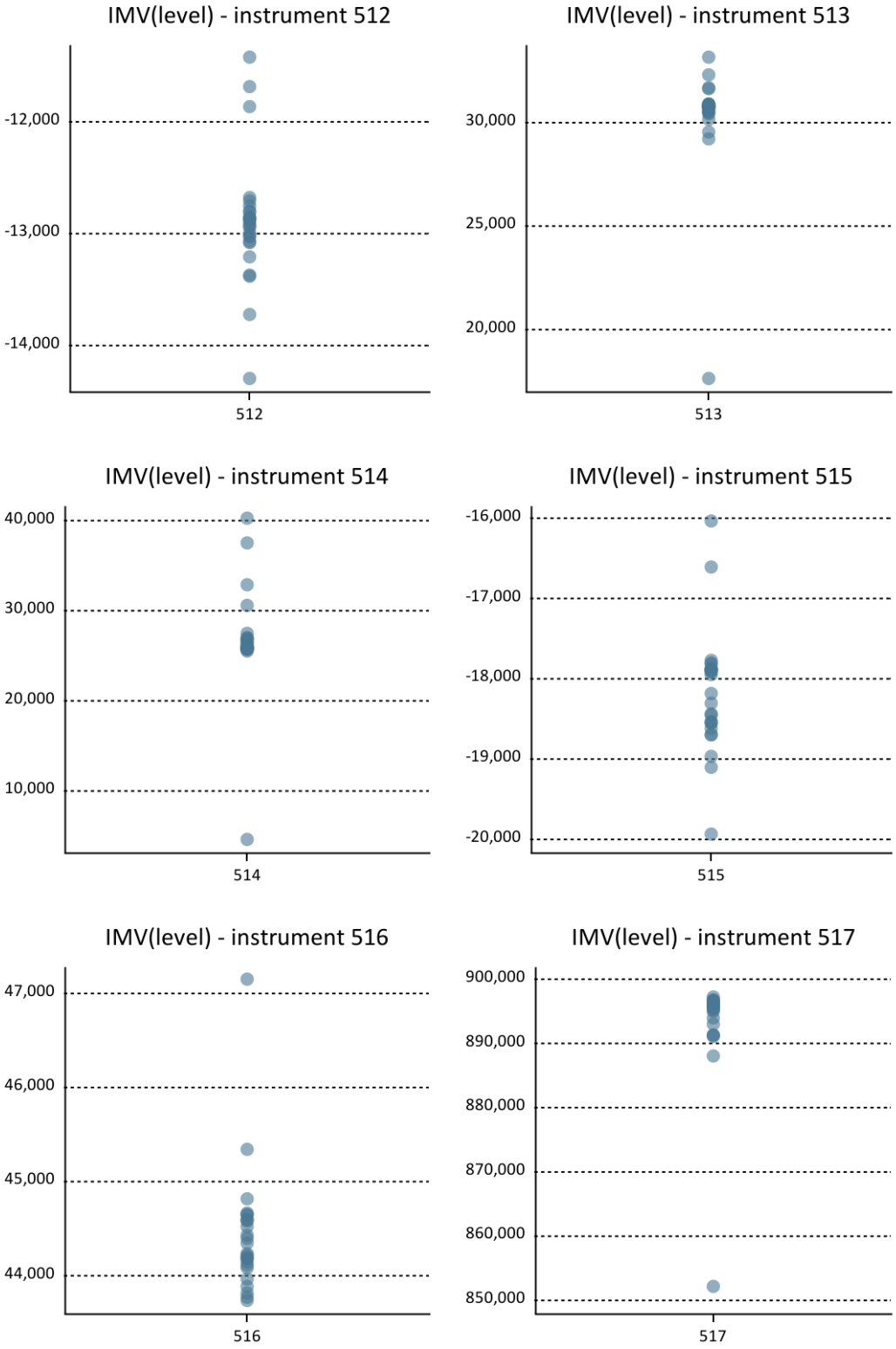
IMV(level) - instrument 507
-10,000
-11,000
-12,000
-13,000
507

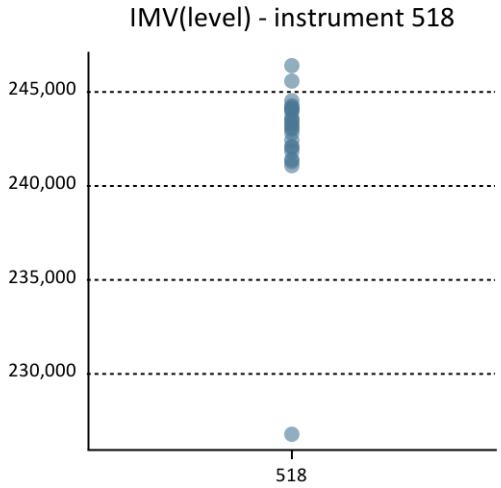

IMV(level) - instrument 508
-4,000
-6,000
-8,000
-10,000
508

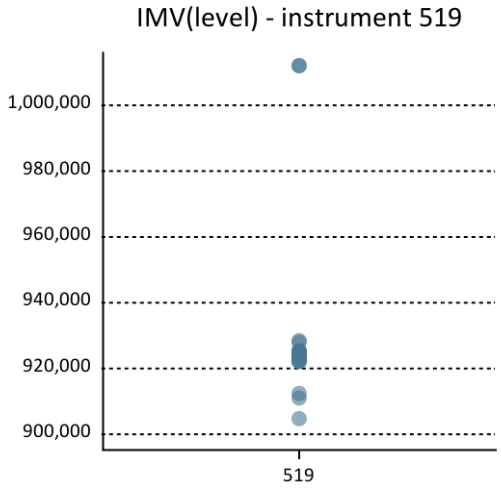

IMV(level) - instrument 509
-10,000
-20,000
-30,000
-40,000
-50,000
509

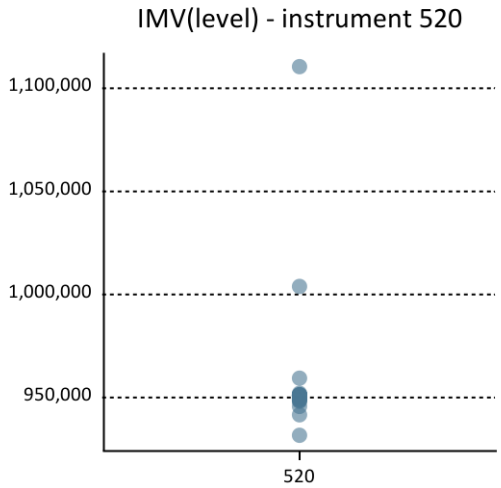

IMV(level) - instrument 510
15,000
10,000
5,000
0
-5,000
510

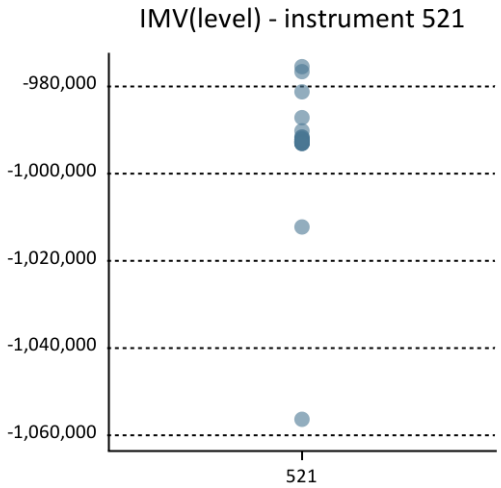

IMV(level) - instrument 511
3,500
3,000
2,500
2,000
1,500
1,000
511

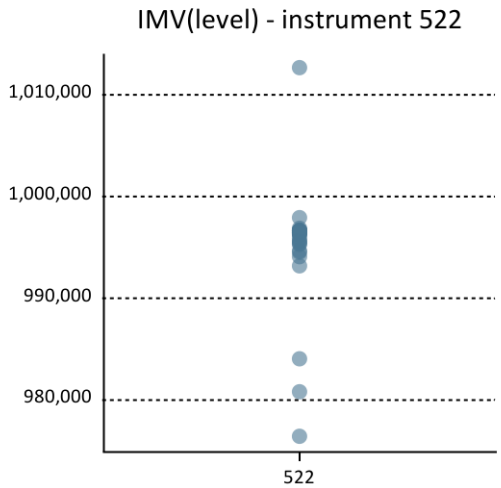

IMV(level) - instrument 512
-12,000
-13,000
-14,000
512
IMV(level) - instrument 513
30,000
25,000
20,000
513
IMV(level) - instrument 514
40,000
30,000
20,000
10,000
514
IMV(level) - instrument 515
-16,000
-17,000
-18,000
-19,000
-20,000
515
IMV(level) - instrument 516
47,000
46,000
45,000
44,000
516
IMV(level) - instrument 517
900,000
890,000
880,000
870,000
860,000
850,000
517

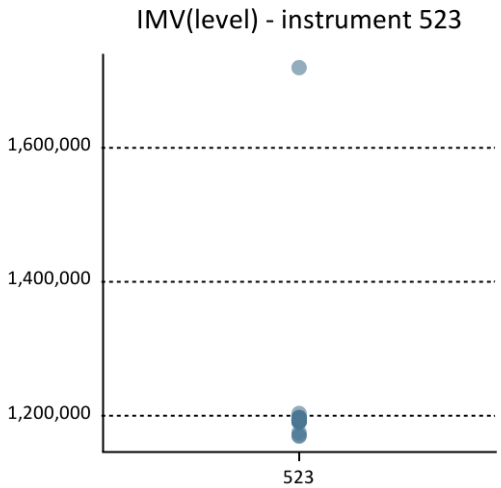

IMV(level) - instrument 518
245,000
240,000
235,000
230,000
518

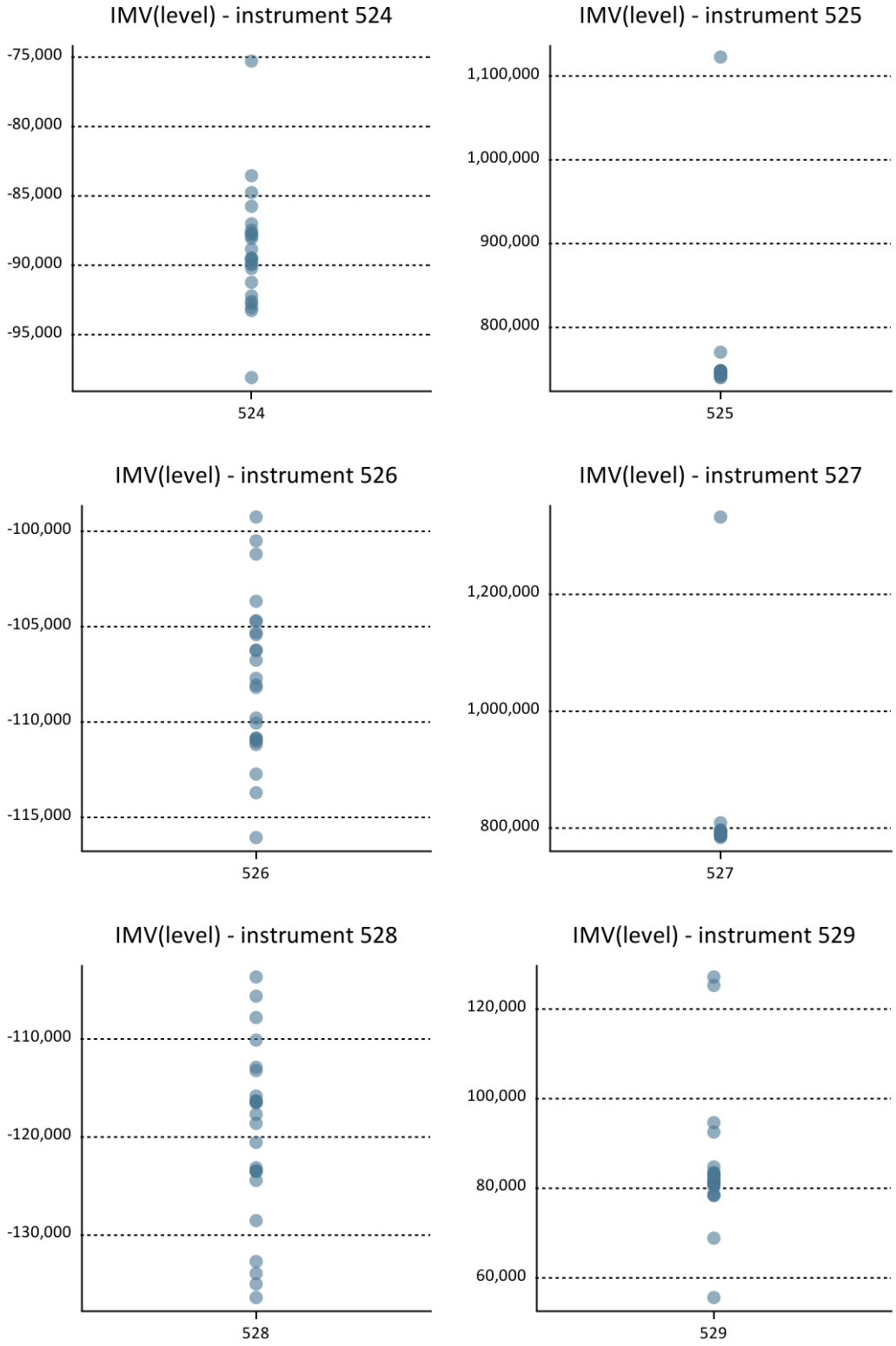

IMV(level) - instrument 519
1,000,000
980,000
960,000
940,000
920,000
900,000
519

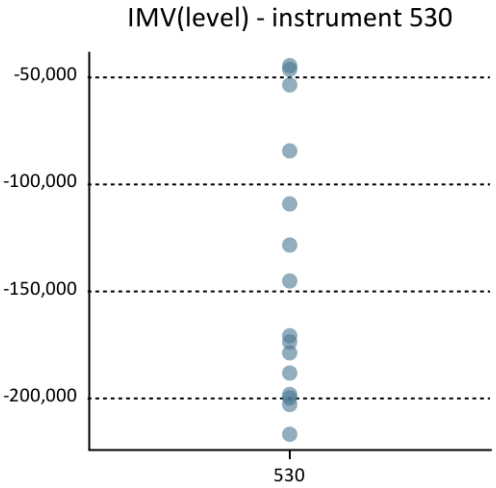

IMV(level) - instrument 520
1,100,000
1,050,000
1,000,000
950,000
520

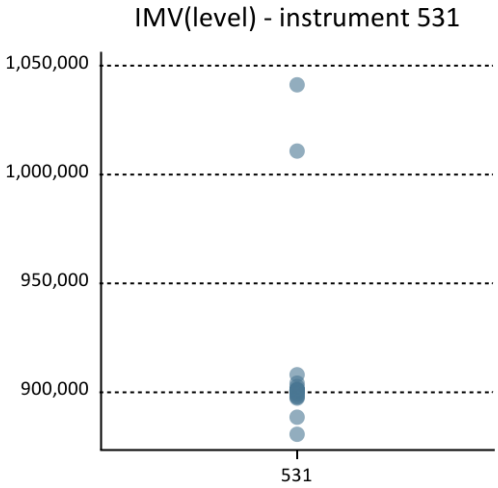

IMV(level) - instrument 521
-980,000
-1,000,000
-1,020,000
-1,040,000
-1,060,000
521

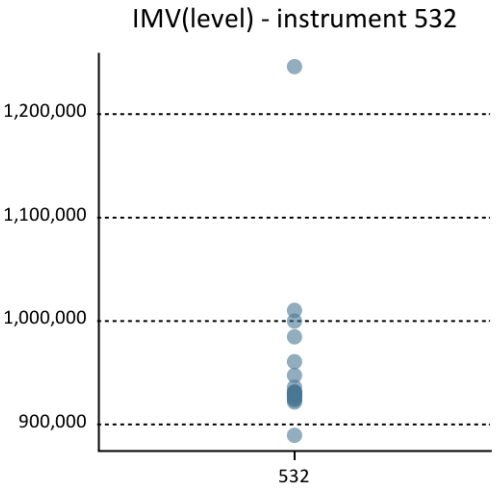

IMV(level) - instrument 522
1,010,000
1,000,000
990,000
980,000
522

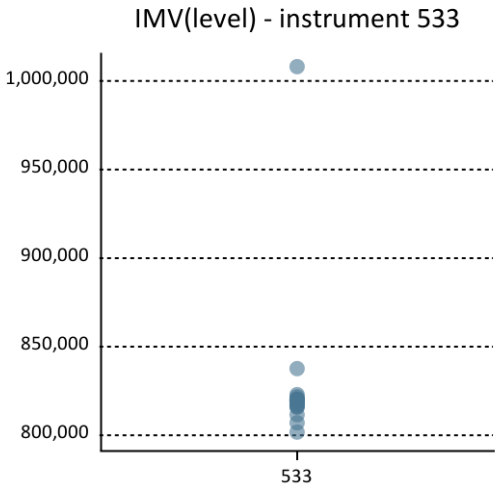

IMV(level) - instrument 523
1,600,000
1,400,000
1,200,000
523

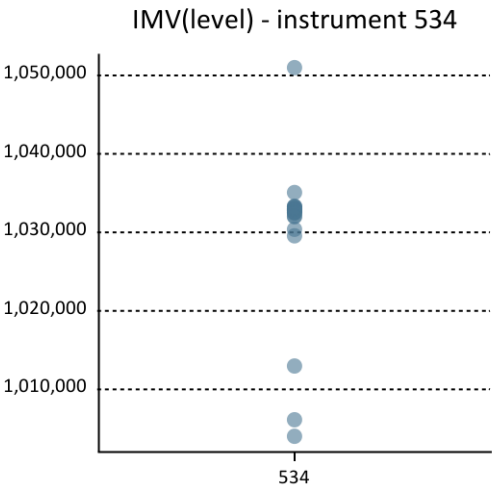

IMV(level) - instrument 524
-75,000
-80,000
-85,000
-90,000
-95,000
524
IMV(level) - instrument 525
1,100,000
1,000,000
900,000
800,000
525
IMV(level) - instrument 526
-100,000
-105,000
-110,000
-115,000
526
IMV(level) - instrument 527
1,200,000
1,000,000
800,000
527
IMV(level) - instrument 528
-110,000
-120,000
-130,000
528
IMV(level) - instrument 529
120,000
100,000
80,000
60,000
529

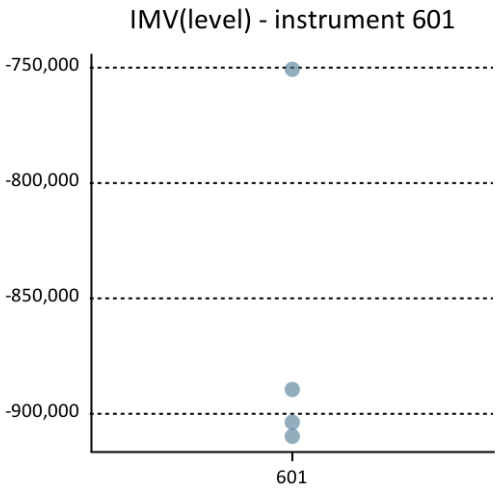

IMV(level) - instrument 530
-50,000
-100,000
-150,000
-200,000
530

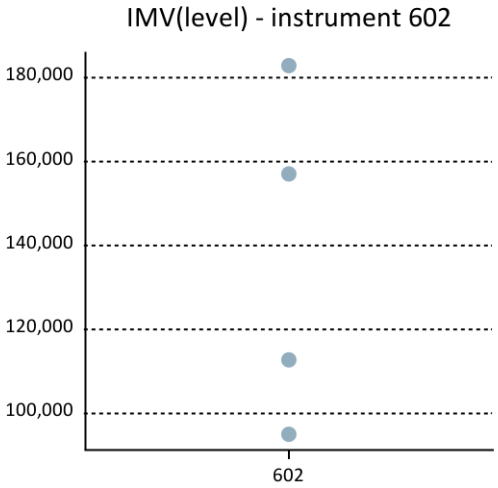

IMV(level) - instrument 531
1,050,000
1,000,000
950,000
900,000
531

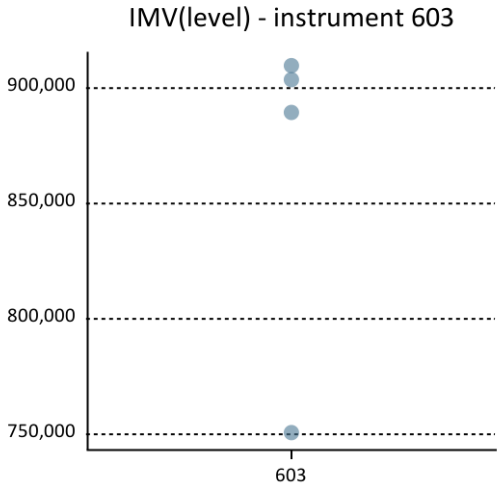

IMV(level) - instrument 532
1,200,000
1,100,000
1,000,000
900,000
532

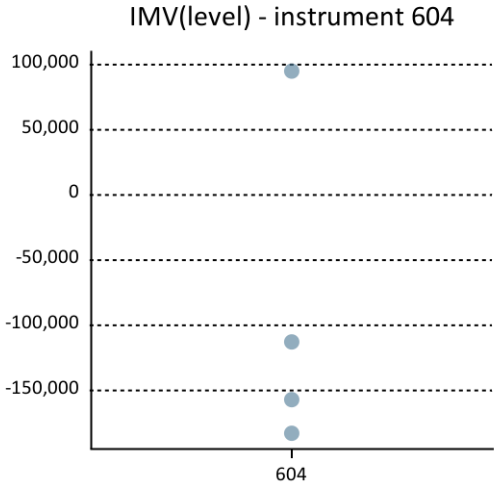

IMV(level) - instrument 533
1,000,000
950,000
900,000
850,000
800,000
533

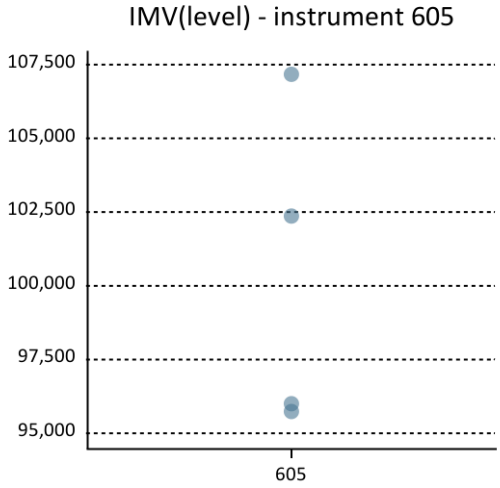

IMV(level) - instrument 534
1,050,000
1,040,000
1,030,000
1,020,000
1,010,000
534

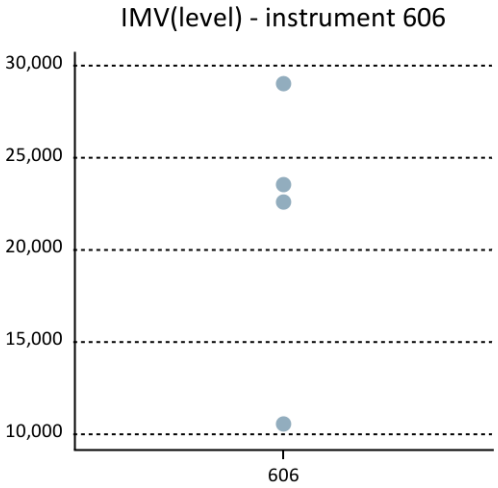

IMV(level) - instrument 601
-750,000
-800,000
-850,000
-900,000
601

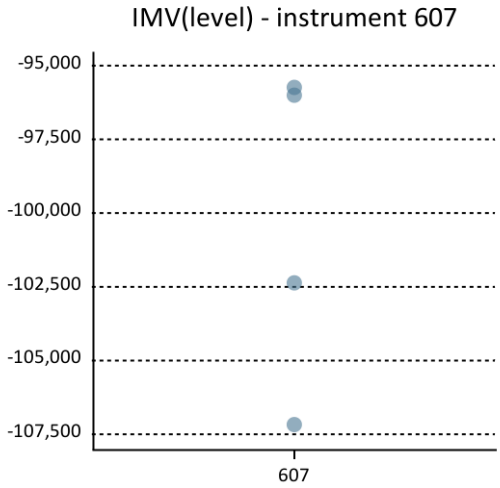

IMV(level) - instrument 602
180,000
160,000
140,000
120,000
100,000
602

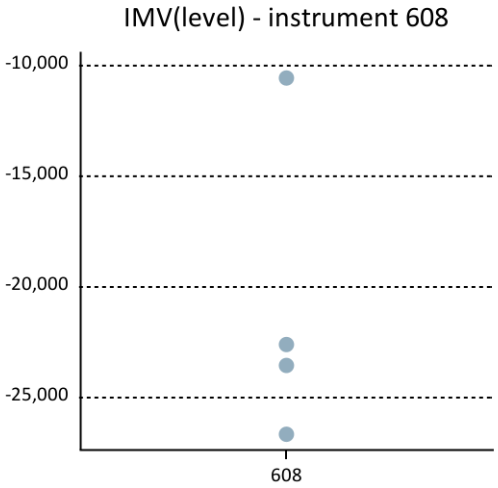

IMV(level) - instrument 603
900,000
850,000
800,000
750,000
603

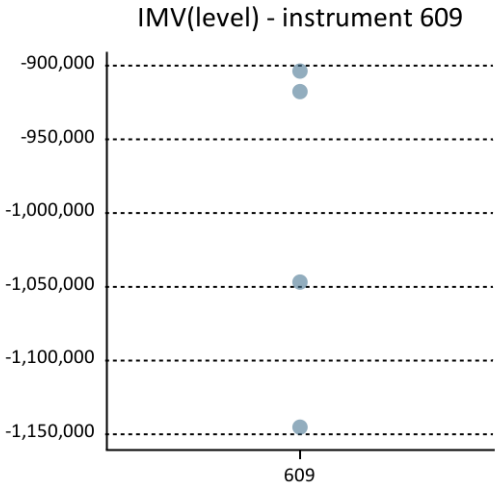

IMV(level) - instrument 604
100,000
50,000
0
-50,000
-100,000
-150,000
604


IMV(level) - instrument 605
107,500
105,000
102,500
100,000
97,500
95,000
605


IMV(level) - instrument 606
30,000
25,000
20,000
15,000
10,000
606


IMV(level) - instrument 607
-95,000
-97,500
-100,000
-102,500
-105,000
-107,500
607


IMV(level) - instrument 608
-10,000
-15,000
-20,000
-25,000
608


IMV(level) - instrument 609
-900,000
-950,000
-1,000,000
-1,050,000
-1,100,000
-1,150,000
609

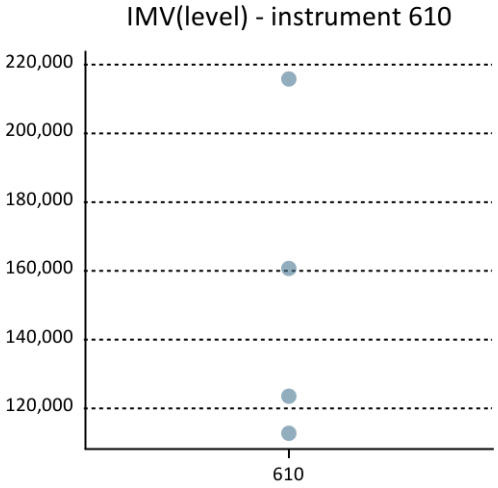
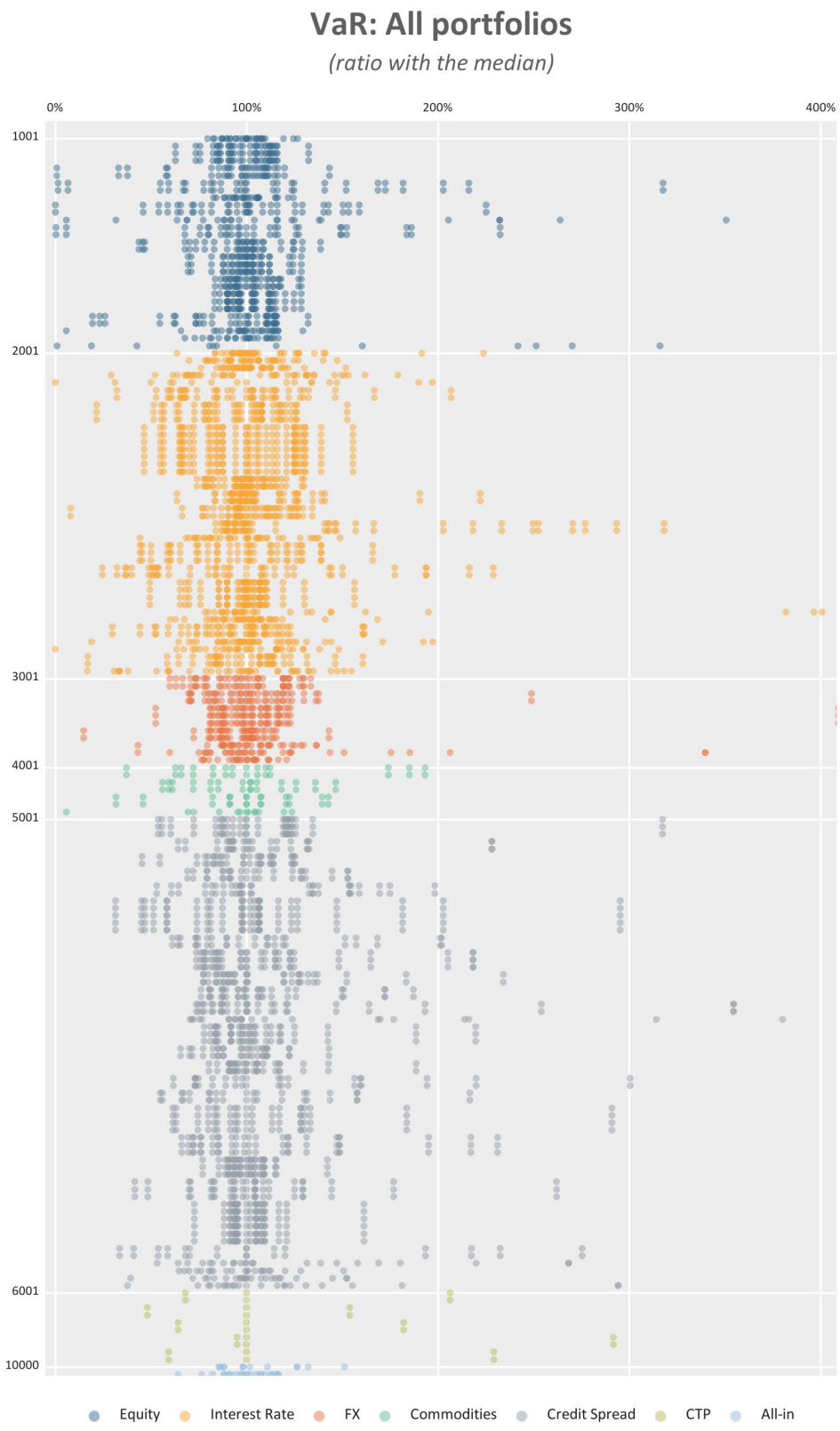
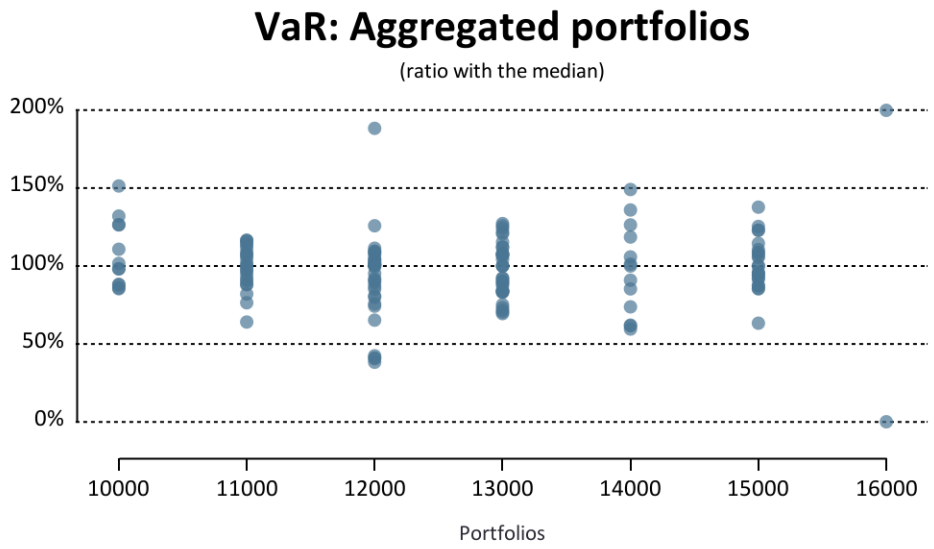
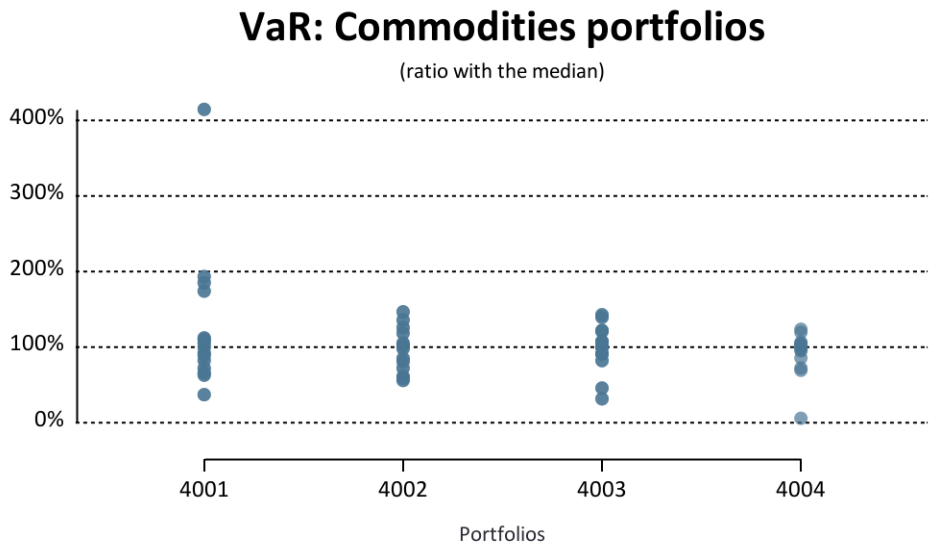
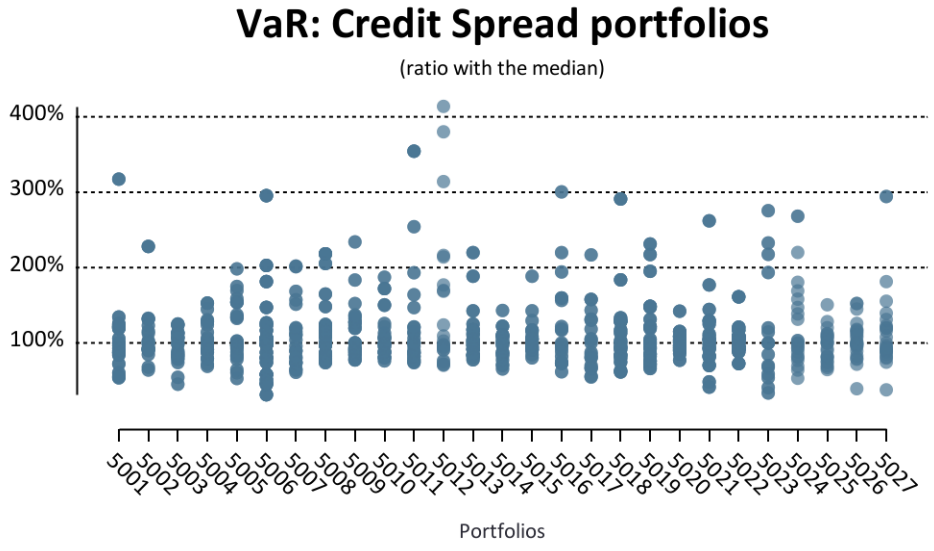

IMV(level) - instrument 610
220,000
200,000
180,000
160,000
140,000
120,000
610

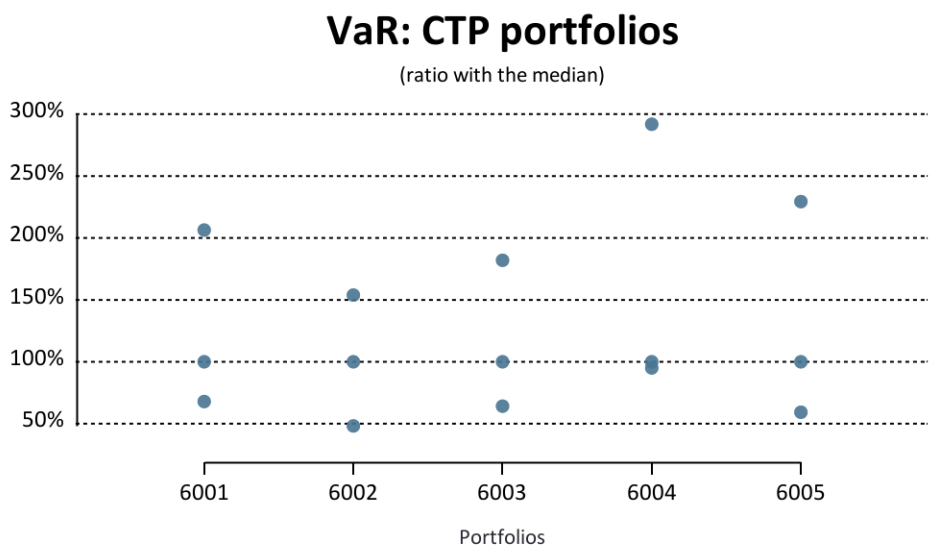
Figure 33: VaR submissions normalised by the median of each portfolio (by asset class)

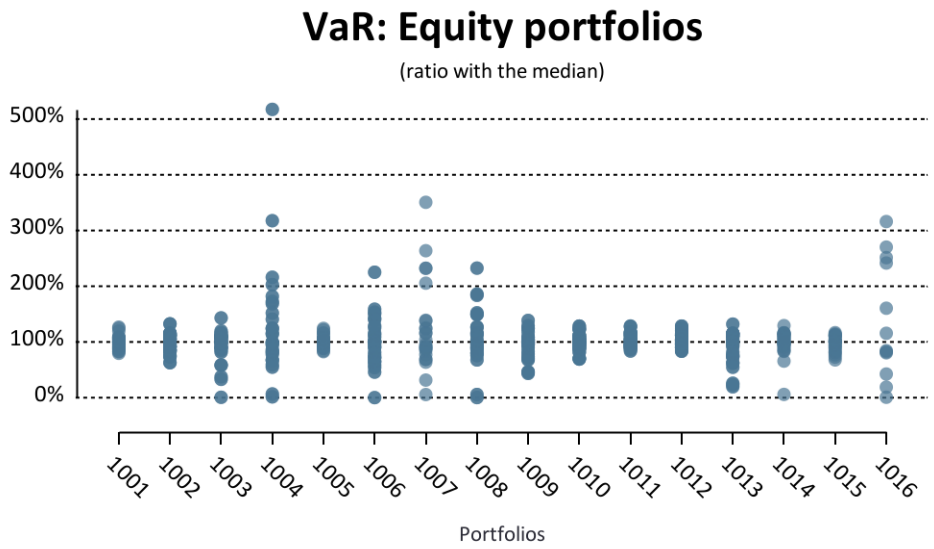


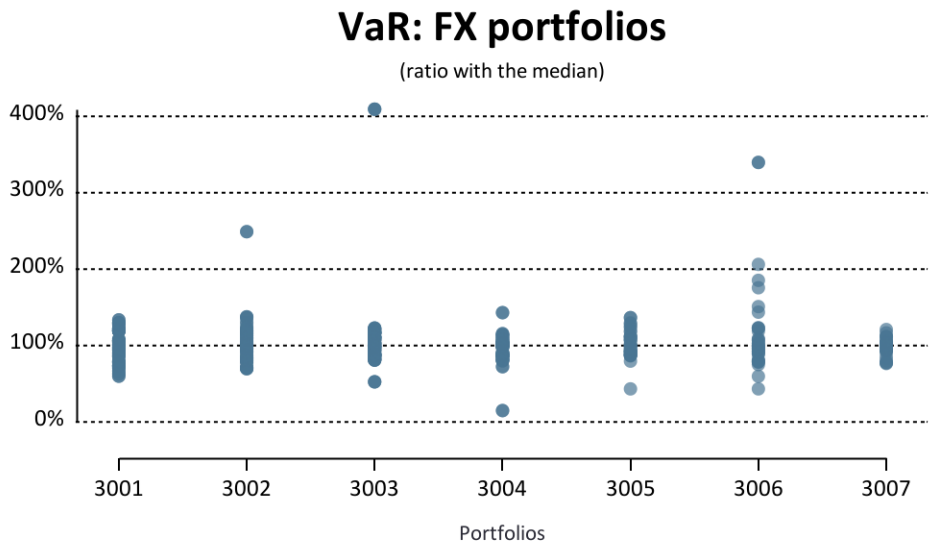

VaR: Aggregated portfolios
(ratio with the median)
200%
150%
100%
50%
0%
10000
11000
12000
13000
14000
15000
16000
Portfolios


VaR: Commodities portfolios
(ratio with the median)
400%
300%
200%
100%
0%
4001
4002
4003
4004
Portfolios


VaR: Credit Spread portfolios
(ratio with the median)
400%
300%
200%
100%
5001
5002
5003
5004
5005
5006
5007
5008
5009
5010
5011
5012
5013
5014
5015
5016
5017
5018
5019
5020
5021
5022
5023
5024
5025
5026
5027
Portfolios


VaR: CTP portfolios
(ratio with the median)
300%
250%
200%
150%
100%
50%
6001
6002
6003
6004
6005
Portfolios


VaR: Equity portfolios
(ratio with the median)
500%
400%
300%
200%
100%
0%
1001
1002
1003
1004
1005
1006
1007
1008
1009
1010
1011
1012
1013
1014
1015
1016
Portfolios


VaR: FX portfolios
(ratio with the median)
400%
300%
200%
100%
0%
3001
3002
3003
3004
3005
3006
3007
Portfolios

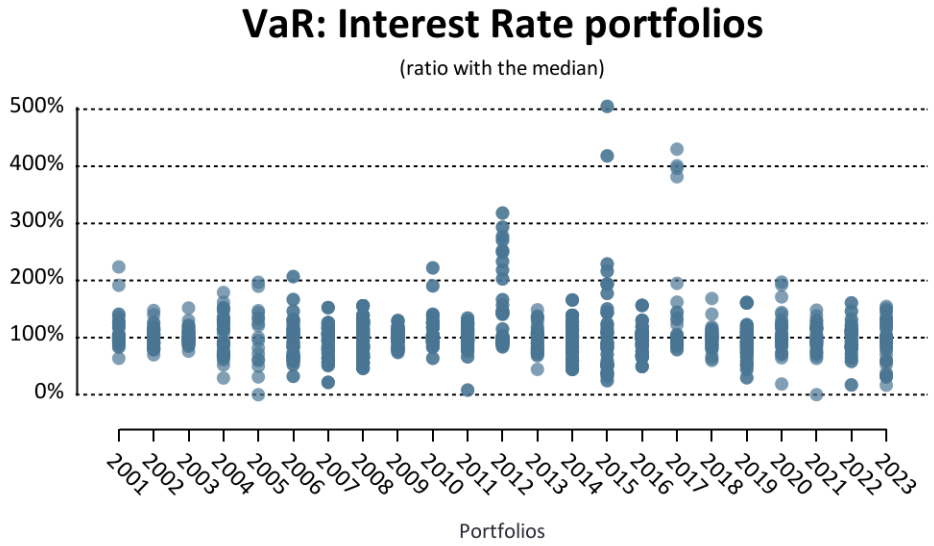
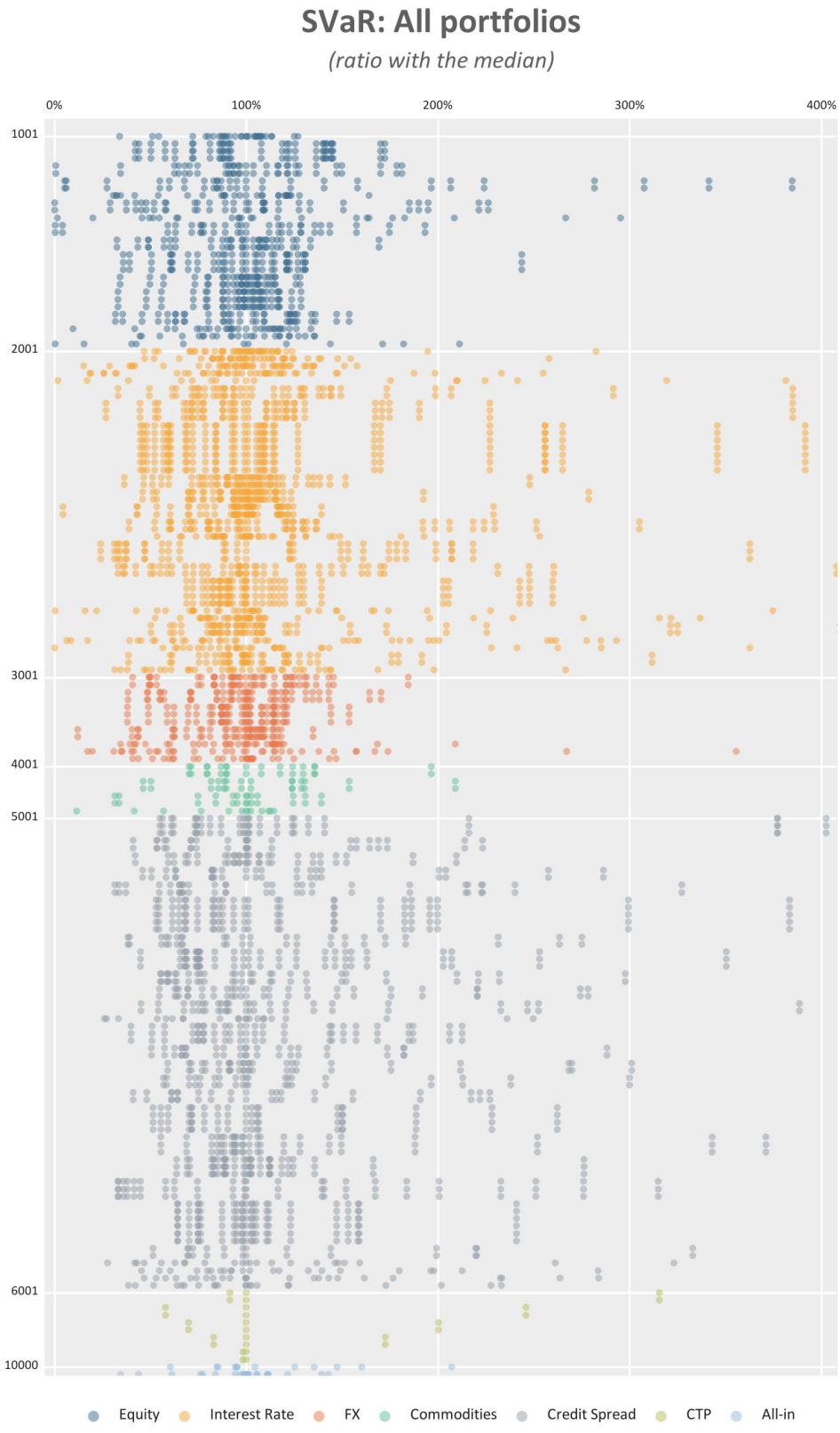
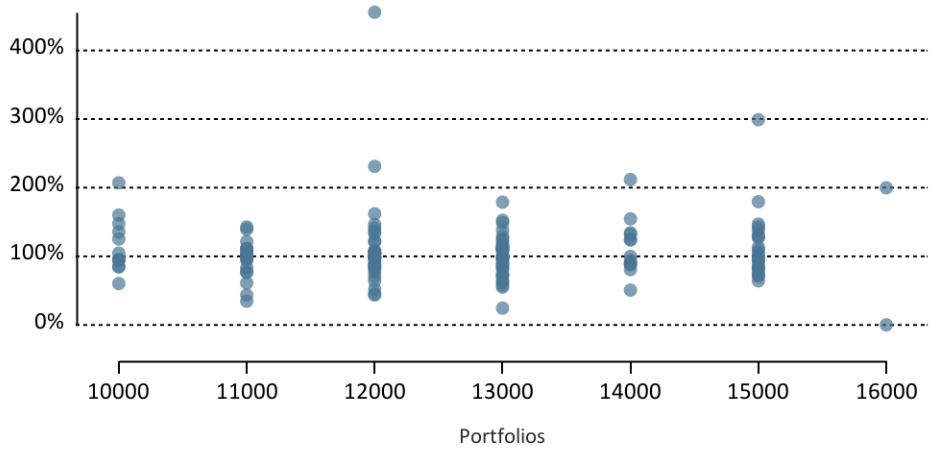

VaR: Interest Rate portfolios
(ratio with the median)
500%
400%
300%
200%
100%
0%
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
Portfolios

Figure 34: sVaR submissions normalised by the median of each portfolio (by asset class)



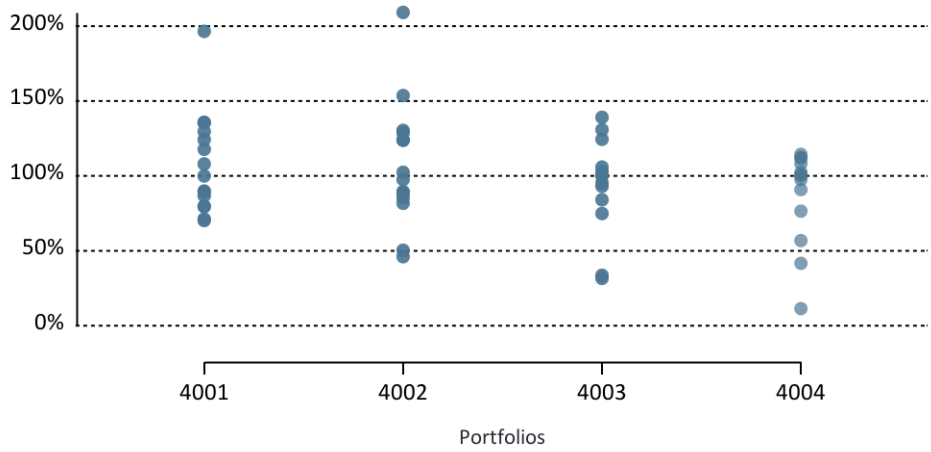
SVaR: Aggregated portfolios

(ratio with the median)



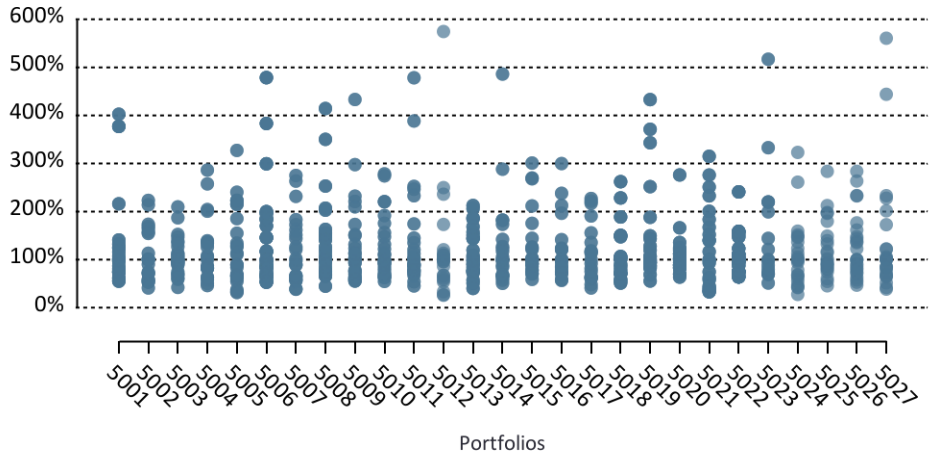
SVaR: Commodities portfolios

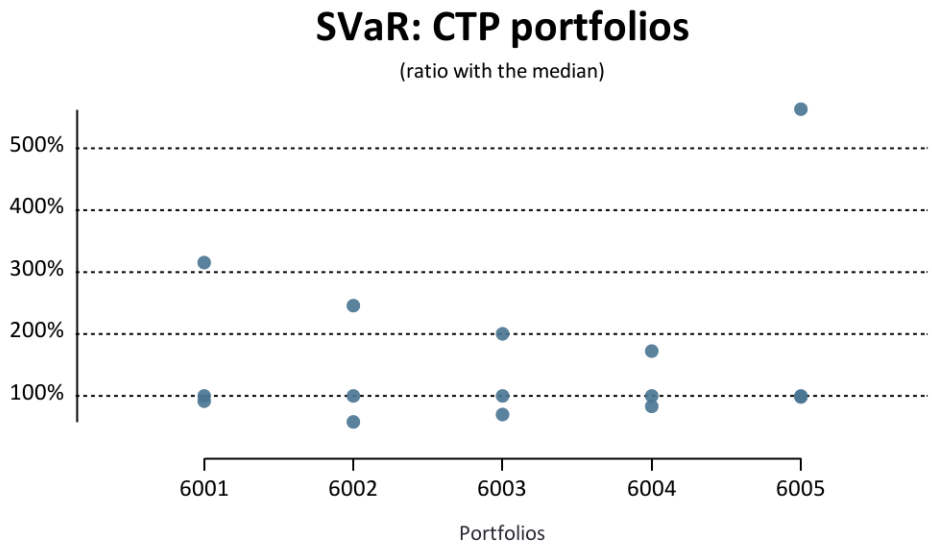
(ratio with the median)

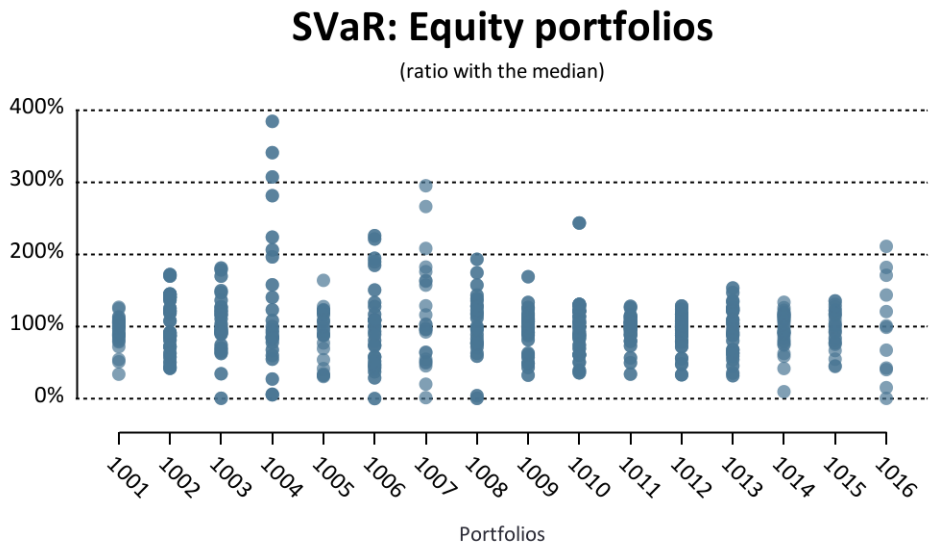


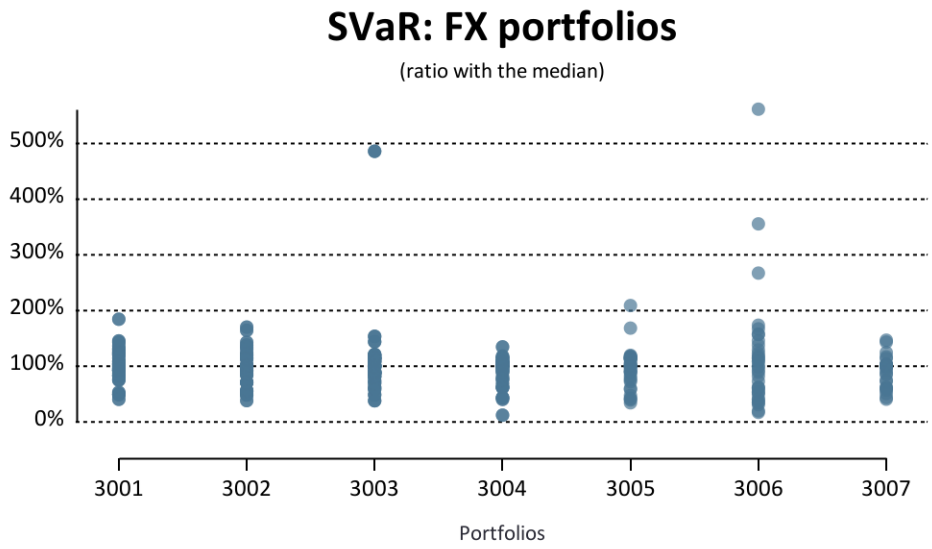
SVaR: Credit Spread portfolios

(ratio with the median)




SVaR: CTP portfolios
(ratio with the median)
500%
400%
300%
200%
100%
6001
6002
6003
6004
6005
Portfolios


SVaR: Equity portfolios
(ratio with the median)
400%
300%
200%
100%
0%
1001
1002
1003
1004
1005
1006
1007
1008
1009
1010
1011
1012
1013
1014
1015
1016
Portfolios


SVaR: FX portfolios
(ratio with the median)
500%
400%
300%
200%
100%
0%
3001
3002
3003
3004
3005
3006
3007
Portfolios

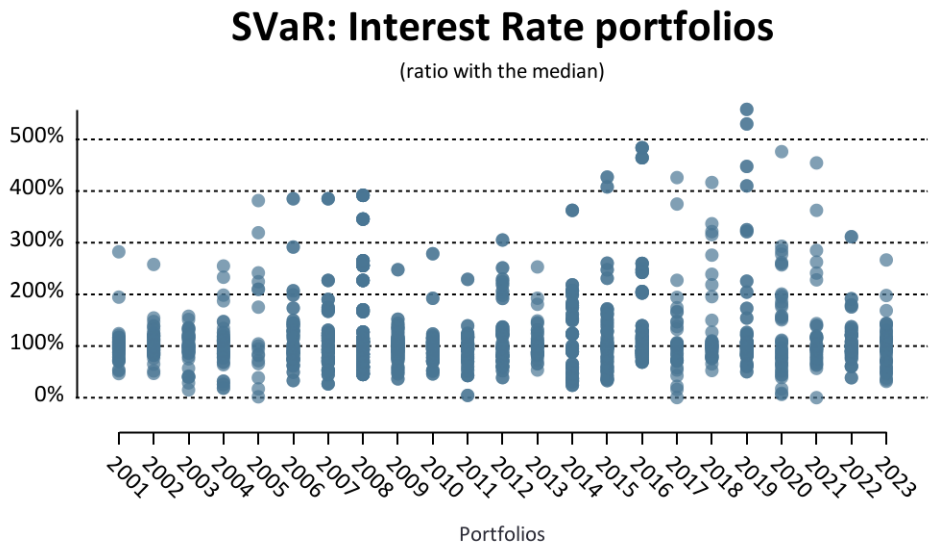

SVaR: Interest Rate portfolios
(ratio with the median)
500%
400%
300%
200%
100%
0%
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
Portfolios

Figure 35: sVaR submissions normalised by the median of each portfolio (by methodological approach)

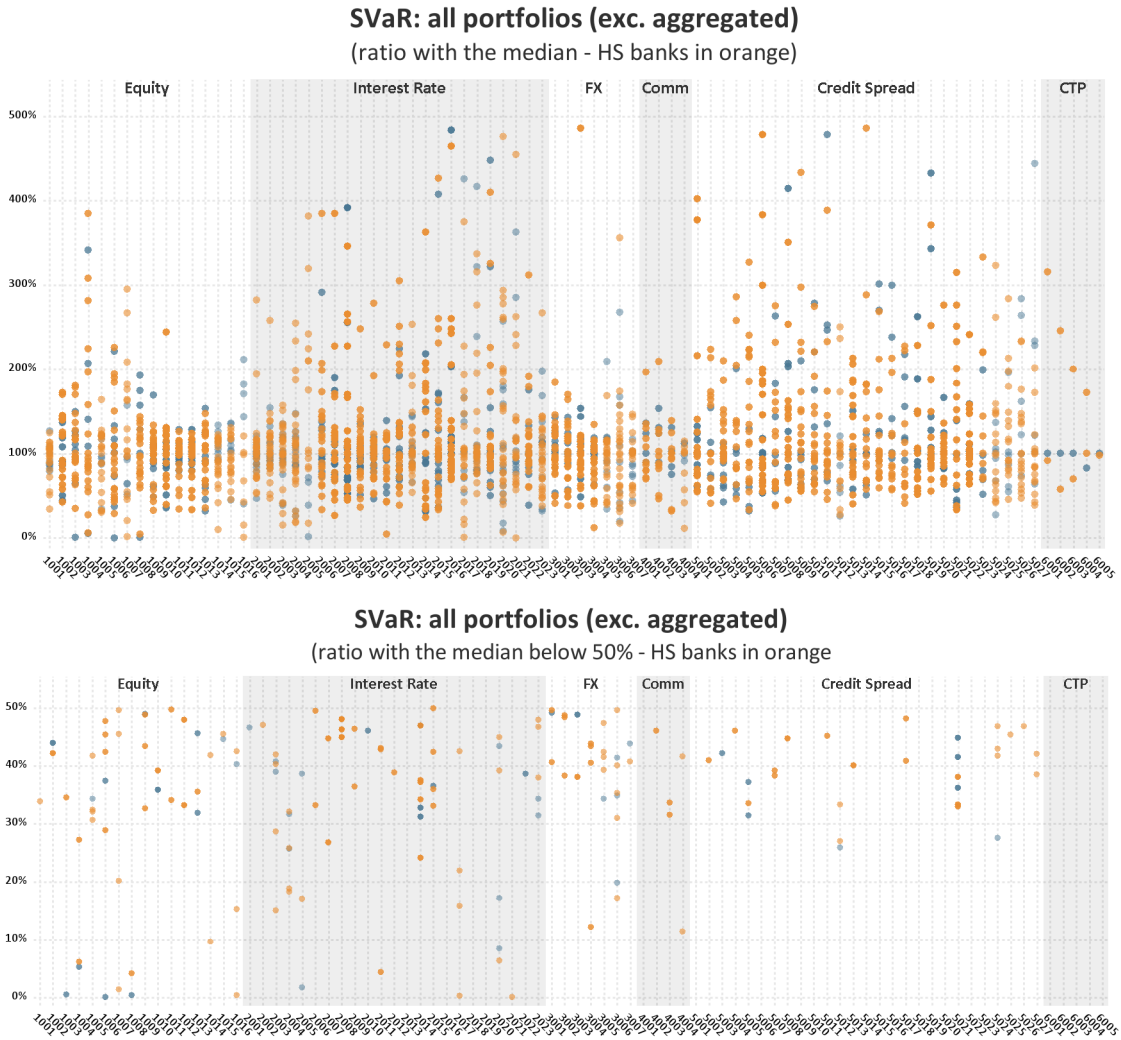


Table 26: VaR statistics (small banks only)

EU Statistics for VaR

		Other stats						Percentiles							
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range
Equity	1001	398,842	509,000	448,168	40,194	9%	5	405,828	412,814	433,773	441,957	457,266	488,306	498,653	3%
	1002	310,895	406,330	366,693	49,728	14%	3	318,091	325,287	346,875	382,854	394,592	401,635	403,982	6%
	1003	11,619	14,314	12,614	1,479	12%	3	11,648	11,677	11,765	11,910	13,112	13,833	14,074	5%
	1004	14	1,668	879	742	84%	4	94	173	412	917	1,385	1,555	1,611	54%
	1005	47,568,576	56,880,676	52,337,583	4,012,727	8%	5	47,820,978	48,073,380	48,830,585	53,266,369	55,141,709	56,185,089	56,532,883	6%
	1006	2,587	4,034	3,413	745	22%	3	2,690	2,793	3,103	3,618	3,826	3,951	3,992	10%
	1007						1								
	1008	6,321	11,991	10,455	2,758	26%	4	7,133	7,945	10,382	11,755	11,828	11,926	11,958	7%
	1009	41,981	77,324	61,860	14,873	24%	4	44,825	47,668	56,199	64,068	69,730	74,286	75,805	11%
	1010	38,227	42,215	40,877	1,811	4%	4	38,680	39,133	40,492	41,534	41,919	42,097	42,156	2%
	1011	372,590	451,768	412,311	29,558	7%	5	378,704	384,819	403,162	406,248	427,787	442,176	446,972	3%
	1012	354,442	429,101	395,154	31,171	8%	5	360,094	365,746	382,702	385,565	423,958	427,044	428,072	5%
	1013	58,113	105,931	80,309	20,924	26%	4	59,850	61,588	66,800	78,595	92,103	100,400	103,165	16%
	1014	306,376	372,831	342,944	26,097	8%	5	310,977	315,578	329,380	345,820	360,311	367,823	370,327	4%
	1015	242,159	299,991	268,478	25,958	10%	4	243,814	245,468	250,432	265,881	283,928	293,566	296,778	6%
	1016	100,555	322,113	240,757	121,939	51%	3	120,460	140,365	200,080	299,604	310,859	317,611	319,862	22%
Interest Rate	2001	228,996	296,045	252,890	21,271	8%	7	232,163	235,331	243,025	247,154	255,992	273,386	284,716	3%
	2002	132,253	200,884	164,693	31,585	19%	8	133,058	133,863	135,349	164,766	192,030	195,367	198,125	17%
	2003	23,988	29,945	27,004	2,069	8%	8	24,500	25,011	25,898	26,325	28,879	29,403	29,674	5%
	2004	88,407	217,922	154,542	47,188	31%	9	94,487	100,567	105,660	175,290	188,867	199,630	208,776	28%
	2005	53,908	55,335	54,622	1,009	2%	2	53,979	54,051	54,265	54,622	54,978	55,192	55,264	1%
	2006	40,391	61,377	50,318	8,037	16%	5	41,530	42,670	46,088	49,148	54,588	58,661	60,019	8%
	2007	104,289	143,564	122,431	18,034	15%	6	104,902	105,515	107,651	118,224	139,176	143,555	143,560	13%
	2008	79,125	128,836	105,038	20,357	19%	6	80,859	82,594	89,035	106,705	120,962	125,817	127,327	15%
	2009	190,543	281,923	245,468	31,536	13%	7	202,571	214,598	233,478	238,399	270,229	277,639	279,781	7%
	2010	206,236	267,222	228,628	19,244	8%	7	209,486	212,735	219,942	222,830	232,113	247,181	257,201	3%
	2011	381,204	585,069	472,932	71,966	15%	8	382,046	382,888	432,636	473,069	501,867	563,285	574,177	7%
	2012	130,089	258,325	172,764	47,768	28%	7	133,076	136,063	143,423	156,268	188,910	235,700	247,012	14%
	2013	57,985	97,347	78,202	14,713	19%	7	59,844	61,703	70,105	77,040	87,417	96,604	96,975	11%
	2014	23,129	61,509	46,601	15,793	34%	5	26,140	29,151	38,184	52,914	57,269	59,813	60,661	20%
	2015	1,591	14,789	6,946	5,930	85%	6	1,785	1,979	2,588	4,475	11,910	14,385	14,587	64%
	2016	143,618	186,559	170,433	16,752	10%	5	148,840	154,062	169,729	169,879	182,378	184,887	185,723	4%
	2017	23,322	106,081	49,016	33,752	69%	5	24,182	25,041	27,620	35,883	52,172	84,517	95,299	31%
	2018	26,949	34,507	30,500	2,723	9%	6	27,481	28,013	29,187	29,834	32,136	33,653	34,080	5%
	2019	13,176	20,233	17,754	2,819	16%	6	13,746	14,317	16,250	18,845	19,740	20,100	20,166	10%
	2020	27,857	52,256	43,066	7,982	19%	9	30,811	33,764	39,101	46,018	48,546	50,088	51,172	11%
	2021	47,034	90,537	62,280	15,470	25%	6	47,631	48,228	52,545	61,981	62,555	76,631	83,584	9%
	2022	238,203	379,422	304,162	48,637	16%	6	245,014	251,825	277,010	311,890	316,611	348,772	364,097	7%
	2023	134,329	339,774	246,823	64,651	26%	8	157,783	181,237	215,329	250,891	283,991	310,583	325,179	14%
FX	3001	410,212	789,743	609,833	151,605	25%	7	417,524	424,836	506,372	591,656	732,238	780,967	785,355	18%
	3002	131,655	242,890	173,330	41,449	24%	8	132,040	132,426	132,895	171,052	200,078	217,269	230,079	20%
	3003	157,194	217,097	187,314	24,558	13%	8	157,533	157,872	164,430	191,630	204,582	215,813	216,455	11%
	3004	490,226	672,105	587,150	74,151	13%	8	493,387	496,548	509,866	615,187	645,181	654,802	663,453	12%
	3005	343,714	439,807	377,594	33,302	9%	8	345,059	346,404	354,828	371,481	384,971	421,916	430,862	4%
	3006	8,148	28,111	15,121	6,267	41%	8	9,543	10,938	12,384	12,948	15,369	22,840	25,476	11%
	3007	735,228	896,825	790,230	72,407	9%	4	739,276	743,324	755,468	764,434	799,196	857,773	877,299	3%
Commodities	4001	16,045	25,728	20,887	6,847	33%	2	16,529	17,013	18,466	20,887	23,307	24,760	25,244	12%
	4002	297,147	541,978	419,563	173,122	41%	2	309,389	321,630	358,355	419,563	480,770	517,495	529,736	15%
	4003	468,623	569,625	519,124	71,419	14%	2	473,673	478,723	493,874	519,124	544,375	559,525	564,575	5%
	4004	341,677	469,204	405,441	90,175	22%	2	348,053	354,430	373,559	405,441	437,322	456,451	462,828	8%
Credit Spread	5001	9,766	16,711	12,781	3,562	28%	3	9,976	10,186	10,817	11,867	14,289	15,742	16,227	14%
	5002	23,441	45,759	32,793	11,590	35%	3	24,015	24,588	26,310	29,178	37,469	42,443	44,101	17%
	5003	6,388	8,131	7,658	848	11%	4	6,633	6,877	7,611	8,057	8,105	8,121	8,126	3%
	5004	11,438	20,720	14,920	5,056	34%	3	11,555	11,671	12,021	12,603	16,662	19,097	19,908	16%
	5005	3,274	9,515	5,956	2,611	44%	4	3,562	3,849	4,712	5,517	6,761	8,413	8,964	18%
	5006	9,753	19,357	14,002	4,578	33%	4	9,889	10,025	10,434	13,449	17,017	18,421	18,889	24%
	5007	38,989	89,252	62,276	25,334	41%	3	40,949	42,909	48,789	58,588	73,920	83,119	86,186	20%
	5008	60,785	115,752	87,934	23,806	27%	4	63,349	65,913	73,605	87,599	101,927	110,222	112,987	16%
	5009	16,870	24,628	19,617	4,346	22%	3	16,918	16,967	17,112	17,354	20,991	23,173	23,901	10%
	5010	25,202	46,625	34,862	10,865	31%	3	25,958	26,713	28,980	32,758	39,692	43,852	45,238	16%
	5011	16,415	32,602	23,822	8,180	34%	3	17,018	17,622	19,432	22,448	27,525	30,571	31,587	17%
	5012	1,574	4,836	3,205	2,307	72%	2	1,737	1,900	2,390	3,205	4,021	4,510	4,673	25%
	5013	17,656	23,386	20,521	4,052	20%	2	17,943	18,229	19,089	20,521	21,954	22,813	23,100	7%
	5014	4,566	5,980	5,273	1,000	19%	2	4,637	4,707	4,920	5,273	5,627	5,839	5,909	7%
	5015	24,950	28,874	26,912	2,775	10%	2	25,146	25,342	25,931	26,912	27,893	28,482	28,678	4%
	5016	49,084	55,568	52,326	4,585	9%	2	49,408	49,732	50,705	52,326	53,947	54,920	55,244	3%
	5017	23,268	45,694	34,481	15,858	46%	2	24,389	25,511	28,875	34,481	40,088	43,451	44,573	16%
	5018	58,539	95,000	76,770	25,782	34%	2	60,362	62,185	67,654	76,770	85,885	91,354	93,177	12%
	5019	12,997	20,275	15,899	3,856	24%	3	13,140	13,283	13,712	14,426	17,351	19,105	19,690	12%
	5020	198,146	235,905	218,249	15,987	7%	4	200,611	203,075	210,469	219,472	227,252	232,444	234,174	4%
	5021	15,542	29,394	23,666	7,230	31%	3	16,594	17,646	20,803	26,063	27,729	28,728	29,061	14%
	5022	187,070	208,782	197,926	15,353	8%	2	188,156	189,241	192,498	197,926	203,354	206,611	207,696	3%
	5023	53,018	86,604	69,811	23,749	34%	2	54,697	56,377	61,415	69,811	78,208	83,245	84,925	12%
	5024	32,443	70,160	51,302	26,670	52%	2	34,329	36,215	41,872	51,302	60,731	66,388	68,274	18%
	5025	59,026	80,472	69,749	15,165	22%	2	60,098	61,171	64,388	69,749	75,111	78,327	79,400	8%
	5026	29,380	44,243	36,812	10,510	29%	2	30,123	30,866	33,096	36,812	40,527	42,757	43,500	10%
	5027	14,313	32,467	23,419	9,077	39%	3	15,229	16,146	18,895	23,476	27,972	30,669	31,568	19%
CTP	6001														
	6002														
	6003														
	6004														
	6005														
ALL-IN no-CTP	10000						1								
Equity Cumulative	11000	275,916	337,484	309,654	31,206	10%	3	279,881	283,845	295,740	315,563	326,524	333,100	335,292	5%
IR Cumulative	12000	255,384	435,862	358,288	63,155	18%	6	274,838	294,292	334,929	364,610	394,322	415,962	425,912	8%
FX Cumulative	13000	596,587	1,035,822	742,536	152,896	21%	8	602,029	607,471	660,484	685,753	780,077	948,660	992,241	8%
Commodity Cumulative	14000	316,392	537,621	427,007	156,433	37%	2	327,453	338,515	371,699	427,007	482,314	515,498	526,560	13%
CS Cumulative	15000	242,431	295,184	261,664	29,134	11%	3	242,926	243,420	244,904	247,377	271,281	285,623	290,403	5%
CTP Cumulative	16000														

Figure 36: VaR ratio with median (focus on small banks)

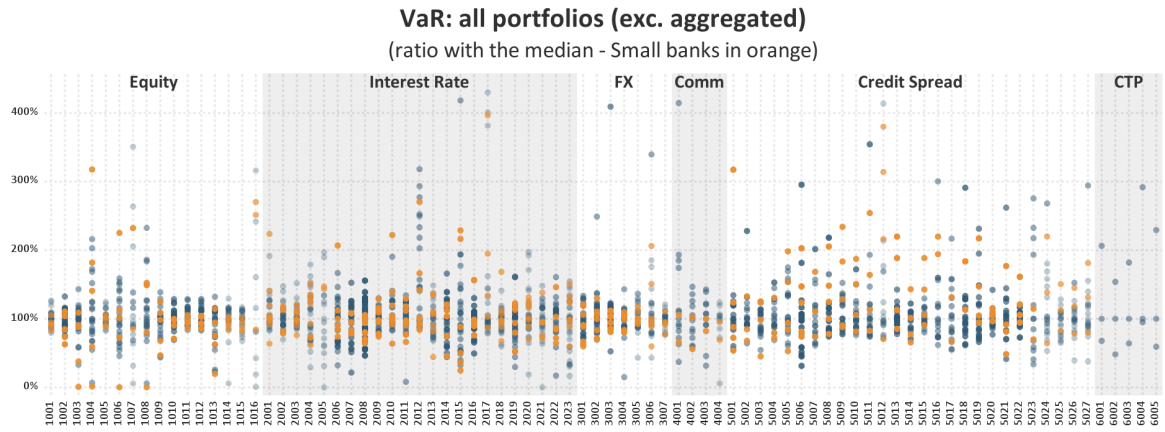


Table 27: VaR statistics (medium-sized banks only)

EU Statistics for VaR

		Other stats						Percentiles							
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range
Equity	1001	385,140	577,601	468,932	54,167	12%	15	397,445	409,654	422,869	481,694	505,216	527,100	545,047	9%
	1002	277,489	419,285	355,425	45,109	13%	14	293,786	305,005	320,985	349,558	392,908	411,255	414,181	10%
	1003	7,624	18,809	13,035	3,028	23%	13	7,687	8,329	11,834	13,780	14,452	14,980	16,559	10%
	1004	62	1,860	999	488	49%	11	343	623	753	917	1,270	1,546	1,703	26%
	1005	44,528,539	62,687,319	53,686,115	5,690,172	11%	13	45,028,097	45,868,454	50,567,315	53,300,702	57,045,955	61,262,603	62,415,568	6%
	1006	1,644	5,488	3,320	1,288	39%	14	1,833	1,985	2,306	3,088	4,374	5,080	5,239	31%
	1007	1,528	55,097	24,030	14,579	61%	10	4,652	7,776	17,997	24,073	29,441	35,698	45,398	24%
	1008	5,333	10,015	7,879	1,637	21%	8	5,661	5,990	6,672	8,207	9,066	9,414	9,715	15%
	1009	43,454	85,858	64,112	12,344	19%	12	46,175	49,131	58,567	62,973	69,839	79,688	82,628	9%
	1010	34,581	45,690	40,852	3,571	9%	11	35,831	37,081	38,263	40,557	43,567	44,896	45,293	6%
	1011	359,889	507,145	421,826	46,260	11%	13	373,248	382,611	390,041	405,045	445,415	492,828	503,253	7%
	1012	343,511	495,028	402,753	43,972	11%	13	359,237	369,817	370,871	393,962	425,404	461,189	479,070	7%
	1013	50,640	122,288	89,460	20,026	22%	13	61,091	68,061	71,753	93,217	102,602	107,003	113,205	18%
	1014	301,745	415,590	365,385	37,952	10%	12	308,950	316,617	344,446	359,979	395,844	411,919	414,177	7%
	1015	227,827	334,365	292,423	36,704	13%	9	232,583	237,340	291,584	300,079	307,173	333,780	334,073	3%
	1016	95,999	191,387	130,835	44,708	34%	4	96,323	96,647	97,618	117,976	151,192	175,309	183,348	22%
Interest Rate	2001	206,696	315,247	247,280	29,717	12%	19	206,757	218,865	231,150	241,557	252,373	294,786	311,401	4%
	2002	140,308	210,467	168,960	18,018	11%	18	148,398	151,958	153,563	166,996	178,204	193,732	198,803	7%
	2003	22,436	31,217	26,169	2,080	8%	19	23,121	23,875	24,901	26,118	27,107	28,705	29,135	4%
	2004	75,199	220,880	141,273	42,683	30%	19	90,290	96,437	106,236	130,115	165,566	198,925	216,048	22%
	2005	0	74,067	34,879	24,861	71%	7	3,505	7,010	19,259	35,697	47,935	59,856	66,962	43%
	2006	28,730	79,878	51,114	17,238	34%	16	31,234	32,634	35,705	50,898	64,003	71,481	74,141	28%
	2007	84,296	167,586	132,388	27,112	20%	13	91,696	97,975	107,005	139,679	155,887	162,703	165,500	19%
	2008	67,335	169,979	117,727	35,041	30%	15	68,737	73,651	85,028	124,763	147,386	157,461	163,061	27%
	2009	193,625	293,518	243,872	29,815	12%	21	194,627	199,179	227,764	245,714	264,972	279,304	287,668	8%
	2010	186,675	284,233	223,172	26,606	12%	19	187,431	197,015	208,046	218,615	227,409	265,292	280,422	4%
	2011	394,429	613,113	512,387	61,118	12%	20	429,486	447,162	476,248	501,379	560,909	605,035	611,831	8%
	2012	134,738	338,818	181,036	62,521	35%	18	136,256	137,708	144,548	152,940	206,794	265,011	318,342	18%
	2013	48,607	95,220	67,221	13,812	21%	19	51,539	51,946	54,697	67,039	75,595	86,175	91,648	16%
	2014	25,559	70,822	44,317	15,263	34%	13	28,105	29,931	30,749	40,621	50,976	65,696	67,789	25%
	2015	2,079	12,517	6,503	2,850	44%	20	2,560	3,106	4,364	6,705	7,886	9,877	11,511	29%
	2016	161,488	206,755	188,594	14,871	8%	12	161,639	163,635	184,692	190,244	201,738	203,265	204,928	4%
	2017	21,374	115,029	42,309	33,070	78%	16	22,780	23,311	24,029	25,698	36,058	104,673	109,191	20%
	2018	24,114	36,378	29,771	3,621	12%	18	24,641	25,112	27,141	29,898	32,085	34,665	35,498	8%
	2019	9,734	19,580	15,389	2,791	18%	18	10,680	11,825	13,650	15,751	17,097	18,481	19,299	11%
	2020	25,700	50,122	37,866	5,955	16%	18	28,198	29,150	35,544	38,269	40,288	43,025	47,792	6%
	2021	41,539	85,041	62,351	13,269	21%	15	43,334	45,663	53,345	60,050	71,479	79,219	82,513	15%
	2022	295,745	453,879	384,186	48,833	13%	12	303,583	312,321	352,394	400,551	413,210	422,261	436,663	8%
	2023	119,469	348,302	227,958	69,822	31%	17	129,806	133,129	176,941	227,410	262,354	327,427	335,270	19%
FX	3001	460,183	830,624	634,002	114,602	18%	19	476,660	480,496	537,342	636,100	698,780	779,365	798,823	13%
	3002	130,058	254,893	182,201	31,989	18%	16	141,858	147,604	160,747	179,499	196,251	219,502	234,455	10%
	3003	169,638	238,550	203,098	25,249	12%	16	169,843	170,264	177,833	208,604	225,173	234,150	236,477	12%
	3004	497,646	707,577	591,015	58,670	10%	16	520,143	528,943	535,971	608,321	626,986	649,777	675,534	8%
	3005	296,901	483,491	380,635	63,642	17%	15	316,921	325,803	327,748	346,979	430,223	471,679	480,062	14%
	3006	5,900	46,297	15,986	9,143	57%	17	9,704	10,698	10,971	13,529	16,685	24,470	29,471	21%
	3007	648,835	901,573	796,890	77,071	10%	10	665,978	683,121	775,360	824,009	840,290	850,620	876,097	4%
Commodities	4001	9,043	24,365	18,426	5,681	31%	6	10,614	12,185	15,888	19,646	22,328	23,447	23,906	17%
	4002	324,638	668,729	469,936	124,888	27%	6	339,365	354,093	395,327	441,544	532,818	614,173	641,451	15%
	4003	261,170	795,023	546,313	172,834	32%	6	325,776	390,381	519,796	545,360	601,109	703,199	749,111	7%
	4004	356,396	589,461	482,315	83,188	17%	5	380,398	404,400	476,406	492,939	496,373	552,226	570,843	2%
Credit Spread	5001	11,341	16,964	14,422	2,305	16%	8	11,447	11,554	12,692	14,847	16,293	16,601	16,783	12%
	5002	22,098	45,367	34,086	7,789	23%	6	24,542	26,986	31,877	33,174	37,738	42,099	43,733	8%
	5003	5,371	8,031	6,890	919	13%	9	5,372	5,373	6,865	7,284	7,365	7,529	7,780	4%
	5004	10,946	20,348	15,316	3,152	21%	6	11,674	12,402	14,011	14,938	16,504	18,609	19,479	8%
	5005	4,853	9,833	6,773	1,811	27%	10	4,952	5,052	5,571	6,160	7,835	9,586	9,710	17%
	5006	5,936	15,339	11,884	3,460	29%	8	6,543	7,151	9,748	13,823	14,000	14,440	14,890	18%
	5007	34,562	83,277	52,938	16,905	32%	7	36,038	37,515	41,350	47,463	61,284	71,538	77,408	19%
	5008	57,678	128,724	80,570	21,116	26%	11	59,078	60,478	65,267	75,570	92,735	95,905	112,315	17%
	5009	14,901	26,308	20,461	4,454	22%	12	15,152	15,434	16,429	20,461	24,133	25,890	26,109	19%
	5010	23,598	46,377	32,128	7,395	23%	9	24,120	24,643	26,853	32,768	35,002	40,427	43,402	13%
	5011	15,241	38,395	21,673	7,008	32%	9	15,640	16,039	17,191	19,860	23,963	26,981	32,688	16%
	5012	1,612	3,959	2,270	784	35%	7	1,644	1,676	1,874	2,099	2,237	2,960	3,460	9%
	5013	16,102	25,918	20,031	3,319	17%	10	16,419	16,737	17,322	19,857	21,410	24,579	25,248	11%
	5014	4,219	7,216	6,028	943	16%	8	4,562	4,904	5,623	6,379	6,530	6,743	6,979	7%
	5015	21,980	32,124	27,336	3,301	12%	9	23,143	24,306	25,620	27,031	28,959	32,054	32,089	6%
	5016	18,471	40,364	27,716	9,324	34%	7	18,490	18,509	20,529	23,783	35,169	39,874	40,119	26%
	5017	19,456	54,753	36,264	11,861	33%	7	22,040	24,624	28,650	36,046	43,146	49,010	51,881	20%
	5018	31,845	68,942	52,669	13,353	25%	7	35,221	38,596	45,815	49,285	63,492	67,415	68,179	16%
	5019	9,898	20,463	13,543	3,955	29%	8	9,920	9,941	10,368	12,010	16,733	17,888	19,176	23%
	5020	183,030	237,074	205,707	18,051	9%	11	184,337	185,643	191,199	199,948	221,285	224,237	230,656	7%
	5021	22,437	46,308	34,865	7,546	22%	7	25,325	28,214	32,721	33,528	38,171	43,441	44,874	8%
	5022	180,940	231,428	202,637	17,623	9%	9	182,220	183,499	188,083	207,379	213,845	219,568	225,498	6%
	5023	30,933	164,598	71,278	54,789	77%	5	32,899	34,864	40,761	44,436	75,660	129,023	146,810	30%
	5024	34,957	91,399	55,862	18,075	32%	8	39,200	43,444	47,260	49,662	57,871	79,559	85,479	10%
	5025	54,389	91,732	72,388	10,534	15%	9	58,249	62,108	66,051	71,905	77,369	80,859	86,296	8%
	5026	29,873	43,833	37,601	5,159	14%	8	30,321	30,770	34,952	37,689	41,728	43,298	43,565	9%
	5027	6,776	27,821	17,861	5,845	33%	9	9,880	12,985	15,813	17,169	21,445	23,154	25,487	15%
CTP	6001														
	6002														
	6003														
	6004														
	6005														
ALL-IN no-CTP	10000	768,194	1,099,771	907,825	171,868	19%	3	776,926	785,657	811,852	855,509	977,640	1,050,919	1,075,345	9%
Equity Cumulative	11000	246,586	349,759	293,164	37,756	13%	8	252,891	259,197	264,704	285,855	315,278	343,855	346,807	9%
IR Cumulative	12000	316,037	492,096	396,267	44,289	11%	13	336,243	350,920	358,880	403,384	419,628	427,635	453,976	8%
FX Cumulative	13000	565,591	1,023,824	809,861	156,186	19%	15	571,495	577,415	715,820	814,483	926,395	999,452	1,014,808	13%
Commodity Cumulative	14000	327,295	671,020	481,390	122,488	25%	6	343,471	359,647	407,274	467,948	542,297	616,575	643,797	14%
CS Cumulative	15000	220,661	316,890	260,899	34,176	13%	8	222,223	223,784	234,536	260,900	281,344	294,483	305,687	9%
CTP Cumulative	16000														

Figure 37: VaR ratio with median (focus on medium-sized banks)

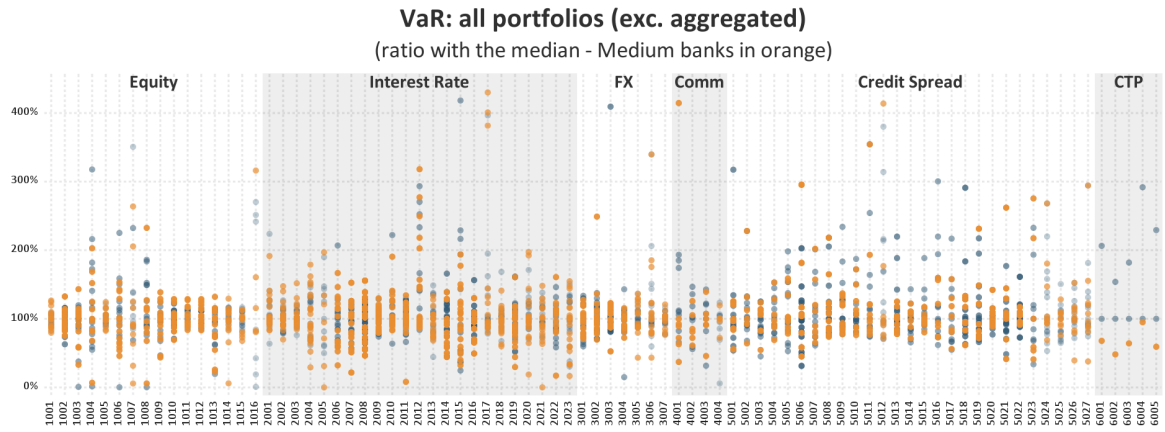


Table 28: VaR statistics (large banks only)

EU Statistics for VaR

		Other stats						Percentiles							
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range
Equity	1001	442,718	525,357	491,390	26,659	5%	10	453,451	464,183	476,695	487,663	514,203	522,649	524,003	4%
	1002	315,747	426,069	381,666	41,471	11%	10	323,542	331,337	343,680	394,920	415,149	424,677	425,373	9%
	1003	11,222	15,743	13,534	1,410	10%	10	11,613	12,004	12,864	13,213	14,467	15,336	15,540	6%
	1004	503	1,982	1,016	456	45%	10	553	602	732	889	1,117	1,622	1,802	21%
	1005	49,815,393	61,917,426	54,287,932	4,100,428	8%	9	50,013,750	50,212,107	50,982,916	53,894,269	56,913,388	58,136,984	60,027,205	5%
	1006	2,733	5,683	4,011	938	23%	10	2,952	3,171	3,445	3,739	4,402	5,410	5,547	12%
	1007	18,424	37,253	28,073	7,139	25%	9	18,436	18,447	23,727	27,877	33,158	36,984	37,119	17%
	1008	5,959	9,914	7,596	1,146	15%	8	6,322	6,685	7,075	7,379	7,945	8,693	9,304	6%
	1009	45,513	72,985	60,410	7,594	13%	10	48,190	50,867	58,889	61,255	64,261	66,214	69,600	4%
	1010	39,059	51,719	44,431	3,693	8%	10	39,873	40,686	42,366	43,713	46,946	47,817	49,768	5%
	1011	408,649	503,209	454,616	37,275	8%	10	408,672	408,696	416,155	462,289	486,766	490,758	496,984	8%
	1012	393,959	474,939	433,224	33,653	8%	10	394,450	394,940	398,188	442,776	461,772	464,031	469,485	7%
	1013	57,347	106,822	94,612	16,212	17%	10	65,697	74,047	91,320	102,068	105,051	106,008	106,415	7%
	1014	350,820	423,285	391,760	28,247	7%	10	353,635	356,450	366,688	396,852	416,559	422,679	422,982	6%
	1015	266,321	345,602	308,951	29,726	10%	10	266,524	266,726	283,378	319,873	328,629	339,302	342,452	7%
	1016	964	288,030	90,559	133,211	147%	4	4,205	7,446	17,169	36,620	110,010	216,822	252,426	73%
Interest Rate	2001	215,458	315,516	260,465	32,957	13%	11	222,869	230,279	240,425	251,430	277,466	313,034	314,275	7%
	2002	133,789	194,462	165,461	20,029	12%	10	137,778	141,767	154,732	163,897	179,516	188,244	191,353	7%
	2003	22,975	29,920	26,422	2,445	9%	10	23,197	23,419	24,825	26,250	28,226	29,774	29,847	6%
	2004	98,732	210,379	149,654	43,466	29%	11	98,916	99,100	104,053	165,523	184,473	190,363	200,371	28%
	2005	18,777	71,402	37,702	17,852	47%	8	20,099	21,420	23,041	34,135	47,870	56,688	64,045	35%
	2006	32,590	69,875	50,970	11,454	22%	11	34,875	37,160	41,792	55,618	57,785	59,612	64,744	16%
	2007	75,454	167,453	131,388	29,690	23%	11	80,716	85,977	119,869	138,295	152,945	160,020	163,737	12%
	2008	82,170	159,544	129,581	27,095	21%	11	92,545	102,920	105,688	135,108	153,608	156,971	158,258	18%
	2009	200,784	265,759	240,563	17,177	7%	11	214,363	227,942	233,904	242,192	249,437	256,882	261,321	3%
	2010	207,307	283,818	236,070	27,710	12%	11	208,599	209,891	216,561	226,880	249,393	282,104	282,961	7%
	2011	410,714	629,203	537,546	73,353	14%	11	439,427	468,140	474,523	548,376	594,435	628,707	628,955	11%
	2012	139,699	226,725	169,185	35,250	21%	8	139,939	140,179	144,629	151,686	188,654	221,020	223,873	13%
	2013	49,801	98,195	69,686	14,700	21%	10	52,477	55,153	58,438	68,545	77,940	84,855	91,525	14%
	2014	42,966	70,822	55,975	9,385	17%	9	43,120	43,273	51,525	57,635	62,009	65,637	68,230	9%
	2015	2,394	27,014	8,054	7,830	97%	9	2,758	3,121	3,445	5,172	9,252	15,416	21,215	46%
	2016	170,064	225,107	198,040	14,189	7%	11	178,663	187,261	190,616	197,161	205,082	209,278	217,193	4%
	2017	20,987	43,381	28,075	6,763	24%	11	21,645	22,303	25,132	26,314	27,273	38,578	40,980	4%
	2018	25,542	35,100	31,324	2,843	9%	11	26,138	26,733	31,302	31,714	32,728	34,071	34,586	2%
	2019	11,482	18,223	15,537	2,475	16%	9	11,758	12,034	14,088	16,552	17,289	18,007	18,115	10%
	2020	33,802	56,155	40,972	6,716	16%	10	33,858	33,915	36,509	40,069	42,340	47,756	51,956	7%
	2021	57,356	84,940	73,014	8,137	11%	11	60,059	62,762	68,058	75,877	77,221	80,118	82,529	6%
	2022	301,018	485,422	374,286	65,415	17%	10	304,456	307,894	312,257	371,281	418,090	446,106	465,764	14%
	2023	85,315	303,783	230,247	67,079	29%	10	129,372	173,430	197,995	229,224	284,327	298,546	301,164	18%
FX	3001	474,130	869,104	715,712	144,371	20%	10	487,995	501,861	625,392	778,902	831,848	846,663	857,883	14%
	3002	151,487	231,358	199,011	29,846	15%	9	154,010	156,533	181,215	215,974	222,373	224,274	227,816	10%
	3003	160,770	227,547	190,926	24,125	13%	9	162,486	164,203	171,680	189,097	198,052	226,772	227,159	7%
	3004	530,453	698,383	617,358	59,786	10%	8	536,710	542,967	585,008	620,713	647,041	692,850	695,617	5%
	3005	322,520	466,688	383,315	46,794	12%	9	328,704	334,887	344,378	381,805	417,866	428,795	447,742	10%
	3006	10,230	46,297	17,630	10,399	59%	10	11,279	12,328	13,037	14,296	16,607	22,253	34,275	12%
	3007	749,556	941,645	827,931	63,586	8%	9	755,364	761,172	780,149	811,212	850,810	909,587	925,616	4%
Commodities	4001	20,081	47,103	34,807	11,417	33%	6	21,766	23,451	26,946	34,872	44,427	46,099	46,601	24%
	4002	314,402	779,543	584,776	165,930	28%	6	366,039	417,675	526,400	585,878	698,756	750,775	765,159	14%
	4003	612,845	814,356	703,204	83,204	12%	4	624,232	635,618	669,778	692,807	726,233	779,107	796,731	4%
	4004	422,408	609,319	517,235	66,215	13%	5	440,813	459,217	514,431	515,379	524,639	575,447	592,383	1%
Credit Spread	5001	8,144	18,163	14,207	2,920	21%	11	9,981	11,818	12,349	14,298	16,431	16,704	17,434	14%
	5002	30,987	45,396	35,804	5,073	14%	10	31,148	31,309	31,713	34,382	38,801	42,724	44,060	10%
	5003	4,805	6,988	5,865	752	13%	11	4,948	5,090	5,325	5,657	6,489	6,930	6,959	10%
	5004	12,564	22,951	16,894	3,307	20%	10	13,190	13,815	14,443	16,179	19,262	20,665	21,808	14%
	5005	3,751	9,519	6,677	2,062	31%	9	3,850	3,949	5,714	6,061	8,329	8,712	9,115	19%
	5006	4,129	16,668	10,809	3,963	37%	11	5,145	6,161	7,214	12,819	13,153	14,055	15,362	29%
	5007	32,378	80,201	50,490	14,844	29%	10	33,084	33,790	39,759	49,108	59,390	64,798	72,499	20%
	5008	59,267	91,202	73,818	11,949	16%	10	60,322	61,378	64,338	71,451	83,631	89,890	90,546	13%
	5009	14,855	24,433	18,989	3,194	17%	10	15,425	15,994	17,096	18,539	19,252	24,409	24,421	6%
	5010	24,892	37,594	30,193	3,496	12%	10	25,914	26,936	28,120	30,108	30,863	33,748	35,671	5%
	5011	14,679	29,205	18,943	4,410	23%	10	14,765	14,852	15,939	17,644	19,931	23,444	26,325	11%
	5012	1,595	4,787	2,667	1,018	38%	11	1,641	1,687	2,071	2,180	3,273	3,796	4,292	22%
	5013	17,377	29,545	21,376	3,309	15%	11	18,186	18,995	19,475	20,323	22,264	24,275	26,910	7%
	5014	4,138	7,216	5,632	883	16%	11	4,503	4,867	5,019	5,719	6,236	6,429	6,823	11%
	5015	23,171	31,536	27,143	2,540	9%	10	23,927	24,682	25,429	26,840	28,765	29,964	30,750	6%
	5016	15,615	40,364	24,839	7,637	31%	9	16,743	17,870	18,944	24,685	29,560	31,999	36,182	22%
	5017	19,023	54,753	33,388	12,112	36%	9	20,609	22,194	24,344	30,406	36,619	50,787	52,770	20%
	5018	32,676	67,280	49,133	11,867	24%	9	35,038	37,400	41,330	47,249	53,245	66,574	66,927	13%
	5019	9,104	20,463	13,510	3,777	28%	10	9,318	9,532	10,761	12,699	15,785	18,327	19,395	19%
	5020	175,819	224,237	199,846	14,778	7%	10	180,370	184,922	189,372	199,761	209,485	214,832	219,535	5%
	5021	22,705	41,529	31,834	6,028	19%	10	24,388	26,072	27,504	30,793	35,273	40,251	40,890	12%
	5022	174,562	216,603	193,118	13,673	7%	9	177,193	179,824	185,342	187,780	201,656	209,489	213,046	4%
	5023	25,469	176,035	89,979	53,401	59%	7	33,241	41,013	57,753	75,660	118,593	158,228	167,132	35%
	5024	26,930	85,592	52,808	18,870	36%	10	32,380	37,829	41,148	47,578	62,952	80,618	83,105	21%
	5025	48,189	85,943	64,321	13,924	22%	9	48,874	49,559	52,970	58,234	74,486	81,066	83,505	17%
	5026	26,918	47,236	37,424	5,386	14%	10	29,875	32,832	35,694	37,194	39,657	42,921	45,079	5%
	5027	13,339	24,980	18,136	3,610	20%	9	14,113	14,887	16,205	16,744	20,772	22,164	23,572	12%
CTP	6001														
	6002														
	6003														
	6004														
	6005														
ALL-IN no-CTP	10000	747,951	1,149,049	923,510	156,168	17%	7	753,005	758,059	809,174	884,645	1,032,290	1,120,085	1,134,567	12%
Equity Cumulative	11000	284,096	350,067	315,516	24,304	8%	9	287,032	289,967	292,847	321,609	328,681	347,463	348,765	6%
IR Cumulative	12000	290,323	426,691	361,173	53,257	15%	8	292,387	294,452	308,775	383,042	397,272	408,790	417,740	13%
FX Cumulative	13000	678,260	990,847	812,670	98,862	12%	10	693,543	708,827	725,502	832,109	872,913	892,941	941,894	9%
Commodity Cumulative	14000	329,720	791,636	600,825	180,489	30%	5	369,972	410,224	530,980	629,804	721,985	763,776	777,706	15%
CS Cumulative	15000	219,993	316,890	256,339	29,617	12%	9	222,183	224,373	236,254	257,699	272,166	282,767	299,828	7%
CTP Cumulative	16000														

Figure 38: VaR ratio with median (focus on large banks)

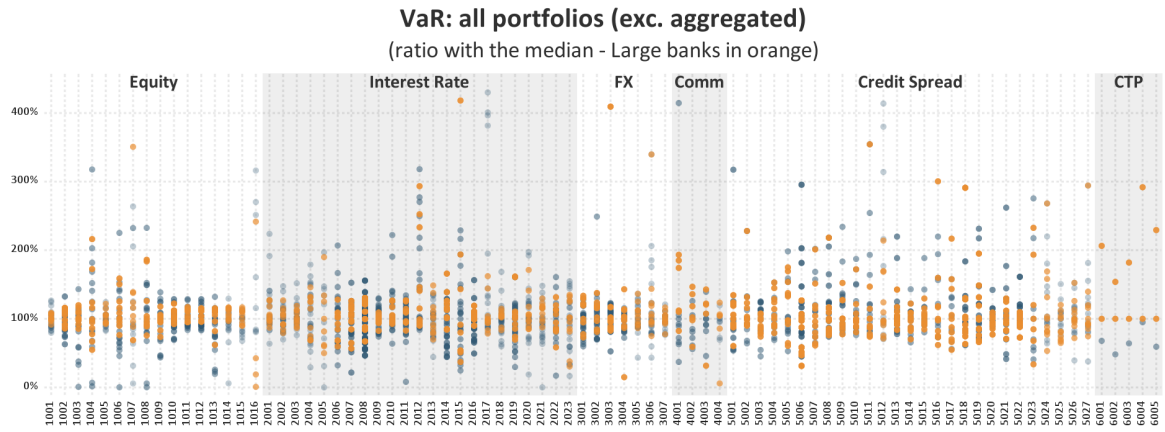


Table 29: VaR statistics (small TB banks only)

EU Statistics for VaR

		Other stats						Percentiles								Extreme Values range (Full Sample)		
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range	STDev_trunc[1]	-2*STDev_trunc	+2*STDev_trunc
Equity	1001	385,140	509,000	450,313	47,486	11%	5	394,867	404,593	433,773	441,957	481,694	498,078	503,539	5%	54,103	374,766	591,176
	1002						4											
	1003						2											
	1004						4											
	1005	47,568,576	57,008,479	51,169,065	3,984,380	8%	6	47,650,864	47,733,152	48,130,942	49,698,950	53,998,111	56,075,094	56,541,787	6%	5,063,038	43,968,203	64,220,356
	1006						2											
	1007						1											
	1008						3											
	1009						3											
	1010						2											
	1011	359,889	451,768	412,174	33,872	8%	5	369,161	378,433	406,248	415,179	427,787	442,176	446,972	3%	46,347	339,389	524,777
	1012	343,511	429,101	396,052	34,445	9%	5	351,922	360,333	385,565	398,123	423,958	427,044	428,072	5%	43,036	336,843	508,989
	1013						4											
	1014						4											
	1015						2											
	1016						2											
Interest Rate	2001	206,696	296,045	245,185	25,467	10%	8	215,560	224,424	235,902	242,044	249,936	269,610	282,827	3%	34,180	178,978	315,698
	2002	132,253	196,745	159,391	26,748	17%	7	132,943	133,633	136,738	152,876	180,194	193,064	194,905	14%	22,616	122,477	212,942
	2003	22,436	29,171	26,510	2,270	9%	7	23,310	24,183	25,698	26,567	28,000	28,937	29,054	4%	2,329	21,867	31,184
	2004	91,967	188,867	125,136	29,613	24%	8	96,041	100,115	105,147	123,484	131,063	150,394	169,631	11%	40,857	52,193	215,620
	2005						2											
	2006						2											
	2007						3											
	2008						3											
	2009	194,627	279,304	246,269	29,647	12%	7	205,429	216,232	233,478	243,244	269,878	276,591	277,948	7%	25,586	191,545	293,890
	2010	186,675	267,222	221,916	22,914	10%	8	194,414	202,152	213,122	220,716	225,578	243,841	255,531	3%	30,110	163,223	283,663
	2011	381,204	585,069	503,882	63,374	13%	8	414,300	447,397	482,321	501,042	541,575	574,865	579,967	6%	67,015	361,581	629,641
	2012	130,089	220,616	155,724	30,063	19%	7	132,020	133,950	141,032	146,800	155,252	182,007	201,312	5%	97,842	41,450	349,919
	2013	48,607	96,108	69,961	17,223	25%	8	50,370	52,134	56,900	68,030	79,835	92,708	94,408	17%	14,438	42,425	100,177
	2014						4											
	2015	1,591	14,789	7,573	4,033	53%	7	2,822	4,053	6,077	6,951	8,764	11,736	13,263	18%	10,356	-14,252	27,171
	2016						3											
	2017						3											
	2018	24,114	30,929	28,570	2,620	9%	6	24,823	25,532	27,481	29,297	30,505	30,882	30,905	5%	3,962	22,435	38,282
	2019	8,691	20,233	14,900	3,606	24%	7	10,037	11,382	13,357	15,457	16,604	18,166	19,200	11%	4,253	8,046	25,058
	2020	28,639	52,256	41,982	8,667	21%	7	30,620	32,600	37,171	39,968	49,334	50,976	51,616	14%	8,400	22,991	56,590
	2021						4											
	2022						4											
	2023	74,323	298,073	201,764	75,835	38%	7	92,112	109,902	167,481	219,991	242,499	275,909	286,991	18%	75,752	72,361	375,369
FX	3001	434,586	705,820	599,401	91,841	15%	7	471,535	508,484	567,953	591,656	663,920	697,372	701,596	8%	136,942	369,510	917,276
	3002	132,756	242,890	192,913	36,072	19%	6	146,152	159,548	187,407	192,067	206,902	227,126	235,008	5%	34,325	121,673	258,975
	3003	157,194	208,640	187,292	22,485	12%	5	159,683	162,172	169,638	199,965	201,021	205,592	207,116	8%	28,940	133,334	249,092
	3004						4											
	3005	296,901	373,044	343,578	28,485	8%	5	306,264	315,626	343,714	346,979	357,251	366,727	369,885	2%	67,200	237,081	505,880
	3006	1,677	28,111	13,723	7,954	58%	7	4,416	7,156	10,943	12,697	15,844	21,336	24,724	18%	23,314	-32,811	60,446
	3007						1											
Commodities	4001						2											
	4002						2											
	4003						2											
	4004						2											
Credit Spread	5001						1											
	5002						1											
	5003						2											
	5004						1											
	5005						2											
	5006						2											
	5007						1											
	5008						4											
	5009						4											
	5010						3											
	5011						3											
	5012						1											
	5013						2											
	5014						1											
	5015						1											
	5016						1											
	5017						1											
	5018						1											
	5019						1											
	5020						4											
	5021						2											
	5022						1											
	5023						1											
	5024						2											
	5025						2											
	5026						3											
	5027						3											
CTP	6001																	
	6002																	
	6003																	
	6004																	

Table 30: VaR statistics (medium TB banks only)

EU Statistics for VaR

		Other stats						Percentiles									Extreme Values range (Full Sample)	
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range	STDev_trunc[1]	-2*STDev_trunc	+2*STDev_trunc
Equity	1001	422,745	577,601	482,931	41,677	9%	14	430,641	437,241	456,115	479,302	510,338	522,593	543,642	6%	53,266	377,212	590,274
	1002	277,489	426,069	378,212	48,022	13%	13	300,444	319,211	333,361	395,048	413,063	423,475	425,141	11%	47,073	273,248	461,540
	1003	7,624	18,809	12,827	3,107	24%	12	7,682	8,140	11,891	12,911	14,585	15,635	17,123	10%	2,973	7,188	19,080
	1004	613	1,982	1,218	469	39%	10	679	745	878	1,105	1,535	1,872	1,927	27%	591	-265	2,099
	1005	49,815,393	62,687,319	55,486,866	4,119,598	7%	11	50,399,155	50,982,916	53,132,994	54,294,290	56,897,032	62,234,400	62,460,860	3%	4,977,240	43,939,788	63,848,750
	1006	1,935	5,683	3,691	1,252	34%	13	2,149	2,303	2,562	3,578	4,148	5,466	5,566	24%	1,135	1,308	5,848
	1007	1,528	37,253	23,421	12,183	52%	10	4,652	7,776	18,431	23,231	33,447	36,951	37,102	29%	16,303	-5,802	59,409
	1008	5,333	11,774	8,113	1,885	23%	8	5,915	6,497	7,179	7,844	8,888	9,857	10,816	11%	3,116	1,637	14,103
	1009	43,454	85,858	64,806	11,572	18%	11	47,458	51,462	60,601	64,459	70,092	77,007	81,433	7%	12,933	36,058	87,791
	1010	37,203	51,719	43,559	3,984	9%	11	38,719	40,235	41,541	42,672	45,583	47,383	49,551	5%	4,772	32,768	51,858
	1011	382,154	503,209	437,796	39,363	9%	12	389,209	395,799	407,277	437,459	466,012	488,211	495,490	7%	45,952	338,031	521,839
	1012	370,871	474,939	416,201	35,589	9%	12	372,733	375,102	391,145	411,772	438,828	462,402	468,273	6%	42,501	326,769	496,774
	1013	68,059	122,288	99,705	15,092	15%	11	71,981	75,903	100,012	103,534	105,924	107,150	114,719	3%	24,471	43,752	141,438
	1014	329,380	422,612	372,261	28,542	8%	11	338,893	348,406	351,105	363,093	389,154	411,192	416,902	5%	46,918	269,256	456,929
	1015	239,718	338,602	291,715	32,029	11%	10	245,780	251,842	269,525	298,091	310,858	329,641	334,121	7%	36,094	223,917	368,295
	1016						1											
Interest Rate	2001	206,764	315,247	254,113	28,703	11%	19	220,377	227,575	239,830	247,522	256,321	296,078	311,401	3%	36,746	174,030	321,013
	2002	133,789	210,467	172,654	19,574	11%	17	146,619	151,654	155,293	172,501	187,553	192,665	196,495	9%	22,089	124,565	212,921
	2003	23,197	29,945	26,038	1,914	7%	19	23,441	23,884	24,789	26,000	26,860	28,876	29,777	4%	2,464	21,616	31,471
	2004	75,199	215,511	149,645	44,327	30%	17	85,765	94,602	107,812	165,523	182,164	191,698	198,925	26%	42,062	59,990	228,240
	2005	11,684	71,402	38,347	21,540	56%	6	13,457	15,231	23,007	40,592	46,646	59,217	65,310	34%	20,244	-2,891	78,084
	2006	28,730	69,875	47,905	13,923	29%	16	32,083	34,448	36,076	43,291	60,286	64,889	67,464	25%	15,397	23,794	85,381
	2007	75,454	167,453	128,772	28,019	22%	13	88,160	97,975	107,005	136,634	151,187	159,431	162,993	17%	29,102	74,720	191,129
	2008	67,335	160,096	115,234	33,805	29%	15	68,737	73,651	85,453	121,996	144,849	158,515	159,710	26%	30,598	61,201	183,593
	2009	193,625	293,538	243,804	26,894	11%	19	198,624	206,434	229,421	242,192	261,844	276,202	288,253	7%	26,566	190,112	296,375
	2010	187,515	284,233	229,270	25,666	11%	19	198,203	204,867	216,561	224,057	231,409	266,353	280,422	3%	32,506	159,044	289,069
	2011	394,429	628,707	519,570	67,170	13%	18	425,796	454,923	469,343	518,738	552,657	612,168	615,452	8%	68,903	358,141	633,755
	2012	134,738	314,728	169,359	49,056	29%	15	138,211	139,701	140,215	154,019	158,585	225,797	254,060	6%	91,859	-28,467	338,970
	2013	51,865	98,195	71,540	14,509	20%	15	52,304	54,465	58,986	74,751	78,022	91,094	96,113	14%	14,438	42,425	100,177
	2014	25,559	65,767	44,311	14,214	32%	13	28,105	29,931	30,749	42,966	57,635	64,731	65,553	30%	14,204	22,567	79,384
	2015	2,079	13,981	5,935	3,317	56%	17	2,484	2,932	3,303	5,402	7,400	10,185	11,963	38%	10,356	-14,252	27,171
	2016	161,488	225,107	192,637	18,442	10%	13	161,653	165,507	182,378	193,134	206,755	209,009	215,610	6%	26,709	135,713	242,549
	2017	20,987	102,100	31,847	19,938	63%	15	21,258	22,174	25,098	25,989	29,821	35,617	55,748	9%	73,788	-120,826	174,328
	2018	24,734	36,378	30,624	3,565	12%	17	25,166	25,713	27,004	31,603	33,012	34,427	34,881	10%	3,582	23,431	37,761
	2019	9,734	19,966	15,412	3,046	20%	17	11,132	11,896	12,975	15,171	17,289	19,269	19,657	14%	3,645	9,195	23,777
	2020	25,700	49,546	38,280	6,152	16%	16	27,318	30,830	34,778	38,673	41,416	44,591	47,504	9%	8,205	23,380	56,200
	2021	41,539	84,940	65,578	13,029	20%	15	46,065	49,401	56,652	67,218	75,905	79,103	81,565	15%	12,886	39,769	91,314
	2022	238,203	485,422	369,657	77,381	21%	14	255,911	274,536	302,928	400,229	421,675	450,237	464,919	16%	73,562	221,973	516,221
	2023	132,390	339,774	261,282	60,250	23%	15	163,576	188,271	221,247	280,882	300,874	328,956	334,341	15%	72,934	79,239	370,973
FX	3001	460,183	869,104	692,096	141,564	20%	16	473,914	479,744	599,648	732,721	799,963	844,102	850,403	14%	129,775	391,137	910,235
	3002	130,058	227,642	186,778	30,725	16%	16	141,858	150,696	161,295	188,486	216,415	222,438	223,788	15%	35,040	116,852	257,012
	3003	165,061	226,578	189,701	19,292	10%	15	168,456	170,193	172,465	189,097	201,366	216,026	219,941	8%	25,051	144,060	244,265
	3004	497,646	707,577	618,897	63,958	10%	15	520,464	532,105	578,145	630,318	659,746	695,221	701,141	7%	66,774	479,014	746,110
	3005	322,520	483,491	377,196	58,610	16%	15	324,607	326,203	329,039	347,557	414,789	471,679	480,062	12%	55,388	262,268	483,819
	3006	5,900	25,264	14,407	4,692	33%	16	9,466	10,691	12,453	13,581	14,974	20,341	24,272	9%	16,539	-19,447	46,710
	3007	648,835	941,645	808,034	84,712	10%	11	667,883	686,931	779,491	811,212	847,706	896,825	919,235	4%	83,725	640,304	975,203
Commodities	4001	9,043	47,103	26,687	13,753	52%	7	10,928	12,813	18,525	24,365	34,623	44,296	45,699	30%	22,359	-20,353	69,083
	4002	324,638	722,007	491,052	139,750	28%	6	339,365	354,093	400,765	486,684	537,303	632,381	677,194	15%	153,198	225,068	837,858
	4003	519,592	814,356	642,499	115,948	18%	5	529,736	539,880	570,313	611,274	696,858	767,357	790,856	10%	183,889	202,535	938,091
	4004	356,396	524,639	462,352	71,501	15%	5	369,598	382,801	422,408	492,939	515,379	520,935	522,787	10%	147,918	197,102	788,775
Credit Spread	5001	11,818	16,964	14,740	2,029	14%	11	11,979	12,139	13,010	16,088	16,329	16,711	16,838	11%	2,980	7,547	19,468
	5002	31,345	45,759	37,519	6,380	17%	10	31,447	31,548	31,951	34,650	44,632	45,432	45,596	17%	11,591	11,278	57,642
	5003	4,805	7,404	6,097	920	15%	11	4,948	5,090	5,276	6,388	6,726	7,325	7,365	12%	1,167	4,154	8,823
	5004	12,564	22,951	17,222	3,577	21%	10	13,146	13,729	14,487	16,179	20,395	20,943	21,947	17%	3,684	8,486	23,221
	5005	3,751	9,833	7,124	2,270	32%	9	4,192	4,633	5,714	6,319	9,515	9,614	9,723	25%	2,112	1,965	10,415
	5006	4,129	15,339	10,440	3,947	38%	10	5,043	5,958	6,983	11,742	13,701	14,117	14,728	32%	5,091	2,970	23,335
	5007	32,378	89,252	56,622	20,337	36%	8	34,685	36,992	39,355	54,804	67,365	82,916	86,084	26%	19,805	13,355	92,577
	5008	59,267	97,319	79,443	14,217	18%	11	61,526	63,785	66,456	78,250	93,477	95,905	96,612	17%	29,050	19,963	136,164
	5009	17,354	25,382	20,453	3,029	15%	11	17,475	17,595	17,955	19,206	23,344	24,406	24,894	13%	5,017	9,157	29,226
	5010	27,163	38,939	31,577	3,582	11%	10	27,381	27,599	29,558	30,780	33,349	35,396	37,167	6%	8,518	13,911	47,982
	5011	14,679	24,128	19,372	3,533	18%	10	14,765	14,852	17,210	18,873	22,372	23,980	24,054	13%	13,099	-6,322	46,073
	5012	1,595	3,959	2,632	947	36%	9	1,632	1,669	2,029	2,294	3,772	3,829	3,894	30%	2,230	-2,223	6,697
	5013	17,293	24,275	20,469	2,203	11%	10	17,331	17,369	19,321	20,521	21,410	23,020	23,648	5%	4,894	10,931	30,506
	5014	4,867	6,540	5,783	596	10%	10	4,939	5,011	5,308	5,835	6,215	6,501	6,521	8%	901	4,102	7,706
	5015	24,850	32,036	27,815	2,764	10%	10	24,867	24,883	25,393	27,577	29,582	31,586	31,811	8%	3,822	19,749	35,037
	5016	15,615	39,548	23,569	8,318	35%	7	16,461	17,306	18,484	20,769	26,042	33,555	36,552	17%	15,546	-5,818	56,366
	5017	19,023	49,796	32,566	12,785	39%	7	19,153	19,283	21,222	30,406	43,146	47,027	48,412	34%	14,653	5,397	64,011
	5018	31,845	68,942	50,331	15,520	31%	7	32,094	32,344	38,207	47,249	63,934	67,945	68,443	25%	26,887	-2,069	105,480
	5019	9,104	16,785	12,947	2,889	22%	10	9,461	9,819	10,761	12,251	15,785	16,723	16,754	19%	5,495	2,778	24,760
	5020	175,819	222,281	200,339	15,265	8%	10	180,370	184,922	189,372	199,062	211,696	220,488	221,385	6%	17,030	171,364	239,482
	5021	22,437	40,109	31,745	5,455	17%	8	23,936	25,436	29,070	32,721	34,122	37,126	38,618	8%	9,044	13,976	50,153
	5022	174,562	213,845	194,670	15,360	8%	9	177,193	179,824	184,139	185,429	207,710	212,757	213,301	6%	17,669	162,507	233,182
	5023						4											
	5024	26,930	85,592	54,293	20,509	38%	9	31,774	36,618	41,629	47,320	74,484	81,170	83,381	28%	26,676	-2,721	103,984
	5025	49,902	79,847	68,920	12,281	18%	7	50,822	51,743	62,002	74,486	77,101	78,360	79,104	11%	12,492	46,484	96,454
	5026	33,489	43,833	37,860	3,076	8%	9	34,278	35,067	36,390	37,416	38,344	41,791	42,812	3%	7,470	22,546	52,425
	5027	13,339	27,821	18,727	4,446	24%	8	14,342	15,345	16,465	17,322	19,946	23,737	25,779	10%	8,728	444	35,356
CTP	6001																	
	6002																	
	6003																	
	6004																	
	6005																	
ALL-IN no-CTP	10000						3											
Equity Cumulative	11000	264,738	350,067	308,196	28,432	9%	9	272,481	280,224	291,435	306,596	321,609	347,463	348,765	5%	33,967	232,430	368,296
IR Cumulative	12000	290,323	492,096	385,800	57,489	15%	13	293,862	300,184	355,745	395,990	419,628	426,138	452,853	8%	82,591	225,877	556,239
FX Cumulative	13000	582,500	1,035,822	846,189	132,790	16%	15	649,532	679,866	743,935	873,279	926,395	1,002,905	1,018,407	11%	130,502	552,993	1,075,000
Commodity Cumulative	14000	327,295	721,985	485,071	152,327	31%	5	340,236	353,177	391,999	453,097	530,980	645,583	683,784	15%	155,103	220,775	841,185
CS Cumulative	15000	219,993	284,880	252,029	22,980	9%	10	222,457	224,921	237,888	246,898	273,742	280,637	282,758	7%	32,350	193,000	322,398
CTP Cumulative	16000																	

Table 31: VaR statistics (large TB banks only)

EU Statistics for VaR

		Other stats						Percentiles								Extreme Values range (Full Sample)		
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range	STDev_trunc[1]	-2*STDev_trunc	+2*STDev_trunc
Equity	1001	402,718	531,095	479,148	45,476	9%	8	408,787	414,855	466,663	487,663	505,160	524,972	528,034	4%	53,266	377,212	590,274
	1002	316,860	415,844	365,862	38,461	11%	8	324,296	331,732	338,311	351,993	404,572	412,756	414,300	9%	47,073	273,248	461,540
	1003	10,731	15,291	13,221	1,578	12%	8	10,903	11,075	12,414	13,536	14,256	14,704	14,997	7%	2,973	7,188	19,080
	1004	62	1,135	738	365	49%	7	194	327	608	793	980	1,080	1,107	23%	591	-265	2,099
	1005	44,528,539	61,917,426	53,593,632	5,718,463	11%	7	46,263,363	47,998,187	50,744,620	52,652,928	57,283,645	59,192,221	60,554,823	6%	4,977,240	43,939,788	63,848,750
	1006	1,644	5,021	3,428	1,229	36%	8	1,804	1,964	2,575	3,410	4,520	4,739	4,880	27%	1,135	1,308	5,848
	1007	23,727	31,118	27,153	3,354	12%	6	23,918	24,108	24,536	26,276	30,241	31,074	31,096	10%	16,303	-5,802	59,409
	1008	5,959	10,015	8,073	1,604	20%	6	6,245	6,530	7,220	7,723	9,403	9,965	9,990	13%	3,116	1,637	14,103
	1009	45,513	63,667	56,790	6,554	12%	8	46,524	47,535	53,878	59,141	60,981	62,619	63,143	6%	12,933	36,058	87,791
	1010	39,059	45,690	42,524	2,635	6%	8	39,151	39,244	40,249	43,083	44,227	45,654	45,672	5%	4,772	32,768	51,858
	1011	390,041	500,659	439,107	45,093	10%	8	391,587	393,132	402,398	428,810	479,088	492,760	496,710	9%	45,952	338,031	521,839
	1012	369,721	468,431	418,565	41,292	10%	8	369,889	370,057	388,022	412,141	460,148	464,338	466,385	9%	42,501	326,769	496,774
	1013	57,347	106,822	88,003	19,640	22%	8	61,100	64,852	70,832	95,508	103,555	106,336	106,679	19%	24,421	43,752	141,438
	1014	301,745	423,285	382,165	45,780	12%	8	312,532	323,318	350,947	404,357	416,280	419,829	421,557	9%	46,918	269,256	456,929
	1015	227,827	345,602	305,043	42,574	14%	7	239,510	251,193	286,972	325,710	331,108	338,421	342,012	7%	36,094	223,917	368,295
	1016	964	288,030	92,732	103,242	111%	6	6,366	11,767	29,595	73,335	97,618	193,094	240,562	53%	127,161	-135,147	373,496
Interest Rate	2001	215,458	315,516	260,312	40,405	16%	7	219,240	223,023	229,173	257,252	287,806	314,027	314,771	11%	36,746	174,030	321,013
	2002	142,653	200,884	170,727	20,397	12%	8	146,820	150,987	155,080	169,250	183,246	196,389	198,636	8%	22,089	124,565	212,921
	2003	22,975	29,920	26,728	2,528	9%	7	23,490	24,006	25,072	26,543	28,756	29,310	29,615	7%	2,464	21,616	31,471
	2004	97,554	220,880	158,287	50,492	32%	10	98,250	98,945	106,553	160,526	205,375	218,218	219,549	32%	42,062	59,990	228,240
	2005	22,553	74,067	39,746	19,734	50%	6	22,716	22,878	25,071	34,135	47,186	62,225	68,146	31%	20,244	-2,891	78,084
	2006	32,590	79,878	55,297	14,548	26%	10	34,647	36,703	46,604	56,304	62,424	71,648	75,763	15%	15,397	23,794	85,381
	2007	85,977	164,109	132,802	23,564	18%	9	96,567	107,158	124,222	139,679	143,564	156,583	160,346	7%	29,102	74,720	191,129
	2008	102,920	169,979	128,215	24,981	19%	9	103,334	103,748	107,039	122,798	148,089	156,097	163,038	16%	30,598	61,201	183,593
	2009	200,784	281,923	242,214	25,546	11%	9	206,526	212,269	231,050	239,171	256,882	271,766	276,845	5%	26,566	190,112	296,375
	2010	205,162	283,818	236,611	33,863	14%	7	205,806	206,449	208,599	232,152	258,974	282,790	283,304	11%	32,506	159,044	289,069
	2011	410,714	629,203	517,894	81,410	16%	9	425,997	441,280	448,978	479,375	576,321	623,180	626,191	12%	68,903	358,141	633,755
	2012	144,217	338,818	213,823	67,552	32%	7	144,765	145,313	162,362	218,575	235,215	281,750	310,284	18%	91,859	-28,467	338,970
	2013	49,801	97,347	67,937	15,318	23%	9	50,667	51,533	55,748	65,205	71,885	86,168	91,757	13%	14,438	42,425	100,177
	2014	40,621	70,822	54,750	9,562	17%	8	43,411	46,201	50,380	51,733	60,472	66,285	68,554	9%	14,204	22,567	79,384
	2015	2,394	27,014	9,581	8,423	88%	7	2,709	3,025	4,450	6,992	10,885	18,316	22,665	42%	10,356	-14,252	27,171
	2016	170,064	203,434	192,922	10,975	6%	8	176,376	182,688	190,035	193,559	201,869	202,593	203,014	3%	26,709	135,713	242,549
	2017	22,303	43,381	28,709	7,351	26%	9	22,681	23,059	23,322	26,442	28,283	39,539	41,460	10%	73,788	-120,826	174,328
	2018	25,542	35,343	31,125	3,578	11%	8	26,245	26,948	28,294	31,968	33,514	35,173	35,258	8%	3,582	23,431	37,761
	2019	10,847	19,249	16,638	2,693	16%	8	12,291	13,735	16,157	17,429	18,158	18,814	19,032	6%	3,645	9,195	23,777
	2020	34,631	56,155	41,837	7,213	17%	9	35,140	35,649	36,994	39,012	47,381	50,044	53,099	12%	8,205	23,380	56,200
	2021	57,356	90,537	71,037	11,556	16%	9	58,434	59,511	62,762	65,716	76,861	86,140	88,339	10%	12,886	39,769	91,314
	2022	309,995	415,458	366,475	46,814	13%	6	312,257	314,520	326,399	371,603	407,045	413,302	414,380	11%	73,562	221,973	516,221
	2023	85,315	348,302	214,674	76,033	35%	10	100,684	116,054	185,490	223,358	254,209	286,198	317,250	16%	72,934	79,239	370,973
FX	3001	410,212	795,289	587,085	136,903	23%	9	435,779	461,346	504,942	516,935	676,875	780,855	788,072	15%	129,775	391,137	910,235
	3002	132,941	254,893	184,567	45,053	24%	7	137,884	142,826	150,452	181,215	211,007	240,772	247,833	17%	35,040	116,852	257,012
	3003	158,162	238,550	204,596	33,638	16%	8	159,075	159,988	179,234	212,800	233,332	236,615	237,583	13%	25,051	144,060	244,265
	3004	490,226	628,863	566,075	50,350	9%	7	502,294	514,362	539,233	548,330	608,321	619,082	623,973	6%	66,774	479,014	746,110
	3005	326,257	466,688	398,228	49,064	12%	8	331,796	337,335	362,959	408,621	425,771	451,588	459,138	8%	55,388	262,268	483,819
	3006	10,230	46,297	18,804	11,743	62%	8	10,489	10,749	12,515	14,871	19,831	28,296	37,296	23%	16,539	-19,447	46,710
	3007	749,556	901,573	811,676	57,485	7%	6	753,186	756,816	768,094	808,009	838,090	870,202	885,887	4%	83,725	640,304	975,203
Commodities	4001						3											
	4002						3											
	4003						2											
	4004						2											
Credit Spread	5001	8,144	18,163	14,020	3,488	25%	7	9,103	10,062	12,191	14,298	16,575	17,288	17,725	15%	2,980	7,547	19,468
	5002	30,987	39,898	35,170	3,627	10%	6	31,209	31,430	32,386	34,717	38,000	39,364	39,631	8%	11,591	11,278	57,642
	5003	5,469	8,131	6,781	1,052	16%	8	5,516	5,563	5,761	6,959	7,471	8,061	8,096	13%	1,167	4,154	8,823
	5004	13,954	19,650	16,398	2,218	14%	6	14,068	14,182	14,659	16,138	17,791	18,874	19,262	10%	3,684	8,486	23,221
	5005	3,998	9,519	6,877	1,962	29%	8	4,416	4,833	5,376	7,106	8,328	8,686	9,103	22%	2,112	1,965	10,415
	5006	11,508	19,357	14,497	2,651	18%	7	11,901	12,295	13,102	13,686	15,362	17,744	18,550	8%	5,091	2,970	23,335
	5007	33,947	63,712	48,255	12,073	25%	7	34,132	34,316	38,345	47,463	57,987	61,961	62,836	20%	19,805	13,355	92,577
	5008	57,678	128,724	84,126	23,545	28%	7	58,858	60,038	68,799	85,424	89,731	105,336	117,030	13%	29,050	19,963	136,164
	5009	14,855	26,308	19,727	4,662	24%	7	15,235	15,615	16,327	16,929	23,673	25,183	25,746	18%	5,017	9,157	29,226
	5010	23,598	46,377	32,731	8,481	26%	6	23,922	24,245	26,320	31,963	36,526	41,986	44,181	16%	8,518	13,911	47,982
	5011	15,497	38,395	23,387	8,732	37%	6	15,977	16,457	18,028	19,905	26,891	33,800	36,098	20%	13,099	-6,322	46,073
	5012	1,612	4,836	2,912	1,341	46%	7	1,738	1,865	2,098	2,180	3,780	4,807	4,821	29%	2,230	-2,223	6,697
	5013	18,995	29,545	23,064	3,760	16%	7	19,267	19,538	20,456	21,647	25,174	27,369	28,457	10%	4,894	10,931	30,506
	5014	4,138	7,216	5,845	1,082	19%	7	4,400	4,662	5,105	6,397	6,478	6,803	7,009	12%	901	4,102	7,706
	5015	23,171	32,124	27,151	3,020	11%	6	23,819	24,468	25,822	26,694	28,192	30,291	31,208	4%	3,822	19,749	35,037
	5016	18,471	40,364	25,918	7,474	29%	7	18,613	18,755	21,364	24,685	27,591	34,090	37,227	13%	15,546	-5,818	56,366
	5017	24,344	54,753	34,794	9,929	29%	7	25,399	26,455	28,546	34,704	36,333	43,873	49,313	12%	14,653	5,397	64,011
	5018	38,581	66,297	49,868	9,041	18%	7	39,406	40,230	44,932	49,285	52,475	58,506	62,451	8%	26,887	-2,069	105,480
	5019	9,580	20,463	13,919	4,121	30%	7	9,694	9,808	10,633	13,610	16,258	19,039	19,751	21%	5,495	2,778	24,760
	5020	183,030	237,074	213,110	20,524	10%	7	186,350	189,671	200,632	210,258	230,071	236,373	236,723	7%	17,030	171,364	239,482
	5021	15,542	46,308	31,116	9,922	32%	8	18,049	20,556	25,511	30,793	36,492	42,963	44,635	18%	9,044	13,976	50,153
	5022	180,940	231,428	202,709	18,651	9%	6	182,650	184,360	190,296	199,750	212,866	224,016	227,722	6%	17,669	162,507	233,182
	5023	25,469	146,357	72,598	45,258	62%	5	30,650	35,832	51,376	64,129	75,660	118,078	132,218	19%	57,482	-39,304	190,624
	5024	40,987	66,564	51,276	8,477	17%	6	42,511	44,034	47,879	50,452	51,746	59,341	62,952	4%	26,676	-2,721	103,984
	5025	48,189	91,732	68,496	15,824	23%	7	50,957	53,726	57,826	66,051	78,924	88,259	89,995	15%	12,492	46,484	96,454
	5026	26,918	47,236	38,316	8,057	21%	6	27,657	28,396	32,494	41,400	42,912	45,152	46,194	14%	7,470	22,546	52,425
	5027	6,776	24,980	18,268	5,970	33%	7	9,325	11,875	16,222	20,772	21,453	22,868	23,924	14%	8,728	444	35,356
CTP	6001																	
	6002																	
	6003																	
	6004																	
	6005																	
ALL-IN no-CTP	10000	747,951	1,149,049	902,049	164,096	18%	5	751,320	754,689	764,797	884,645	963,804	1,074,951	1,112,000	12%	188,567	492,942	1,247,211
Equity Cumulative	11000	264,601	341,325	309,710	27,368	9%	6	273,340	282,079	299,960	312,048	327,242	335,003	338,164	4%	33,967	232,430	368,296
IR Cumulative	12000	312,959	435,862	386,209	42,521	11%	7	326,735	340,512	365,552	393,859	414,840	431,482	433,672	6%	82,591	225,877	556,239
FX Cumulative	13000	596,587	1,023,824	783,106	125,613	16%	8	637,060	677,532	721,060	771,993	823,296	901,962	962,893	7%	130,502	552,993	1,075,000
Commodity Cumulative	14000						3											
CS Cumulative	15000	225,123	316,890	269,223	33,104	12%	5	231,638	238,153	257,699	272,166	274,236	299,828	308,359	3%	32,350	193,000	322,398
CTP Cumulative	16000																	

Table 32: VaR statistics (same business model – cross-border universal bank)

EU Statistics for VaR

		Other stats								Percentiles							
	Port. ID	Min	Max	Ave.	STDev	STDev_trunc[2]	MAD (median absolute deviation)	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range
Equity	1001	385,140	577,601	474,858	47,309			10%	18	400,081	414,855	442,812	482,971	503,818	518,005	530,636	6%
	1002	277,489	426,069	369,917	44,454			12%	17	304,063	314,398	338,105	382,854	410,839	417,220	420,642	10%
	1003	7,624	18,809	13,453	2,561			19%	15	9,799	10,927	12,451	13,291	14,862	15,562	16,663	9%
	1004	62	1,982	1,070	524			49%	14	349	566	812	987	1,332	1,802	1,903	24%
	1005	44,528,539	62,687,319	54,172,243	5,519,262			10%	14	46,718,512	48,621,795	50,671,215	53,429,777	57,122,252	62,139,308	62,392,922	6%
	1006	1,644	5,683	3,655	1,311			36%	15	1,964	2,177	2,648	3,400	4,796	5,445	5,547	29%
	1007	8,470	37,253	26,382	7,965			30%	13	14,442	18,886	23,656	25,730	31,118	36,242	37,051	14%
	1008	5,333	11,735	8,084	1,977			24%	9	5,583	5,834	7,101	7,870	9,157	10,278	11,007	13%
	1009	43,454	77,007	59,837	9,449			16%	14	44,792	46,379	56,468	60,762	63,950	70,728	74,393	6%
	1010	34,581	51,719	42,588	4,068			10%	14	37,492	39,138	40,393	42,419	43,727	46,860	48,901	4%
	1011	359,889	489,375	433,922	39,534			9%	16	382,503	392,249	405,232	437,459	465,041	484,359	489,224	7%
	1012	343,511	462,819	412,644	37,510			9%	16	363,169	369,961	389,034	411,772	438,828	460,960	462,643	6%
	1013	50,640	122,288	88,305	20,668			23%	15	55,335	61,632	69,911	91,973	102,921	106,316	111,462	19%
	1014	301,745	423,285	369,546	38,468			10%	15	310,915	321,933	348,320	362,203	399,006	420,906	422,814	7%
	1015	227,827	345,602	293,966	40,450			14%	11	233,773	239,718	266,546	301,322	327,146	338,602	342,102	10%
	1016	964	288,030	110,724	123,864			112%	5	5,285	9,606	22,570	50,670	191,387	249,373	268,701	79%
Interest Rate	2001	206,696	315,516	258,237	31,835			12%	22	215,780	222,903	241,258	252,567	261,504	312,828	315,136	4%
	2002	142,653	210,467	172,048	19,304			11%	19	149,109	152,263	154,243	171,445	189,082	193,294	196,063	10%
	2003	22,436	29,920	26,242	2,088			8%	21	22,975	23,468	25,109	26,118	27,218	28,904	29,171	4%
	2004	75,199	215,511	145,088	42,536			29%	20	91,129	96,995	107,043	144,115	179,774	192,365	210,636	25%
	2005	11,684	71,402	35,404	16,866			48%	12	15,585	19,155	23,041	33,186	45,873	53,220	61,780	33%
	2006	28,730	66,660	46,210	12,788			28%	19	31,734	32,486	35,953	45,281	57,853	62,842	63,471	23%
	2007	75,454	157,077	122,686	25,497			21%	18	82,970	85,473	104,267	128,250	140,920	152,242	155,058	15%
	2008	69,338	160,096	115,981	26,615			23%	18	79,523	81,915	100,378	114,708	133,897	150,754	157,440	14%
	2009	193,625	293,518	241,708	28,503			12%	22	194,935	201,530	228,548	239,737	263,233	274,638	287,024	7%
	2010	186,675	284,233	233,590	27,753			12%	22	199,860	208,896	217,160	228,296	235,338	281,894	283,732	4%
	2011	394,429	629,203	523,195	70,201			13%	22	411,745	433,090	472,630	518,738	580,601	612,978	621,246	10%
	2012	134,738	314,728	180,059	48,508			27%	19	136,345	139,067	150,593	156,268	220,489	231,189	250,806	19%
	2013	49,801	98,195	69,522	14,180			20%	20	51,858	52,439	57,828	68,542	77,531	85,937	95,369	15%
	2014	25,559	65,767	46,393	12,375			27%	15	28,530	30,059	39,131	46,523	54,788	62,277	64,769	17%
	2015	2,079	27,014	7,615	5,883			77%	20	2,378	2,566	3,430	6,426	9,364	14,062	15,400	46%
	2016	161,488	209,278	190,458	15,516			8%	16	161,694	165,914	185,040	191,913	202,533	207,343	208,268	5%
	2017	21,374	115,029	40,237	30,532			76%	19	22,210	23,159	25,180	26,442	34,387	102,896	106,976	15%
	2018	24,114	36,378	30,403	3,516			12%	21	24,734	25,274	28,541	31,139	32,798	35,100	35,343	7%
	2019	9,734	19,061	15,498	2,615			17%	20	10,791	12,040	13,875	16,670	17,167	18,023	18,265	11%
	2020	25,700	56,155	39,579	7,043			18%	19	28,345	32,769	35,482	39,136	41,717	47,614	49,307	8%
	2021	44,103	80,118	64,601	10,264			16%	18	47,419	53,036	58,425	64,065	74,508	77,077	77,962	12%
	2022	308,658	453,879	390,205	47,226			12%	14	314,809	318,398	359,871	408,098	418,090	435,990	445,987	7%
	2023	85,315	339,774	223,365	76,168			34%	18	114,346	128,514	178,511	222,725	285,041	308,255	333,176	23%
FX	3001	460,183	869,104	644,978	142,777			22%	19	472,735	477,619	508,057	628,932	776,315	833,306	846,541	21%
	3002	130,058	231,358	180,705	28,119			16%	16	146,130	153,544	157,287	182,483	194,644	219,174	224,619	11%
	3003	160,770	235,786	190,861	22,354			12%	16	163,988	167,350	170,440	189,694	210,031	216,180	221,769	10%
	3004	527,642	707,577	614,159	62,987			10%	16	529,593	530,348	544,972	627,369	651,361	694,431	700,682	9%
	3005	322,520	483,491	397,920	56,849			14%	17	324,905	326,554	344,378	414,249	439,807	471,450	479,573	12%
	3006	5,900	25,264	13,041	3,957			30%	19	9,797	10,570	10,890	12,561	13,818	15,566	20,149	12%
	3007	648,835	896,825	784,154	67,209			9%	13	671,693	699,456	764,076	780,149	838,830	849,568	869,216	5%
Commodities	4001	9,043	47,103	27,501	13,032			47%	10	11,871	14,699	20,492	23,447	38,648	45,295	46,199	31%
	4002	314,402	779,543	522,888	158,352			30%	10	319,008	323,614	400,765	531,851	611,655	727,761	753,652	21%
	4003	261,170	814,356	596,908	162,822			27%	8	351,618	442,065	557,633	612,110	690,782	732,107	773,232	11%
	4004	356,396	609,319	488,072	80,079			16%	7	376,200	396,003	457,674	496,373	519,535	558,511	583,915	6%
Credit Spread	5001	8,144	18,163	14,688	2,884			20%	12	10,165	11,850	12,816	16,161	16,488	16,938	17,504	13%
	5002	30,987	45,396	36,848	5,372			15%	12	31,184	31,399	32,076	34,985	40,530	45,073	45,380	12%
	5003	5,090	8,096	6,227	954			15%	12	5,140	5,199	5,445	6,103	6,881	7,286	7,672	12%
	5004	12,564	22,951	16,953	3,299			19%	12	13,276	13,868	14,296	16,362	19,825	20,405	21,554	16%
	5005	3,998	9,833	7,459	2,121			28%	10	4,383	4,768	5,801	8,270	9,267	9,586	9,710	23%
	5006	6,161	16,668	12,236	3,372			28%	10	6,427	6,692	11,836	12,872	13,832	15,472	16,070	8%
	5007	32,378	80,201	50,124	15,115			30%	11	33,163	33,947	37,023	50,752	59,824	63,086	71,644	24%
	5008	59,267	95,752	76,401	11,596			15%	14	60,791	62,264	66,076	76,932	85,047	89,736	91,847	13%
	5009	14,855	24,628	19,951	3,414			17%	13	15,157	15,672	17,900	19,206	22,970	24,290	24,511	12%
	5010	24,892	38,939	31,643	4,103			13%	12	26,141	27,211	29,067	31,852	33,377	37,189	38,199	7%
	5011	14,679	32,602	20,299	5,691			28%	12	14,785	14,934	16,768	18,646	21,798	28,681	30,734	13%
	5012	1,595	4,787	2,600	966			37%	10	1,790	1,986	2,052	2,228	2,691	3,874	4,330	13%
	5013	17,293	29,545	21,688	3,194			15%	11	18,171	19,049	20,112	21,138	22,264	24,275	26,910	5%
	5014	4,138	6,540	5,737	737			13%	12	4,618	5,027	5,191	5,835	6,405	6,490	6,516	10%
	5015	23,171	32,124	27,404	2,941			11%	11	24,011	24,850	25,254	26,286	29,374	31,536	31,830	8%
	5016	15,615	39,548	23,456	6,670			28%	11	17,025	18,434	18,739	22,523	24,980	29,908	34,728	14%
	5017	19,023	45,181	30,084	8,590			29%	11	19,240	19,456	23,666	29,229	35,662	41,111	43,146	20%
	5018	31,845	68,942	47,130	11,305			24%	11	32,261	32,676	39,956	47,249	52,475	60,587	64,765	14%
	5019	9,104	18,090	12,686	3,156			25%	11	9,342	9,580	9,929	11,788	15,007	16,716	17,403	20%
	5020	175,819	237,074	205,146	17,768			9%	13	181,887	186,322	193,858	207,166	220,289	223,950	229,450	6%
	5021	22,437	40,109	30,156	5,215			17%	13	22,598	23,377	26,446	30,132	33,377	35,641	37,552	12%
	5022	174,562	231,428	195,968	17,305			9%	11	177,851	181,140	184,741	187,780	207,071	213,845	222,637	6%
	5023	25,469	176,035	102,685	59,642			58%	7	33,241	41,013	57,753	90,828	155,478	169,173	172,604	46%
	5024	26,930	80,065	51,532	16,050			31%	11	32,985	39,040	41,308	47,320	59,341	74,484	77,275	18%
	5025	48,189	85,943	65,586	13,017			20%	11	49,046	49,902	55,194	66,051	75,928	79,847	82,895	16%
	5026	26,918	47,236	39,323	5,503			14%	12	30,532	33,837	37,305	39,351	43,259	44,202	45,590	7%
	5027	13,339	32,467	20,182	5,070			25%	12	14,403	15,402	16,696	20,019	21,592	24,681	28,349	13%
CTP	6001																
	6002																
	6003																
	6004																
	6005																
ALL-IN no-CTP	10000	764,797	1,149,049	926,402	152,520			16%	7	765,816	766,835	810,872	884,645	1,032,290	1,120,085	1,134,567	12%
Equity Cumulative	11000	264,601	346,812	303,056	28,408			9%	12	264,676	265,480	281,110	300,363	324,365	336,604	341,682	7%
IR Cumulative	12000	290,323	426,691	376,809	42,340			11%	16	307,300	314,498	354,237	394,501	408,074	421,777	424,617	7%
FX Cumulative	13000	565,591	1,035,822	802,034	143,731			18%	18	579,964	649,532	692,767	800,636	874,286	1,014,808	1,025,624	12%
Commodity Cumulative	14000	327,295	791,636	526,516	166,717			32%	9	328,265	329,235	391,999	530,980	629,804	735,915	763,776	23%
CS Cumulative	15000	219,993	284,880	253,892	23,096			9%	10	222,457	224,921	237,888	252,059	273,719	279,599	282,239	7%
CTP Cumulative	16000																

Table 33: VaR statistics (low L3 A&L banks only)

EU Statistics for VaR

		Other stats						Percentiles								Extreme Values range (Full Sample)		
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range	STDev_trunc[1]	-2*STDev_trunc	+2*STDev_trunc
Equity	1001	433,773	509,000	477,838	29,369	6%	6	439,646	445,520	461,665	479,302	502,224	508,692	508,846	4%	53,266	377,212	590,274
	1002	310,895	426,069	378,343	46,339	12%	6	316,439	321,982	345,515	394,592	409,712	418,454	422,262	9%	47,073	273,248	461,540
	1003						4											
	1004	14	1,982	1,224	757	62%	5	224	434	1,064	1,394	1,668	1,856	1,919	22%	591	-265	2,099
	1005	48,830,585	56,913,388	53,619,093	3,289,844	6%	6	49,368,668	49,906,751	51,478,508	54,053,497	56,445,934	56,897,032	56,905,210	5%	4,977,240	43,939,788	63,848,750
	1006						4											
	1007						3											
	1008						2											
	1009	59,277	77,324	66,040	7,085	11%	5	59,609	59,941	60,938	65,462	67,198	73,274	75,299	5%	12,933	36,058	87,791
	1010	40,235	47,383	42,295	2,588	6%	6	40,393	40,551	40,962	41,534	42,116	44,799	46,091	1%	4,772	32,768	51,858
	1011	403,162	479,543	435,624	28,581	7%	6	404,534	405,906	413,434	435,311	449,535	465,656	472,599	4%	45,952	338,031	521,839
	1012	382,702	458,644	418,547	27,044	6%	6	385,516	388,331	401,198	423,437	427,815	443,873	451,258	3%	42,501	326,769	496,774
	1013	69,696	105,931	94,442	15,802	17%	5	73,256	76,815	87,494	103,534	105,557	105,781	105,856	9%	24,421	43,752	141,438
	1014	329,380	422,612	371,529	36,359	10%	5	332,668	335,956	345,820	372,831	387,000	408,367	415,490	6%	46,918	269,256	456,929
	1015	239,718	338,602	282,127	39,222	14%	5	242,412	245,106	253,189	279,137	299,991	323,158	330,880	8%	36,094	223,917	368,295
	1016						2											
Interest Rate	2001	237,593	258,280	244,044	6,501	3%	9	237,634	237,675	239,554	242,800	246,495	249,674	253,977	1%	36,746	174,030	321,013
	2002	132,253	191,706	170,517	20,232	12%	8	140,317	148,381	162,949	170,611	188,317	190,939	191,322	7%	22,089	124,565	212,921
	2003	23,468	29,945	26,173	2,117	8%	9	23,868	24,269	25,220	25,371	26,567	29,326	29,635	3%	2,464	21,616	31,471
	2004	75,199	182,164	129,097	40,628	31%	7	82,259	89,319	101,170	130,115	156,932	180,840	181,502	22%	42,062	59,990	228,240
	2005						3											
	2006	33,200	55,618	43,204	9,117	21%	7	33,952	34,705	36,219	40,391	50,390	55,000	55,309	16%	15,397	23,794	85,381
	2007	96,630	143,546	121,070	17,882	15%	7	98,647	100,664	106,868	126,066	133,755	140,395	141,971	11%	29,102	74,720	191,129
	2008	69,338	135,108	109,745	22,607	21%	7	77,923	86,508	98,743	115,455	125,416	131,345	133,226	12%	30,598	61,201	183,593
	2009	230,900	287,668	255,458	19,673	8%	9	233,068	235,237	236,757	258,014	265,759	277,360	282,514	6%	26,566	190,112	296,375
	2010	214,286	233,820	220,492	6,154	3%	9	214,399	214,512	216,646	218,700	222,830	226,010	229,915	1%	32,506	159,044	289,069
	2011	469,000	611,763	530,218	50,215	9%	9	469,552	470,105	484,506	531,936	553,949	590,408	601,085	7%	68,903	358,141	633,755
	2012	140,045	159,967	149,623	7,013	5%	9	140,181	140,316	145,539	149,353	154,200	157,008	158,487	3%	91,859	-28,467	338,970
	2013	48,607	79,003	62,243	11,527	19%	7	49,773	50,938	54,959	57,962	70,105	77,219	78,111	12%	14,438	42,425	100,177
	2014	29,803	52,914	39,610	8,769	22%	6	29,963	30,123	32,378	40,575	43,254	48,132	50,523	14%	14,204	22,567	79,384
	2015	3,255	14,789	7,440	3,964	53%	8	3,335	3,415	4,923	6,651	8,735	12,457	13,623	28%	10,356	-14,252	27,171
	2016	161,488	209,278	179,801	17,010	9%	7	161,571	161,653	165,821	182,378	186,910	196,068	202,673	6%	26,709	135,713	242,549
	2017	25,989	107,245	65,697	43,245	66%	6	25,996	26,002	26,199	64,426	105,086	106,663	106,954	60%	73,788	-120,826	174,328
	2018	24,734	34,507	29,881	3,035	10%	8	25,509	26,285	28,607	30,176	31,638	32,572	33,539	5%	3,582	23,431	37,761
	2019	12,172	20,233	16,225	3,123	19%	8	12,197	12,222	14,372	15,939	18,659	20,046	20,140	13%	3,645	9,195	23,777
	2020	25,700	49,546	39,526	7,188	18%	9	28,941	32,182	37,547	39,968	41,125	48,746	49,146	5%	8,205	23,380	56,200
	2021	48,004	75,877	62,905	8,763	14%	7	51,413	54,822	60,640	62,049	66,562	72,591	74,234	5%	12,886	39,769	91,314
	2022	238,203	406,359	329,524	62,123	19%	6	255,817	273,431	309,419	314,911	375,105	400,229	403,294	10%	73,562	221,973	516,221
	2023	176,941	298,073	257,507	42,686	17%	7	191,018	205,095	242,499	277,916	282,311	289,473	293,773	8%	72,934	79,239	370,973
FX	3001	460,183	869,104	660,601	131,159	20%	8	496,344	532,505	574,493	659,146	726,803	813,551	841,328	12%	129,775	391,137	910,735
	3002	155,600	222,373	187,837	24,651	13%	8	155,657	155,715	172,467	186,636	207,557	214,665	218,519	9%	35,040	116,852	257,012
	3003	171,680	215,263	196,965	15,774	8%	7	175,164	178,648	186,793	201,021	208,604	211,289	213,276	6%	25,051	144,060	244,265
	3004	536,328	707,577	636,298	52,567	8%	8	560,177	584,027	619,867	639,573	658,159	695,608	701,593	3%	66,774	479,014	746,110
	3005	296,901	461,309	364,657	62,051	17%	7	304,587	312,272	324,888	347,557	398,529	448,408	454,858	10%	55,388	262,268	483,819
	3006	5,900	25,264	14,227	5,431	38%	8	8,082	10,263	12,384	13,602	14,728	19,353	22,309	9%	16,539	-19,447	46,710
	3007						4											
Commodities	4001						1											
	4002						1											
	4003																	
	4004																	
Credit Spread	5001						4											
	5002						4											
	5003	6,388	8,096	6,965	749	11%	5	6,389	6,390	6,392	6,586	7,365	7,804	7,950	7%	1,167	4,154	8,823
	5004						4											
	5005						4											
	5006	6,751	12,822	10,085	2,189	22%	5	7,351	7,952	9,753	10,440	10,661	11,958	12,390	4%	5,091	2,970	23,335
	5007						4											
	5008	60,478	97,319	73,604	14,026	19%	6	60,555	60,632	62,318	72,397	78,157	87,785	92,552	11%	29,050	19,963	136,164
	5009	14,901	24,628	18,689	3,323	18%	6	15,393	15,886	16,991	18,266	19,199	21,917	23,273	6%	5,017	9,157	29,226
	5010	24,904	32,758	28,291	3,480	12%	5	24,964	25,023	25,202	27,647	30,946	32,033	32,396	10%	8,518	13,911	47,982
	5011	15,241	32,602	20,280	7,096	35%	5	15,476	15,711	16,415	17,265	19,875	27,511	30,057	10%	13,099	-6,322	46,073
	5012						3											
	5013						4											
	5014						3											
	5015						3											
	5016						3											
	5017						3											
	5018						3											
	5019						3											
	5020	175,819	224,367	195,091	18,282	9%	5	177,842	179,865	185,933	191,188	198,146	213,879	219,123	3%	17,030	171,364	239,482
	5021						4											
	5022						3											
	5023						2											
	5024						4											
	5025						4											
	5026	29,380	44,243	36,874	5,277	14%	5	30,748	32,115	36,218	36,972	37,555	41,568	42,905	2%	7,470	22,546	52,425
	5027	14,313	32,467	19,409	7,414	38%	5	14,613	14,913	15,813	16,552	17,900	26,640	29,554	6%	8,728	444	35,356
CTP	6001																	
	6002																	
	6003																	
	6004																	
	6005																	
ALL-IN no-CTP	10000																	
Equity Cumulative	11000						4											
IR Cumulative	12000	290,323	426,691	371,279	47,581	13%	7	303,186	316,049	344,472	389,103	401,948	415,376	421,034	8%	82,591	225,877	556,239
FX Cumulative	13000	582,500	1,010,944	746,248	147,060	20%	8	592,872	603,245	661,729	711,308	790,565	943,199	977,072	9%	130,502	552,993	1,075,000
Commodity Cumulative	14000																	
CS Cumulative	15000						4											
CTP Cumulative	16000																	

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

EU Statistics for VaR

		Other stats						Percentiles								Extreme Values range (Full Sample)		
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range	STDev_trunc[1]	-2*STDev_trunc	+2*STDev_trunc
Equity	1001	385,140	577,601	476,906	53,916	11%	15	397,445	410,729	438,425	484,034	519,246	528,800	545,047	8%	53,266	377,212	590,274
	1002	277,489	424,522	369,653	50,394	14%	13	297,419	311,714	338,105	395,048	413,063	418,597	421,380	10%	47,073	273,248	461,540
	1003	7,624	18,809	13,779	2,730	20%	13	9,488	10,829	13,003	14,452	15,059	15,653	16,969	7%	2,973	7,188	19,080
	1004	62	1,860	996	446	45%	13	393	633	793	917	1,145	1,524	1,693	18%	591	-265	2,099
	1005	44,528,539	62,687,319	53,814,331	5,283,387	10%	14	46,504,563	48,242,621	50,375,293	53,273,599	57,146,025	60,776,705	62,392,922	6%	4,977,240	43,939,788	63,848,750
	1006	1,644	5,488	3,765	1,103	29%	14	2,241	2,570	3,229	3,589	4,585	5,080	5,239	17%	1,135	1,308	5,848
	1007	18,453	36,917	27,122	5,853	22%	11	19,593	20,732	23,692	24,675	32,138	33,543	35,230	15%	16,303	-5,802	59,409
	1008	5,333	11,991	8,306	1,836	22%	11	6,165	6,996	7,171	7,870	9,536	10,015	11,003	14%	3,116	1,637	14,103
	1009	43,454	77,007	60,543	9,496	16%	12	46,175	48,707	56,936	61,378	64,148	72,132	74,795	6%	12,933	36,058	87,791
	1010	34,581	51,719	43,058	4,650	11%	11	36,820	39,059	39,940	43,378	45,665	47,382	49,551	7%	4,772	32,768	51,858
	1011	359,889	503,209	436,385	47,969	11%	13	380,630	394,562	405,045	410,845	489,174	498,402	501,679	9%	45,952	338,031	521,839
	1012	343,511	474,939	414,448	43,039	10%	13	359,525	371,012	385,565	397,375	462,584	467,309	471,034	9%	42,501	326,769	496,774
	1013	68,059	122,288	95,114	16,923	18%	12	68,065	68,852	85,867	102,068	106,041	106,781	113,782	11%	24,421	43,752	141,438
	1014	301,745	423,285	376,632	39,007	10%	14	310,260	325,638	353,620	377,201	410,070	417,521	420,076	7%	46,918	269,256	456,929
	1015	227,827	345,602	303,590	34,983	12%	11	247,074	266,321	287,338	307,173	328,613	333,634	339,618	7%	36,094	223,917	368,295
	1016	964	299,604	138,904	125,201	90%	6	13,391	25,817	62,002	97,079	240,562	293,817	296,711	59%	127,161	-135,147	373,496
Interest Rate	2001	206,696	315,516	259,238	35,353	14%	16	213,268	221,762	235,466	250,355	291,143	313,111	315,314	11%	36,746	174,030	321,013
	2002	133,789	210,467	166,669	24,097	14%	16	134,362	138,603	152,111	158,967	182,705	198,815	203,280	9%	22,089	124,565	212,921
	2003	22,436	31,217	26,525	2,287	9%	16	22,840	23,834	25,365	26,331	27,463	29,207	30,123	4%	2,464	21,616	31,471
	2004	91,967	220,880	152,213	44,853	29%	18	98,030	99,936	108,282	158,637	189,481	216,234	218,366	27%	42,062	59,990	228,240
	2005	11,684	74,067	37,219	18,096	49%	9	16,032	20,379	26,834	35,697	45,487	55,119	64,593	26%	20,244	-2,891	78,084
	2006	28,730	79,878	51,619	15,616	30%	17	31,400	32,381	37,160	56,093	62,308	70,218	72,562	25%	15,397	23,794	85,381
	2007	75,454	167,453	128,509	31,257	24%	15	81,643	84,968	106,873	141,334	155,890	162,473	165,112	19%	29,102	74,720	191,129
	2008	81,320	169,979	122,979	32,060	26%	15	81,915	83,727	95,828	122,798	153,608	159,875	163,061	23%	30,598	61,201	183,593
	2009	193,625	293,518	240,834	28,511	12%	18	194,477	204,162	227,809	239,737	255,275	280,090	283,662	6%	26,566	190,112	296,375
	2010	186,675	284,233	234,818	30,437	13%	16	200,540	206,235	214,830	225,993	261,947	281,909	283,922	10%	32,506	159,044	289,069
	2011	394,429	679,203	523,609	73,606	14%	18	425,796	443,644	470,046	513,855	574,864	623,784	628,781	10%	68,903	358,141	633,755
	2012	130,089	338,818	192,487	66,661	35%	15	134,594	137,794	141,960	154,235	225,232	286,318	321,955	23%	91,859	-28,467	338,970
	2013	49,801	98,195	72,314	15,941	22%	17	52,876	54,907	60,010	71,085	84,906	96,071	97,517	17%	14,438	42,425	100,177
	2014	23,129	70,822	49,884	14,915	30%	13	24,587	27,975	40,621	51,525	62,009	65,482	67,789	21%	14,204	22,567	79,384
	2015	2,585	27,014	7,144	5,879	82%	16	3,019	3,234	3,430	5,765	7,016	10,885	16,141	34%	10,356	-14,252	27,171
	2016	143,618	225,107	192,188	19,691	10%	13	159,486	172,147	188,098	196,426	201,748	206,091	214,096	4%	26,709	135,713	242,549
	2017	20,987	115,079	32,272	22,160	69%	17	21,297	21,931	23,322	25,406	28,283	40,499	57,711	10%	13,788	-120,826	174,328
	2018	24,114	36,378	30,370	4,062	13%	15	24,926	25,381	26,869	31,139	33,542	35,246	35,654	11%	3,582	23,431	37,761
	2019	9,734	19,249	15,285	2,923	19%	15	10,513	11,101	13,763	16,552	17,208	18,358	18,814	11%	3,645	9,195	23,777
	2020	33,927	50,122	40,637	5,286	13%	15	34,721	35,133	36,449	39,136	44,591	48,062	48,998	10%	8,205	23,380	56,200
	2021	44,103	90,537	69,082	14,143	20%	15	46,155	50,298	58,703	75,639	77,221	85,001	86,690	14%	12,886	39,769	91,314
	2022	301,018	485,422	385,509	60,857	16%	12	305,955	310,203	317,303	402,290	416,335	450,388	468,073	13%	73,562	221,973	516,221
	2023	85,315	348,302	221,621	76,349	34%	17	112,638	127,222	183,220	219,991	279,297	315,075	335,270	21%	72,934	79,239	370,973
FX	3001	410,212	844,169	631,730	132,934	21%	17	464,835	479,995	511,172	636,160	775,384	786,450	805,065	21%	129,775	391,137	910,235
	3002	130,058	254,893	190,446	39,728	21%	14	131,932	137,884	161,150	190,348	221,312	239,430	247,091	16%	35,040	116,852	257,012
	3003	158,162	238,550	197,604	28,257	14%	15	162,991	166,892	170,264	194,163	227,063	234,477	236,615	14%	25,051	144,060	244,265
	3004	490,226	632,562	577,760	49,158	9%	13	512,676	528,162	534,898	597,234	625,904	630,027	631,216	8%	66,774	479,014	746,110
	3005	326,257	483,491	391,182	50,995	13%	15	334,462	339,621	345,347	381,805	418,594	465,203	480,062	10%	55,388	262,268	483,819
	3006	10,655	46,297	16,181	8,598	53%	16	10,708	10,767	12,164	13,244	16,699	20,081	27,010	16%	16,539	-19,447	46,710
	3007	648,835	941,645	801,900	78,248	10%	12	696,351	736,661	760,446	795,681	840,273	895,876	919,605	5%	83,725	640,304	975,203
Commodities	4001	9,043	47,103	26,671	12,389	46%	9	11,844	14,645	21,723	24,365	27,320	45,496	46,299	11%	22,359	-20,353	69,083
	4002	324,638	779,543	523,962	142,691	27%	8	345,256	365,874	435,202	531,463	576,963	674,164	726,853	14%	153,198	225,068	837,858
	4003	261,170	814,356	581,004	157,801	27%	8	351,618	442,065	557,117	590,844	631,823	726,436	770,396	6%	183,889	202,535	938,091
	4004	356,396	609,319	484,556	73,816	15%	8	379,500	402,604	457,505	494,656	514,668	543,561	576,440	6%	147,918	197,102	788,775
Credit Spread	5001	8,144	18,163	14,063	2,884	21%	12	9,902	11,389	12,373	13,903	16,293	16,912	17,504	14%	2,980	7,547	19,468
	5002	30,987	45,367	35,215	4,491	13%	11	31,279	31,571	31,881	34,460	37,170	39,898	42,633	8%	11,591	11,278	57,642
	5003	4,805	8,131	6,348	1,130	18%	13	5,030	5,218	5,469	5,813	7,284	7,890	8,073	14%	1,167	4,154	8,823
	5004	13,858	20,348	16,323	2,239	14%	11	13,906	13,954	14,505	15,853	17,484	19,650	19,999	9%	3,684	8,486	23,221
	5005	3,751	9,833	6,600	2,136	32%	12	3,887	4,084	5,107	5,858	8,328	9,436	9,682	24%	2,112	1,965	10,415
	5006	4,129	19,357	12,307	4,612	37%	11	5,145	6,161	9,593	13,686	14,697	16,668	18,013	21%	5,091	2,970	23,335
	5007	33,947	63,712	49,605	12,084	24%	10	34,224	34,501	39,098	51,322	60,309	63,149	63,430	21%	19,805	13,355	92,577
	5008	57,678	128,724	81,264	20,071	25%	12	58,552	59,502	64,899	79,951	90,109	95,297	110,589	16%	29,050	19,963	136,164
	5009	14,855	26,308	19,855	3,899	20%	12	15,551	16,162	16,830	17,955	23,157	24,337	25,262	16%	5,017	9,157	29,226
	5010	23,598	46,377	32,553	6,500	20%	11	24,245	24,892	29,576	30,614	35,569	38,939	42,658	9%	8,518	13,911	47,982
	5011	14,679	38,395	21,863	6,861	31%	11	15,088	15,497	17,531	19,950	23,384	29,205	33,800	14%	13,099	-6,322	46,073
	5012	1,595	4,836	2,693	1,220	45%	11	1,604	1,612	1,858	2,180	3,285	4,787	4,812	28%	2,230	-2,223	6,697
	5013	17,293	29,545	21,464	3,567	17%	12	17,339	17,539	19,674	20,667	22,233	25,769	27,550	6%	4,894	10,931	30,506
	5014	4,138	7,216	5,699	927	16%	12	4,539	4,881	5,023	5,482	6,505	6,539	6,844	13%	901	4,102	7,706
	5015	24,887	32,124	27,243	2,179	8%	11	25,102	25,317	25,692	26,286	28,663	28,959	30,542	5%	3,822	19,749	35,037
	5016	15,615	40,364	25,209	8,276	33%	11	17,043	18,471	18,739	23,783	27,417	39,548	39,956	19%	15,546	-5,818	56,366
	5017	19,023	54,753	34,856	12,034	35%	11	19,240	19,456	26,103	36,046	43,146	49,796	52,275	25%	14,653	5,397	64,011
	5018	31,845	68,942	51,984	13,100	25%	11	32,261	32,676	44,932	51,705	63,492	67,280	68,111	17%	26,887	-2,069	105,480
	5019	9,104	20,463	13,389	3,572	27%	12	9,541	9,904	10,330	13,162	14,999	17,953	19,158	18%	5,495	2,778	24,760
	5020	183,030	237,074	210,779	17,861	8%	12	185,696	188,499	197,157	210,477	222,770	234,738	236,431	6%	17,030	171,364	239,482
	5021	15,542	46,308	31,958	8,087	25%	12	19,334	22,838	29,211	32,721	35,072	40,961	43,680	9%	9,044	13,976	50,153
	5022	180,940	231,428	202,193	17,010	8%	10	182,380	183,819	185,952	204,683	213,505	218,086	224,757	7%	17,669	162,507	233,182
	5023	25,469	164,598	76,246	52,797	69%	5	30,650	35,832	51,376	64,129	75,660	129,023	146,810	19%	57,482	-39,304	190,624
	5024	44,524	85,592	59,865	15,355	26%	10	45,675	46,825	48,058	51,375	72,504	80,618	83,105	20%	26,676	-2,721	103,984
	5025	48,189	91,732	71,660	13,278	19%	9	52,207	56,225	66,051	71,905	77,369	87,101	89,416	8%	12,492	46,484	96,454
	5026	26,918	47,236	37,706	6,517	17%	10	28,248	29,578	33,982	37,367	42,912	44,173	45,705	12%	7,470	22,546	52,425
	5027	6,776	24,980	17,790	5,256	30%	10	9,729	12,683	15,507	18,218	21,456	22,286	23,633	16%	8,728	444	35,356
CTP	6001																	
	6002																	
	6003																	
	6004																	
	6005																	
ALL-IN no-CTP	10000	747,951	1,149,049	874,558	156,934	18%	6	752,163	756,374	765,646	810,872	936,241	1,056,427	1,102,738	10%	188,567	492,942	1,247,211
Equity Cumulative	11000	264,738	350,067	311,886	30,614	10%	10	268,075	271,412	293,466	312,048	338,164	347,138	348,602	7%	33,067	232,430	368,296
IR Cumulative	12000	296,221	435,862	378,333	43,906	12%	13	308,111	320,853	349,714	393,012	408,796	427,635	431,482	8%	82,591	225,877	556,239
FX Cumulative	13000	565,591	1,023,824	805,609	131,529	16%	15	587,288	630,862	726,998	814,483	878,342	959,030	1,000,740	9%	130,502	552,993	1,075,000
Commodity Cumulative	14000	327,295	791,636	528,070	144,184	27%	8	349,941	372,588	437,823	534,301	579,048	678,354	734,995	14%	155,103	220,775	841,185
CS Cumulative	15000	225,123	316,890	263,638	28,133	11%	9	229,575	234,028	242,788	257,930	279,012	291,282	304,086	7%	32,350	193,000	322,398
CTP Cumulative	16000																	

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

EU Statistics for VaR

		Other stats						Percentiles								Extreme Values range (Full Sample)		
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range	STDev_trunc[1]	-2*STDev_trunc	+2*STDev_trunc
Equity	1001	420,057	510,989	470,860	31,391	7%	6	428,976	437,894	458,440	474,131	488,012	500,554	505,771	3%	53,266	377,212	590,274
	1002	316,860	387,555	354,683	26,028	7%	6	320,985	325,111	338,904	357,969	370,889	380,970	384,262	5%	47,073	273,248	461,540
	1003	7,729	13,291	11,551	2,213	19%	5	8,550	9,371	11,834	12,091	12,811	13,099	13,195	4%	2,973	7,188	19,080
	1004						3											
	1005						4											
	1006	1,935	5,380	2,900	1,419	49%	5	1,968	2,001	2,101	2,350	2,733	4,321	4,851	13%	1,135	1,308	5,848
	1007						3											
	1008						4											
	1009	45,513	85,858	62,555	14,852	24%	5	47,551	49,589	55,704	61,925	63,775	77,025	81,441	7%	12,933	36,058	87,791
	1010	37,203	43,756	41,917	2,707	6%	5	38,225	39,247	42,313	42,672	43,641	43,710	43,733	2%	4,772	32,768	51,858
	1011	382,154	475,659	423,422	35,136	8%	6	384,126	386,098	396,326	423,631	442,082	460,537	468,098	5%	45,952	338,031	521,839
	1012	369,721	459,336	404,014	34,172	8%	6	370,009	370,296	377,684	399,375	419,210	442,370	450,853	5%	42,501	326,769	496,774
	1013	50,640	107,150	81,167	24,444	30%	6	52,317	53,994	60,949	84,735	101,224	104,772	105,961	25%	24,421	43,752	141,438
	1014						4											
	1015						3											
	1016						1											
Interest Rate	2001	206,764	313,034	246,445	32,568	13%	8	212,058	217,352	227,220	242,863	257,414	274,440	293,737	6%	36,746	174,030	321,013
	2002	155,254	193,002	178,129	13,314	7%	7	158,991	162,728	173,470	179,507	186,100	192,665	192,834	4%	22,089	124,565	212,921
	2003	23,197	29,920	26,233	2,416	9%	8	23,474	23,751	24,030	26,295	27,640	29,209	29,564	7%	2,464	21,616	31,471
	2004	88,407	210,379	143,949	46,187	32%	9	92,066	95,725	102,781	126,820	179,712	197,898	204,139	27%	42,062	59,990	228,240
	2005						2											
	2006	35,696	66,660	55,062	12,348	22%	5	38,671	41,646	50,571	59,612	62,773	65,105	65,883	11%	15,397	23,794	85,381
	2007						4											
	2008	67,335	156,971	113,537	34,955	31%	6	70,531	73,728	86,945	118,842	136,900	148,042	152,506	22%	30,598	61,201	183,593
	2009	199,179	273,336	237,744	26,696	11%	8	199,741	200,303	226,670	240,296	252,085	267,481	270,409	5%	26,566	190,112	296,375
	2010	187,515	282,104	222,375	29,319	13%	8	191,671	195,828	204,525	219,595	232,217	247,320	264,712	6%	32,506	159,044	289,069
	2011	410,714	604,287	495,176	61,817	12%	7	427,010	443,306	467,703	479,375	518,225	566,420	585,353	5%	68,903	358,141	633,755
	2012						4											
	2013	51,865	83,373	69,011	12,322	18%	7	51,895	51,926	61,742	71,879	76,237	79,573	81,473	11%	14,438	42,425	100,177
	2014						4											
	2015	2,079	13,981	7,592	4,603	61%	6	2,158	2,237	3,811	8,699	9,610	11,841	12,911	43%	10,356	-14,252	27,171
	2016						4											
	2017	25,146	35,883	29,851	5,316	18%	5	25,160	25,173	25,214	27,794	35,218	35,617	35,750	17%	73,788	-120,826	174,328
	2018	26,005	34,374	31,049	2,888	9%	7	26,766	27,527	29,735	31,714	32,892	33,541	33,957	5%	3,582	23,431	37,761
	2019	12,975	19,580	16,926	2,290	14%	7	13,634	14,293	15,980	16,905	18,531	19,269	19,424	7%	3,645	9,195	23,777
	2020	27,857	56,155	38,310	8,908	23%	8	28,131	28,404	33,133	38,202	40,954	46,447	51,301	11%	8,205	23,380	56,200
	2021	41,539	80,118	60,391	13,281	22%	6	44,028	46,518	53,150	61,739	65,629	72,917	76,518	11%	12,886	39,769	91,314
	2022	265,446	441,738	351,204	69,355	20%	6	273,021	280,596	305,123	340,859	404,049	432,158	436,948	14%	73,562	221,973	516,221
	2023	218,040	339,774	272,092	52,128	19%	6	220,699	223,358	230,560	260,845	314,647	332,073	335,923	15%	72,934	79,239	370,973
FX	3001	474,130	844,034	683,382	141,811	21%	7	499,216	524,301	584,723	690,325	802,870	835,988	840,011	16%	129,775	391,137	910,735
	3002	145,791	227,642	183,561	34,937	19%	6	147,215	148,639	154,231	180,235	211,483	221,808	224,725	16%	35,040	116,852	257,012
	3003	160,770	217,097	188,999	22,687	12%	6	163,890	167,010	174,778	184,229	208,089	215,758	216,428	9%	25,051	144,060	244,265
	3004	497,646	698,383	597,253	80,613	13%	6	505,848	514,050	537,604	592,465	660,548	685,244	691,814	10%	66,774	479,014	746,110
	3005	325,501	466,688	368,149	58,787	16%	6	326,186	326,870	328,639	337,109	396,781	440,469	453,578	9%	55,388	262,268	483,819
	3006	10,230	23,941	14,157	4,575	32%	7	10,484	10,738	11,602	13,529	14,097	18,314	21,127	10%	16,539	-19,447	46,710
	3007						4											
Commodities	4001						2											
	4002						2											
	4003						1											
	4004						1											
Credit Spread	5001						3											
	5002						2											
	5003						3											
	5004						2											
	5005						3											
	5006						3											
	5007						2											
	5008						4											
	5009						4											
	5010						3											
	5011						3											
	5012						3											
	5013						3											
	5014						3											
	5015						3											
	5016						1											
	5017						1											
	5018						1											
	5019						3											
	5020						4											
	5021						2											
	5022						3											
	5023						3											
	5024						3											
	5025						3											
	5026						3											
	5027						3											
CTP	6001																	
	6002																	
	6003																	
	6004																	
	6005																	
ALL-IN no-CTP	10000						2											
Equity Cumulative	11000						3											
IR Cumulative	12000						4											
FX Cumulative	13000	712,223	1,035,822	885,646	118,194	13%	5	743,727	775,232	869,745	871,814	938,624	996,943	1,016,382	4%	130,502	552,993	1,075,000
Commodity Cumulative	14000						2											
CS Cumulative	15000						3											
CTP Cumulative	16000																	

Table 36: VaR statistics (IR and CS asset classes – only banks with general and specific IR risk approval)

EU Statistics for VaR

		Other stats						Percentiles							
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range
Interest Rate	*2001*	215,458	315,516	261,161	31,719	12%	19	228,797	230,279	238,574	251,430	292,354	311,386	313,282	10%
	2002	133,789	196,745	167,460	20,192	12%	21	135,614	138,922	154,558	172,501	179,759	191,706	194,462	8%
	2003	22,975	31,217	27,248	2,510	9%	18	23,394	24,326	25,252	27,055	29,611	29,928	30,136	8%
	2004	97,554	220,880	155,959	43,806	28%	22	98,750	99,219	112,191	172,618	188,988	208,847	215,254	25%
	2005	11,684	71,402	40,205	18,772	47%	11	15,231	18,777	22,878	47,032	52,145	55,335	63,369	39%
	2006	28,730	79,878	50,761	13,762	27%	18	32,011	34,764	38,142	53,095	59,055	64,904	71,375	22%
	2007	75,454	167,453	130,732	26,604	20%	16	83,346	95,133	111,935	138,987	145,456	160,020	161,878	13%
	2008	79,125	159,544	124,389	29,637	24%	17	79,921	81,350	102,920	128,836	152,626	158,000	159,544	19%
	2009	200,784	279,304	245,276	19,889	8%	19	207,502	224,003	236,028	247,789	253,667	267,564	275,235	4%
	2010	207,307	283,818	236,559	27,154	11%	19	207,307	209,374	216,561	226,880	262,941	280,420	282,275	10%
	2011	381,204	628,707	515,407	77,402	15%	20	383,490	408,004	469,821	536,556	568,020	622,377	628,707	9%
	2012	139,699	338,818	184,818	57,289	31%	16	139,959	140,215	145,918	154,127	221,063	242,525	278,448	20%
	2013	48,607	98,195	70,670	15,653	22%	19	49,682	51,533	56,587	71,517	81,188	92,222	96,317	18%
	2014	30,749	70,822	53,106	12,424	23%	15	35,573	37,858	43,158	57,269	61,759	68,230	70,822	18%
	2015	1,591	27,014	7,251	6,285	87%	18	2,250	2,386	3,303	5,504	8,960	13,199	16,623	46%
	2016	169,729	225,107	196,257	15,627	8%	17	169,997	177,452	187,261	196,426	202,233	215,610	225,107	4%
	2017	20,987	107,245	38,479	26,203	68%	18	21,316	22,024	25,090	26,533	38,578	68,345	106,256	21%
	2018	25,542	35,100	31,483	2,607	8%	20	26,673	28,360	29,991	31,728	33,277	34,387	34,537	5%
	2019	11,482	19,966	15,750	2,613	17%	17	11,482	11,896	14,088	16,420	17,289	18,766	19,657	10%
	2020	33,802	56,155	42,384	6,502	15%	20	33,921	34,561	37,905	41,706	47,254	50,335	52,451	11%
	2021	49,422	84,940	69,282	10,802	16%	17	51,081	55,012	62,724	70,400	75,906	82,047	84,940	10%
	2022	238,203	485,422	362,604	71,070	20%	16	285,314	304,838	309,995	340,859	412,119	463,580	485,422	14%
	2023	134,329	348,302	252,081	54,377	22%	20	180,775	191,390	217,301	245,453	297,991	305,842	325,568	16%
Credit Spread	*5001*	8,144	16,711	14,087	2,497	18%	16	10,900	11,843	12,453	13,903	16,424	16,575	16,706	14%
	5002	23,441	45,759	34,677	6,348	18%	13	27,969	31,059	31,571	32,138	35,510	44,802	45,541	6%
	5003	4,805	8,096	6,504	992	15%	19	5,062	5,162	5,657	6,586	7,305	7,527	8,026	13%
	5004	11,438	22,951	16,142	3,448	21%	13	12,114	12,823	13,954	14,540	18,098	20,658	21,612	13%
	5005	3,751	9,833	6,738	1,930	29%	15	3,924	4,574	5,779	6,061	8,360	9,517	9,613	18%
	5006	4,129	16,668	11,636	3,702	32%	18	5,856	6,574	8,368	12,872	14,031	15,608	16,302	25%
	5007	32,378	89,252	52,740	16,883	32%	13	36,333	38,970	38,989	47,463	60,793	76,778	83,821	22%
	5008	59,267	128,724	83,836	19,946	24%	17	60,236	61,158	65,995	85,424	95,752	104,692	118,346	18%
	5009	14,855	26,308	20,296	4,012	20%	17	14,892	15,633	17,354	19,206	24,406	24,930	25,567	17%
	5010	24,892	46,625	32,909	6,624	20%	16	24,901	26,034	29,067	30,780	35,650	42,658	46,439	10%
	5011	14,679	38,395	21,817	6,830	31%	16	14,823	15,056	16,823	21,162	24,004	30,904	34,050	18%
	5012	1,595	4,787	2,585	1,009	39%	15	1,607	1,642	1,858	2,180	3,273	3,894	4,207	28%
	5013	16,102	29,545	20,981	3,387	16%	17	17,055	17,343	18,995	20,138	22,881	24,932	26,643	9%
	5014	4,138	7,216	5,864	879	15%	15	4,648	4,931	5,099	5,980	6,413	6,946	7,216	11%
	5015	23,171	32,036	27,502	2,625	10%	14	24,262	24,861	25,429	27,393	28,872	31,012	31,711	6%
	5016	15,615	49,084	28,205	10,845	38%	11	17,025	18,434	19,857	24,685	35,136	40,364	44,724	28%
	5017	19,023	54,753	35,615	13,065	37%	11	21,005	22,987	23,806	34,704	45,454	54,753	54,753	31%
	5018	32,676	67,280	52,225	12,338	24%	11	35,629	38,581	42,534	51,705	63,492	66,397	66,839	20%
	5019	9,104	20,463	14,208	3,927	28%	14	9,413	9,842	10,761	13,462	16,768	19,751	20,463	22%
	5020	175,819	224,367	205,274	15,051	7%	16	183,405	186,905	193,191	206,295	216,004	224,237	224,270	6%
	5021	22,705	41,529	32,432	6,392	20%	12	24,552	26,101	26,652	32,416	36,913	41,387	41,529	16%
	5022	174,562	216,603	199,741	14,680	7%	12	178,180	181,560	185,407	204,518	210,048	216,327	216,603	6%
	5023	25,469	176,035	85,417	48,597	57%	9	31,586	37,703	51,376	75,660	90,828	152,293	164,164	28%
	5024	26,930	91,399	56,352	20,227	36%	13	34,196	39,429	41,629	49,051	70,160	84,487	87,915	26%
	5025	48,189	85,943	67,826	12,939	19%	12	49,131	50,209	56,305	71,905	77,586	80,410	82,934	16%
	5026	26,918	47,236	37,615	5,017	13%	13	30,861	33,884	35,462	36,972	40,357	43,651	45,440	6%
	5027	6,776	32,467	19,086	6,731	35%	13	10,714	13,726	15,813	16,744	23,476	27,253	29,679	20%
IR Cumulative	*12000*	255,384	492,096	369,829	64,353	17%	13	276,347	291,503	312,959	393,012	395,990	420,565	452,853	12%
CS Cumulative	*15000*	219,993	316,890	266,768	31,542	12%	13	223,278	227,625	246,419	272,166	280,165	312,549	316,890	6%

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

EU Statistics for VaR

		Other stats						Percentiles							
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range
Interest Rate	2001	206,696	290,739	241,426	21,959	9%	15	206,744	212,814	228,531	246,495	252,373	260,706	271,026	5%
	2002	132,253	210,467	169,382	22,894	14%	13	137,086	142,212	152,876	167,710	179,759	199,195	204,717	8%
	2003	22,436	28,608	25,581	1,635	6%	16	23,007	23,593	24,363	25,784	26,598	27,100	27,566	4%
	2004	75,199	217,922	138,345	42,795	31%	16	85,105	90,187	103,401	130,203	169,974	190,004	197,253	24%
	2005	0	74,067	41,411	28,373	69%	6	6,709	13,417	27,794	38,081	64,923	72,735	73,401	40%
	2006	32,068	70,733	51,446	13,580	26%	12	34,070	35,757	36,596	55,341	61,610	66,225	68,493	25%
	2007	84,296	167,586	132,033	27,436	21%	13	91,696	97,975	107,005	136,634	154,702	162,703	165,500	18%
	2008	67,335	169,979	119,318	34,986	29%	14	68,637	72,933	91,434	119,127	152,154	159,159	163,555	25%
	2009	194,627	293,518	247,498	28,938	12%	17	198,269	208,756	236,321	242,192	269,227	284,221	288,838	7%
	2010	186,675	261,615	217,623	19,600	9%	15	187,263	192,265	205,699	222,830	227,409	234,471	243,575	5%
	2011	448,921	629,203	524,061	60,873	12%	17	448,967	458,612	479,858	506,810	576,321	612,303	616,331	9%
	2012	134,738	314,728	169,013	52,343	31%	13	135,810	136,862	139,703	151,832	159,967	230,699	272,114	7%
	2013	51,865	97,347	67,679	12,283	18%	14	52,273	52,838	58,474	69,062	74,547	75,962	83,490	12%
	2014	25,559	65,767	44,665	14,803	33%	10	27,469	29,379	31,136	45,799	52,671	65,447	65,607	26%
	2015	2,079	11,458	6,425	2,770	43%	13	2,730	3,208	4,544	6,951	8,061	9,611	10,404	28%
	2016	161,488	207,931	185,158	16,767	9%	10	161,612	161,736	172,530	187,097	198,971	203,884	205,907	7%
	2017	23,322	115,029	34,069	26,987	79%	11	23,348	23,373	24,534	25,214	27,363	32,890	73,960	5%
	2018	24,114	35,343	28,589	3,193	11%	14	24,517	24,896	26,241	28,356	30,787	31,639	32,984	8%
	2019	9,734	20,233	15,202	3,100	20%	15	10,513	11,406	13,256	15,081	17,540	19,001	19,544	14%
	2020	27,857	48,516	38,217	6,047	16%	15	28,404	28,931	36,304	39,101	40,771	45,343	47,722	6%
	2021	41,539	90,537	64,542	15,258	24%	14	43,206	45,273	55,923	61,050	76,622	83,564	86,965	16%
	2022	265,446	453,879	381,007	60,119	16%	12	282,110	297,341	347,005	400,551	417,238	439,822	447,201	9%
	2023	85,315	332,012	219,224	73,198	33%	13	105,807	122,299	176,941	226,347	279,297	285,128	304,090	22%
Credit Spread	5001	9,766	18,163	14,107	3,242	23%	6	10,160	10,554	11,766	14,565	16,204	17,203	17,683	16%
	5002	22,098	45,367	35,667	8,249	23%	7	24,222	26,346	30,526	38,830	41,163	43,603	44,485	15%
	5003	5,090	8,131	6,418	1,525	24%	5	5,146	5,202	5,371	5,469	8,031	8,091	8,111	20%
	5004	10,946	22,951	16,968	4,324	25%	7	11,443	11,940	14,005	16,870	19,999	21,389	22,170	18%
	5005	3,274	8,510	6,223	2,123	34%	7	3,748	4,221	4,964	5,191	8,328	8,401	8,456	25%
	5006	5,936	19,357	11,895	4,924	41%	5	6,699	7,463	9,753	11,508	12,922	16,783	18,070	14%
	5007	33,947	80,201	53,297	16,923	32%	7	34,132	34,316	38,889	58,588	61,284	70,308	75,254	22%
	5008	57,678	89,717	69,257	10,501	15%	8	58,765	59,853	63,035	65,267	75,674	80,105	84,911	9%
	5009	15,358	22,913	17,906	2,318	13%	8	15,769	16,180	16,786	17,151	18,324	20,361	21,637	4%
	5010	23,598	33,543	27,879	3,634	13%	6	23,999	24,400	25,692	27,165	29,745	32,074	32,808	7%
	5011	14,871	21,076	18,523	2,380	13%	6	15,257	15,643	17,053	19,414	19,928	20,513	20,795	8%
	5012	1,574	4,836	2,598	1,289	50%	5	1,666	1,758	2,033	2,099	2,446	3,880	4,358	9%
	5013	17,410	24,430	20,987	3,052	15%	6	17,472	17,533	18,495	21,075	23,491	24,353	24,391	12%
	5014	4,219	6,527	5,313	805	15%	7	4,323	4,427	4,789	5,198	5,835	6,153	6,340	10%
	5015	21,980	32,124	26,759	3,338	12%	7	22,841	23,702	24,900	25,994	28,709	30,225	31,175	7%
	5016	18,471	55,568	32,239	13,486	42%	6	19,799	21,127	24,156	28,032	37,359	47,558	51,563	21%
	5017	27,862	45,694	35,347	8,375	24%	6	27,914	27,966	28,360	32,638	42,897	45,438	45,566	20%
	5018	43,097	95,000	59,684	19,401	33%	6	44,456	45,815	48,721	51,265	65,018	81,971	88,486	14%
	5019	9,960	20,275	13,425	3,366	25%	7	10,364	10,768	11,496	12,713	14,018	16,766	18,520	10%
	5020	183,030	237,074	204,578	19,409	9%	9	186,302	189,574	193,858	198,146	209,704	236,139	236,606	4%
	5021	15,542	46,308	31,158	9,069	29%	7	19,698	23,853	29,624	30,132	33,439	39,411	42,860	6%
	5022	180,940	231,428	192,124	17,508	9%	7	181,900	182,859	184,784	187,070	187,932	205,421	218,425	1%
	5023						4								
	5024	32,443	74,484	46,987	14,140	30%	7	33,197	33,951	36,999	47,081	50,452	60,173	67,328	15%
	5025	54,389	91,732	69,521	13,785	20%	7	55,543	56,696	58,630	66,051	78,608	84,601	88,167	15%
	5026	29,380	43,068	36,794	5,431	15%	7	29,528	29,676	33,453	37,416	40,393	42,692	42,880	9%
	5027	14,313	21,460	18,048	2,755	15%	7	14,800	15,287	16,341	17,169	20,356	21,451	21,456	11%
IR Cumulative	12000	333,199	435,862	393,271	34,789	9%	12	342,282	350,317	358,096	404,476	420,703	428,098	431,847	8%
CS Cumulative	15000	225,123	257,699	242,022	10,680	4%	6	228,261	231,398	238,863	242,610	245,511	252,059	254,879	1%

Table 38: VaR statistics (EQ asset class – only banks with general and specific EQ risk approval)

EU Statistics for VaR

		Other stats						Percentiles							
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range
Equity	1001	385,140	531,095	471,562	43,928	9%	20	398,157	417,936	437,787	482,971	508,538	525,357	525,644	7%
	1002	302,562	426,069	367,357	44,418	12%	18	309,484	314,235	333,142	367,394	409,712	424,522	424,754	10%
	1003	7,729	15,291	13,258	1,710	13%	19	11,230	11,791	12,815	13,544	14,383	14,659	15,082	6%
	1004	503	1,982	1,035	452	44%	17	536	585	623	917	1,394	1,616	1,731	38%
	1005	45,361,136	62,234,400	54,247,042	4,089,753	8%	20	49,592,680	50,261,696	51,129,195	53,797,496	56,888,854	57,829,618	61,933,275	5%
	1006	1,935	5,683	3,661	1,058	29%	19	2,084	2,253	2,977	3,618	4,318	5,038	5,163	18%
	1007	1,528	55,097	25,088	12,492	50%	15	6,387	11,916	18,453	24,675	31,074	35,615	42,606	25%
	1008	5,959	11,774	8,415	1,845	22%	15	6,212	6,515	6,996	7,870	9,536	11,047	11,747	15%
	1009	41,981	85,858	62,194	10,087	16%	19	45,160	50,272	59,019	63,667	64,961	69,956	80,573	5%
	1010	34,581	47,383	41,898	3,664	9%	19	36,831	37,179	39,647	42,215	43,770	47,382	47,382	5%
	1011	359,889	503,209	430,354	46,113	11%	19	371,320	380,241	396,602	410,845	463,714	501,169	503,209	8%
	1012	343,511	474,939	411,229	41,825	10%	19	353,349	366,665	376,924	397,375	443,873	469,733	474,939	8%
	1013	57,347	107,150	92,759	16,439	18%	19	58,036	69,025	86,185	102,393	105,917	106,496	106,855	10%
	1014	306,376	423,285	374,463	39,478	11%	18	313,575	325,020	346,467	375,047	411,192	419,627	422,713	9%
	1015	239,718	345,602	298,483	34,626	12%	16	241,549	247,674	276,046	298,093	328,645	336,118	340,352	9%
	1016	22,570	288,030	123,145	83,920	68%	8	32,405	42,240	84,667	99,357	151,192	220,380	254,205	28%
Equity Cumulative	11000	246,586	350,067	308,210	33,258	11%	16	260,097	268,377	282,051	311,080	338,444	349,913	350,067	9%

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

EU Statistics for VaR

		Other stats						Percentiles							
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range
Equity	1001	402,718	577,601	474,228	59,740	13%	7	412,035	421,351	434,333	466,568	502,021	544,449	561,025	7%
	1002	277,489	419,285	358,598	53,053	15%	7	287,511	297,533	327,239	355,534	401,700	417,220	418,253	10%
	1003	7,624	18,809	12,095	4,114	34%	5	8,245	8,867	10,731	11,222	12,091	16,122	17,465	6%
	1004	14	1,145	576	509	88%	5	24	33	62	793	868	1,034	1,090	87%
	1005						4								
	1006	1,644	5,488	3,874	1,605	41%	5	1,967	2,289	3,257	3,600	5,380	5,445	5,466	25%
	1007						4								
	1008						2								
	1009	48,401	77,324	65,048	12,253	19%	5	50,838	53,275	60,585	61,925	77,007	77,197	77,261	12%
	1010						4								
	1011	394,457	489,375	425,644	35,014	8%	6	394,588	394,719	400,031	421,483	431,009	460,729	475,052	4%
	1012	370,201	462,584	404,958	34,345	8%	6	371,215	372,229	380,224	399,375	418,125	443,271	452,928	5%
	1013	50,640	122,288	85,040	26,596	31%	6	54,997	59,355	68,476	83,706	100,800	112,058	117,173	19%
	1014	301,745	406,703	368,710	36,262	10%	6	316,860	331,974	364,860	375,152	387,849	399,006	402,854	3%
	1015						4								
	1016						2								
Equity Cumulative	11000						3								

Table 40: Stress VaR statistics (2008-2009 stress period only)

EU Statistics for SVaR

		Other stats						Percentiles							
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range
Equity	1001	639,346	1,123,456	879,573	108,727	12%	21	734,191	762,312	794,299	887,867	950,107	976,540	1,003,422	9%
	1002	418,386	1,382,437	1,047,269	278,630	27%	18	719,505	805,331	836,883	1,077,800	1,323,102	1,372,901	1,377,460	23%
	1003	11,622	26,895	19,384	4,949	26%	15	12,035	12,382	16,524	19,864	22,737	25,640	26,552	16%
	1004	58	3,061	1,250	791	63%	15	225	416	792	1,087	1,623	2,202	2,489	34%
	1005	84,619,102	155,557,845	126,849,641	22,392,781	18%	17	92,177,638	101,339,055	107,862,274	131,616,193	147,982,053	149,818,341	151,246,287	16%
	1006	8	10,872	5,380	2,977	55%	17	1,671	2,256	2,899	5,649	7,121	9,286	10,653	42%
	1007	818	118,747	64,275	34,222	53%	14	17,151	26,925	40,426	60,489	92,055	102,943	109,184	39%
	1008	6,966	19,291	11,715	3,658	31%	14	7,574	8,057	8,503	11,698	14,024	15,697	17,057	25%
	1009	60,576	126,695	103,911	16,329	16%	16	81,062	89,040	96,625	106,746	114,254	121,592	125,247	8%
	1010	55,894	144,878	115,123	24,926	22%	17	72,803	87,825	98,577	120,057	134,512	141,883	143,929	15%
	1011	560,229	980,145	775,540	93,130	12%	19	659,188	674,357	736,452	772,204	827,565	878,092	891,672	6%
	1012	529,599	941,922	749,843	93,643	12%	19	631,142	643,633	705,025	753,253	799,743	854,636	868,412	6%
	1013	48,460	163,202	110,571	32,135	29%	18	60,530	69,090	93,507	109,308	132,812	148,030	157,375	17%
	1014	441,586	794,472	606,534	102,684	17%	20	450,103	466,606	543,281	617,332	682,829	704,667	751,840	11%
	1015	361,939	652,161	503,154	101,531	20%	14	369,946	380,870	415,655	496,534	581,928	644,120	651,303	17%
	1016	994	523,357	256,093	191,326	75%	9	15,751	30,508	99,785	245,069	423,880	465,527	494,442	62%
Interest Rate	2001	155,991	263,791	216,748	27,784	13%	25	169,881	181,077	200,051	217,052	236,552	248,302	255,492	8%
	2002	109,545	184,116	139,375	19,544	14%	22	114,164	114,786	123,350	138,291	152,077	159,870	166,257	10%
	2003	19,246	51,186	36,752	6,886	19%	24	27,420	29,901	32,950	35,936	40,651	45,220	45,809	10%
	2004	61,311	140,944	95,524	21,864	23%	23	65,435	68,521	78,082	91,872	110,680	121,261	128,009	17%
	2005	1,065	137,110	63,298	46,527	74%	10	5,274	9,484	41,181	50,678	96,165	129,182	133,146	40%
	2006	15,289	91,608	48,447	19,536	40%	20	22,415	27,792	35,355	43,807	59,687	69,972	80,506	26%
	2007	28,317	184,646	101,735	42,959	42%	21	47,239	55,323	76,067	92,978	125,575	176,847	180,670	25%
	2008	45,223	171,077	88,304	35,874	41%	20	46,487	48,131	60,711	81,713	107,151	120,845	167,884	28%
	2009	150,961	350,048	265,409	49,213	19%	23	183,404	211,286	236,238	269,085	293,076	331,486	340,924	11%
	2010	140,479	239,219	196,225	25,474	13%	25	152,852	162,828	181,198	195,403	212,751	224,547	230,202	8%
	2011	294,605	522,960	433,910	59,425	14%	22	322,636	392,495	399,873	427,646	490,468	509,262	511,901	10%
	2012	103,093	197,737	146,252	33,511	23%	19	103,263	105,456	117,274	139,419	178,842	188,779	191,920	21%
	2013	36,165	71,390	51,621	9,844	19%	22	39,394	41,484	43,327	50,124	55,994	64,356	70,198	13%
	2014	27,832	194,416	95,868	56,665	59%	18	29,011	32,183	43,832	86,897	135,324	184,374	185,941	51%
	2015	8,550	29,456	19,181	6,309	33%	21	10,048	12,383	15,057	17,852	24,734	27,995	29,114	24%
	2016	84,762	238,667	120,852	34,231	28%	21	90,927	94,023	101,202	107,516	134,661	150,241	163,967	14%
	2017	107,688	421,815	216,647	85,204	39%	20	129,793	133,522	155,163	190,936	272,809	326,922	363,552	27%
	2018	10,982	22,989	19,214	3,061	16%	22	13,797	15,822	17,749	19,990	21,262	22,429	22,771	9%
	2019	9,843	25,155	15,823	3,515	22%	22	10,192	11,023	13,720	16,096	17,519	19,462	20,570	12%
	2020	6,200	194,635	121,549	52,927	44%	19	54,848	71,667	88,956	106,377	172,674	189,765	192,227	32%
	2021	50	62,105	39,665	14,049	35%	20	23,915	27,648	30,928	41,131	46,540	53,865	61,691	20%
	2022	94,346	325,591	245,107	50,455	21%	18	194,249	214,757	222,506	244,193	265,310	302,520	314,263	9%
	2023	64,444	243,736	161,869	55,183	34%	22	79,421	81,768	118,908	165,896	199,655	232,327	239,646	25%
FX	3001	694,391	1,213,157	936,004	156,316	17%	22	699,710	764,653	802,294	932,857	1,038,850	1,133,930	1,189,538	13%
	3002	154,101	400,867	284,321	74,179	26%	19	154,420	189,781	228,104	284,570	337,844	369,033	379,429	19%
	3003	255,289	453,615	326,506	49,885	15%	19	259,583	271,083	279,585	321,888	359,259	369,269	389,373	12%
	3004	754,705	1,475,838	1,108,904	159,583	14%	21	843,645	888,382	1,034,803	1,121,662	1,191,167	1,253,056	1,293,596	7%
	3005	687,442	1,136,474	981,358	143,067	15%	19	740,139	781,170	856,660	1,053,890	1,092,990	1,116,149	1,125,433	12%
	3006	14,582	94,202	39,611	18,540	47%	20	17,333	18,869	24,790	39,359	46,311	59,138	62,882	30%
	3007	921,823	2,277,904	1,481,294	357,544	24%	17	945,505	961,194	1,320,737	1,560,477	1,599,099	1,862,002	2,002,714	10%
Commodities	4001	24,930	48,206	34,701	8,381	24%	11	25,116	25,302	28,284	31,915	41,223	46,033	47,120	19%
	4002	340,588	1,038,868	707,914	190,919	27%	12	457,312	555,362	592,921	676,247	846,215	880,609	952,412	18%
	4003	946,462	1,653,129	1,278,182	211,909	17%	10	998,585	1,050,708	1,182,972	1,265,975	1,327,558	1,580,784	1,616,957	6%
	4004	629,904	1,245,919	1,061,199	191,630	18%	10	728,018	826,131	1,025,762	1,113,181	1,183,142	1,239,642	1,242,781	7%
Credit Spread	5001	10,717	27,470	19,332	5,364	28%	14	11,466	11,940	15,553	19,589	23,778	25,368	26,378	21%
	5002	53,392	158,251	100,001	40,340	40%	10	58,471	63,549	65,737	91,836	138,279	154,509	156,380	36%
	5003	5,479	19,070	12,503	3,134	25%	15	7,855	9,196	11,666	12,550	13,482	15,687	17,265	7%
	5004	20,420	71,555	36,757	15,296	42%	10	21,173	21,926	24,257	35,929	42,654	49,283	60,419	27%
	5005	4,782	33,942	19,712	10,537	53%	14	8,090	9,890	10,764	16,609	31,502	33,537	33,889	49%
	5006	14,127	52,218	31,893	13,572	43%	14	15,615	16,700	19,198	28,978	43,763	49,372	50,543	39%
	5007	48,112	133,468	87,364	32,214	37%	10	48,408	48,703	64,693	79,786	115,874	126,503	129,985	28%
	5008	49,711	153,929	84,577	31,337	37%	14	51,306	53,392	57,098	78,081	104,158	121,062	134,198	29%
	5009	12,622	47,557	24,329	10,759	44%	14	13,186	14,260	16,445	22,109	25,973	41,279	45,987	22%
	5010	22,790	68,772	40,547	15,263	38%	13	23,016	23,530	29,799	35,844	52,836	61,523	65,260	28%
	5011	15,770	55,171	26,688	12,387	46%	15	16,221	16,612	18,860	21,860	30,607	45,781	52,185	24%
	5012	4,333	20,203	8,715	4,020	46%	14	4,748	5,103	7,166	8,086	8,757	12,451	16,175	10%
	5013	25,367	56,995	38,361	11,380	30%	14	25,425	25,704	27,489	35,290	48,846	52,547	54,530	28%
	5014	5,545	19,967	11,541	4,717	41%	13	6,324	6,928	7,470	10,953	13,921	18,317	19,389	30%
	5015	15,223	32,609	24,810	5,230	21%	13	16,985	18,592	22,161	24,949	26,652	31,895	32,262	9%
	5016	21,670	78,895	44,217	19,077	43%	10	24,176	26,682	31,193	40,543	50,634	73,439	76,167	24%
	5017	33,681	120,154	65,033	29,321	45%	11	34,615	35,549	38,556	62,716	80,581	105,542	112,848	35%
	5018	51,219	162,667	92,640	36,290	39%	10	55,355	59,490	63,083	87,467	118,343	132,591	147,629	30%
	5019	15,316	27,937	19,723	4,021	20%	13	15,866	16,288	17,294	18,300	20,042	26,213	27,249	7%
	5020	137,813	294,087	209,079	40,147	19%	15	148,125	163,482	182,368	214,255	227,402	251,288	267,974	11%
	5021	39,767	255,905	119,105	68,645	58%	13	41,023	43,355	63,695	108,916	167,287	198,293	223,499	45%
	5022	154,638	369,286	229,558	59,968	26%	13	163,436	171,574	180,855	229,139	253,427	291,783	326,098	17%
	5023	63,909	415,141	162,442	106,851	66%	11	75,579	87,248	94,606	122,670	199,855	273,923	344,532	36%
	5024	25,471	147,329	93,735	38,360	41%	13	36,206	47,211	62,822	94,282	126,642	136,524	141,007	34%
	5025	81,793	184,374	115,524	30,840	27%	13	83,024	84,816	94,415	104,371	135,867	150,859	165,449	18%
	5026	21,688	60,594	38,676	13,164	34%	11	24,171	26,654	28,739	34,270	51,221	53,697	57,146	28%
	5027	12,809	56,378	29,355	12,839	44%	13	15,198	17,583	21,104	25,155	30,251	48,475	52,495	18%
CTP	6001														
	6002														
	6003														
	6004														
	6005														
ALL-IN no-CTP	10000	1,147,851	2,174,445	1,572,273	367,247	23%	9	1,200,902	1,253,953	1,291,640	1,421,036	1,838,116	2,037,089	2,105,767	17%
Equity Cumulative	11000	490,252	815,625	621,964	79,005	13%	13	537,823	571,162	579,479	593,028	651,740	699,452	753,030	6%
IR Cumulative	12000	171,785	555,055	368,057	102,524	28%	19	195,388	233,726	314,541	374,037	401,755	509,979	536,330	12%
FX Cumulative	13000	1,005,125	2,015,672	1,425,404	261,024	18%	19	1,094,590	1,125,321	1,257,554	1,362,900	1,539,606	1,771,585	1,887,984	10%
Commodity Cumulative	14000	340,903	1,038,080	705,616	194,578	28%	12	451,472	546,707	596,686	650,470	848,409	899,986	962,973	17%
CS Cumulative	15000	179,139	410,236	280,791	77,326	28%	14	192,232	199,925	216,490	268,549	345,246	386,847	402,521	23%
CTP Cumulative	16000														

Table 41: PV statistics

EU Statistics for PV

		Main statistics								Percentiles			
	Port. ID	Min	Max	Ave	STDev	STDev_trunc[1]	MAD (median absolute deviation)	Coefficient of variation (STDev/Ave)	Num obs.[2]	25th	50th (Median)	75th	Interquantile range
Equity	1001	4,060,083	4,194,166	4,103,681	24,231	637,549	1,313	1%	30	4,097,224	4,101,000	4,101,450	0%
	1002	-2,935,984	-2,258,639	-2,798,881	114,494	465,131	2,827	4%	26	-2,815,780	-2,813,525	-2,810,525	0%
	1003	-28,359	-23,444	-25,688	1,013	1,562	387	4%	26	-26,080	-25,483	-25,289	2%
	1004	3,348	5,881	4,594	469	1,025	143	10%	23	4,377	4,494	4,792	5%
	1005	-536,307,417	-522,765,521	-531,892,461	2,872,245	110,349,801	735,184	1%	25	-532,937,475	-531,225,000	-530,538,387	0%
	1006	-22,524	-13,856	-17,268	2,012	3,712	430	12%	26	-17,300	-16,902	-16,566	2%
	1007	905,185	1,082,316	1,009,324	30,356	233,178	4,571	3%	20	1,004,852	1,013,033	1,016,439	1%
	1008	21,737	31,537	25,343	2,676	5,759	650	11%	22	23,624	23,790	26,473	6%
	1009	534,067	538,375	536,349	1,095	1,658	284	0%	24	536,102	536,319	536,837	0%
	1010	-249,800	-216,728	-238,424	5,265	54,345	712	2%	25	-239,581	-238,806	-237,995	0%
	1011	3,515,529	4,083,038	3,590,083	137,382	582,132	1,269	4%	27	3,549,175	3,550,653	3,551,942	0%
	1012	3,384,548	4,030,954	3,461,117	154,291	558,081	1,888	5%	27	3,415,601	3,417,251	3,419,787	0%
	1013	419,551	432,528	428,400	3,338	34,907	631	1%	25	428,695	429,566	429,948	0%
	1014	591,748	609,400	600,378	3,985	10,657	2,012	1%	26	598,470	601,040	602,500	0%
	1015	411,659	461,800	423,325	12,932	26,058	4,113	3%	20	414,161	421,310	427,705	2%
	1016	750	281,301	171,790	86,905	86,905	67,697	51%	11	110,214	171,581	242,147	37%
Interest Rate	2001	-83,363	-57,374	-72,113	6,550	8,213	2,072	9%	36	-75,391	-73,316	-70,732	3%
	2002	-241,756	-189,529	-211,556	9,785	16,376	2,882	5%	34	-213,519	-209,501	-207,145	2%
	2003	9,752	12,326	11,086	676	941	506	6%	35	10,487	11,254	11,600	5%
	2004	2,740	55,811	30,209	9,368	24,358	3,952	31%	32	25,549	30,887	33,702	14%
	2005	945,227	1,076,188	1,025,353	37,186	81,711	19,299	4%	13	1,018,500	1,035,885	1,051,380	2%
	2006	-212,325	138,010	-59,896	69,347	138,218	1,266	116%	29	-54,873	-54,229	-46,258	9%
	2007	744,125	1,387,528	1,083,826	105,125	174,930	5,001	10%	28	1,091,193	1,092,356	1,117,747	1%
	2008	434,203	1,005,823	767,263	121,740	192,805	4,901	16%	28	783,938	785,367	809,782	2%
	2009	-949	27,557	16,934	6,701	10,142	3,330	40%	35	13,805	17,248	21,133	21%
	2010	-71,721	-49,394	-62,308	5,583	7,179	2,310	9%	36	-65,003	-63,049	-60,740	3%
	2011	72,615	127,598	101,085	12,078	17,441	3,748	12%	36	98,676	102,262	106,200	4%
	2012	-318,054	-257,627	-285,898	14,437	18,338	4,376	5%	35	-288,191	-283,208	-278,838	2%
	2013	1,074,330	1,082,606	1,079,149	1,816	3,401	220	0%	33	1,078,615	1,079,848	1,079,979	0%
	2014	1,013,027	1,046,529	1,040,367	6,824	18,216	1,167	1%	25	1,039,412	1,042,909	1,043,636	0%
	2015	-978,569	-913,548	-933,782	8,872	157,534	1,146	1%	36	-934,963	-933,776	-932,532	0%
	2016	3,794,311	4,262,672	3,981,377	87,537	182,465	2,459	2%	29	3,971,881	3,997,674	3,999,161	0%
	2017	-149,030	6,358	-109,596	25,529	63,187	1,594	23%	26	-115,084	-113,633	-108,884	3%
	2018	922,430	935,104	932,730	2,030	6,397	273	0%	37	932,115	933,519	933,631	0%
	2019	929,972	946,274	942,443	3,073	6,806	824	0%	37	941,941	943,408	943,900	0%
	2020	60,139	71,439	65,647	2,922	3,290	1,470	5%	35	63,828	65,132	66,711	2%
	2021	927,235	1,079,299	1,055,065	27,628	69,347	353	3%	26	1,059,089	1,059,410	1,059,744	0%
	2022	-198,216	-63,977	-124,515	26,719	39,718	10,683	22%	28	-134,232	-127,244	-110,842	10%
	2023	-540,157	-174,423	-464,038	107,326	167,695	5,768	23%	32	-511,184	-505,847	-490,028	2%
FX	3001	-749,100	-533,752	-658,656	29,677	368,198	4,629	5%	34	-666,100	-663,827	-649,209	1%
	3002	8,767,449	9,595,386	9,429,279	161,416	3,803,044	5,361	2%	26	9,463,029	9,466,153	9,474,307	0%
	3003	1,095,952	1,120,272	1,105,427	4,560	16,978	1,942	0%	31	1,102,163	1,105,841	1,107,248	0%
	3004	1,395,916	1,425,849	1,412,655	8,641	14,075	6,596	1%	30	1,406,204	1,412,782	1,419,878	0%
	3005	-669,976	-632,200	-649,400	7,943	12,313	5,371	1%	29	-655,373	-650,212	-643,038	1%
	3006	-18,354	4,729	-364	3,545	1,708,534	337	974%	34	-612	-254	143	161%
	3007	734,676	828,227	808,433	24,837	155,195	11,585	3%	22	803,259	810,986	825,256	1%
Commodities	4001	-23,828	-11,807	-16,796	3,454	7,777	2,037	21%	12	-18,679	-16,697	-14,324	13%
	4002	78,921	139,825	117,789	23,587	44,159	9,241	20%	11	88,503	124,858	135,739	21%
	4003	674,959	766,606	720,912	24,657	198,486	6,671	3%	11	709,885	720,515	727,229	1%
	4004	1,125,478	1,651,063	1,441,640	164,690	358,700	110,275	11%	11	1,338,158	1,391,762	1,610,119	9%
Credit Spread	5001	1,317	2,250	1,576	238	581	81	15%	20	1,436	1,484	1,643	7%
	5002	60,829	68,517	66,795	2,295	6,341	586	3%	17	66,957	67,500	67,967	1%
	5003	-10,364	-8,455	-9,914	557	2,236	100	6%	23	-10,260	-10,150	-9,893	2%
	5004	32,242	34,445	33,789	654	1,462	208	2%	18	33,309	33,993	34,218	1%
	5005	69	778	424	160	2,107	20	38%	22	388	410	416	3%
	5006	31,166	32,757	32,281	333	1,576	100	1%	22	32,211	32,349	32,423	0%
	5007	1,104,243	1,139,397	1,127,853	9,341	20,357	1,182	1%	19	1,125,022	1,130,976	1,132,342	0%
	5008	2,892,034	2,914,520	2,902,320	4,441	10,779	2,282	0%	23	2,900,387	2,902,707	2,903,870	0%
	5009	-33,577	-27,496	-30,578	1,540	2,050	353	5%	23	-31,336	-31,027	-29,220	3%
	5010	917,604	923,316	920,400	1,481	3,064	935	0%	20	919,143	920,733	921,237	0%
	5011	971,465	984,837	975,067	2,840	6,391	336	0%	21	974,346	974,890	975,120	0%
	5012	29,208	31,370	29,854	455	890	65	2%	20	29,667	29,815	29,839	0%
	5013	-28,654	-21,178	-25,280	2,052	2,779	1,166	8%	20	-26,161	-25,930	-23,892	5%
	5014	-11,445	-11,106	-11,327	122	215	72	1%	18	-11,431	-11,346	-11,289	1%
	5015	931,666	971,403	936,167	8,160	172,407	409	1%	21	933,555	935,053	935,173	0%
	5016	998,651	1,038,425	1,015,983	8,341	235,754	1,995	1%	17	1,014,156	1,017,713	1,018,511	0%
	5017	1,007,491	1,100,965	1,036,155	18,596	236,487	1,914	2%	17	1,029,555	1,035,708	1,037,709	0%
	5018	2,006,142	2,139,390	2,052,137	26,518	472,114	3,533	1%	17	2,042,169	2,053,315	2,056,327	0%
	5019	933,091	946,527	943,988	2,792	8,707	709	0%	20	943,681	944,898	945,354	0%
	5020	2,657,890	2,694,806	2,686,364	7,799	18,957	878	0%	19	2,686,854	2,688,057	2,689,279	0%
	5021	-354,716	-292,338	-307,980	18,487	34,938	3,991	6%	20	-316,632	-300,993	-295,889	3%
	5022	2,324,796	2,428,073	2,394,340	27,311	64,650	12,029	1%	19	2,368,363	2,407,010	2,415,081	1%
	5023	-1,918,598	-137,970	-332,645	481,948	8,920,305	12,702	145%	13	-280,102	-162,026	-150,548	30%
	5024	925,448	941,661	939,116	3,827	7,877	447	0%	17	938,123	940,184	941,025	0%
	5025	970,781	1,013,623	989,696	10,812	18,385	7,342	1%	17	982,401	992,991	995,422	1%
	5026	848,377	853,134	850,535	1,214	4,628	539	0%	20	849,400	851,029	851,369	0%
	5027	1,003,023	1,011,273	1,008,756	2,442	4,589	624	0%	20	1,006,363	1,010,232	1,010,500	0%
CTP	6001								3				
	6002								3				
	6003								3				
	6004								3				
	6005								3				
ALL-IN no-CTP **	10000	17,242,123	20,532,550	19,623,714	1,072,366	3,847,181	348,652	6%	9	19,384,021	19,819,302	20,268,221	2%
Equity Cumulative **	11000	704,333	3,364,150	2,688,854	614,880	1,363,220	15,514	23%	18	2,808,155	2,819,846	2,853,715	1%
IR Cumulative **	12000	-60,684	1,088,140	575,863	209,274	417,040	15,073	36%	27	567,754	601,938	611,296	4%
FX Cumulative **	13000	4,268,569	11,918,937	10,969,424	1,445,440	3,861,436	65,902	13%	24	11,089,635	11,189,837	11,343,074	1%
Commodity Cumulative **	14000	28,377	123,119	91,773	29,368	41,369	13,047	32%	11	68,733	103,201	113,372	25%
CS Cumulative **	15000	5,256,075	5,347,953	5,317,086	29,054	89,422	12,843	1%	19	5,287,753	5,325,554	5,340,062	0%
CTP Cumulative **	16000												

[1] *STDev trunc* is the standard deviation computed excluding values below the *5th* and above the *95th* percentile

[2] Refers to the number of banks included in the computation of the statistics

*** For the aggregated portfolios (60 to 66), banks that reported at least a missing portfolio IMV among the ones composing the aggregate are not included in the computation of the benchmarks for that particular aggregate portfolio.*

Table 42: IRC – modelling choice: source of LGD – market convention

EU Statistics for IRC

		Other stats						Percentiles								Extreme Values range (Full Sample)		
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	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																	
	1012																	
	1013																	
	1014																	
	1015																	
	1016																	
Interest Rate	2001																	
	2002																	
	2003																	
	2004																	
	2005	0	800,153	245,765	267,892	109%	7	32,003	64,007	115,702	125,915	281,441	535,295	667,724	42%	343,069	-355,583	1,016,695
	2006	4	97,458	27,891	28,414	102%	10	985	1,967	9,059	24,674	34,328	48,884	73,171	58%	47,858	-63,735	127,696
	2007	61,473	757,995	351,184	247,983	71%	10	90,305	119,137	141,320	287,808	516,355	664,508	711,251	57%	254,102	-144,345	872,062
	2008	79,452	1,192,115	539,443	395,963	73%	10	119,322	159,193	226,468	428,221	783,168	1,097,318	1,144,717	55%	413,662	-210,053	1,444,594
	2009																	
	2010																	
	2011																	
	2012																	
	2013	4,619	195,967	68,298	62,704	92%	9	7,185	9,752	18,399	60,541	89,597	142,500	169,233	66%	107,414	-127,873	301,783
	2014	728,129	1,031,002	804,129	103,992	13%	7	732,531	736,933	744,604	783,457	798,554	894,717	962,860	3%	171,226	441,005	1,125,908
	2015																	
	2016	94,583	1,263,827	630,639	439,712	70%	10	131,262	167,941	235,828	621,342	989,098	1,203,541	1,233,684	61%	430,960	-111,906	1,611,934
	2017																	
	2018	16,123	288,156	125,258	108,455	87%	9	24,085	32,048	38,538	67,997	234,136	269,664	278,910	72%	195,177	-256,838	523,869
	2019	16,123	288,156	125,258	108,455	87%	9	24,085	32,048	38,538	67,997	234,136	269,664	278,910	72%	190,783	-249,802	513,329
	2020																	
	2021	35,162	593,897	342,620	264,016	77%	5	47,864	60,566	98,673	401,583	583,787	589,853	591,875	71%	317,834	-46,826	1,224,510
	2022						3											
	2023																	
FX	3001																	
	3002																	
	3003																	
	3004																	
	3005																	
	3006																	
	3007																	
Commodities	4001																	
	4002																	
	4003																	
	4004																	
Credit Spread	5001	20,347	74,667	45,844	19,197	42%	9	23,455	26,562	30,447	46,468	50,115	74,570	74,619	24%	122,498	-194,882	295,112
	5002	42,350	106,045	76,890	21,622	28%	7	45,833	49,316	66,819	83,098	86,551	95,102	100,573	13%	36,134	2,733	147,271
	5003	29,014	125,618	81,001	29,811	37%	9	40,729	52,444	64,248	77,136	106,243	111,946	118,782	25%	55,005	-32,756	187,262
	5004	22,953	185,396	68,222	60,332	88%	6	24,827	26,700	32,810	47,935	69,993	130,032	157,714	36%	132,330	-185,127	344,193
	5005	31,205	81,422	52,875	17,384	33%	9	33,918	36,631	39,346	49,332	55,121	79,642	80,532	17%	25,754	-2,176	100,841
	5006	607,672	700,716	636,835	34,025	5%	7	608,511	609,351	611,379	630,865	647,918	677,896	689,306	3%	200,640	231,875	1,034,433
	5007	24,573	134,742	106,497	46,491	44%	5	42,484	60,395	114,128	126,534	132,507	133,848	134,295	7%	98,406	-62,070	331,553
	5008	567,132	993,071	723,996	168,895	23%	10	567,308	567,483	576,980	666,035	862,982	964,194	978,632	20%	168,155	365,292	1,037,913
	5009	49,508	140,218	98,559	28,536	29%	8	60,262	71,016	81,202	101,163	114,766	127,787	134,003	17%	33,416	16,736	150,399
	5010	2,679	199,174	92,126	64,150	70%	9	4,645	6,612	54,010	101,937	115,956	164,615	181,894	36%	96,353	-87,271	298,139
	5011	3	96,190	18,969	31,786	168%	10	215	426	1,917	4,913	13,545	59,565	77,877	75%	43,591	-77,353	97,011
	5012	64,077	232,842	136,331	64,143	47%	8	66,113	68,149	69,928	139,564	184,969	204,405	218,624	45%	94,150	-61,409	315,190
	5013	8,160	61,845	22,021	21,093	96%	8	8,578	8,996	10,341	11,762	22,210	53,209	57,527	36%	27,011	-40,902	67,143
	5014	14,963	309,690	70,314	98,879	141%	8	15,706	16,449	18,127	38,963	55,944	145,174	227,432	51%	140,199	-203,107	357,690
	5015	2,484	26,921	11,204	8,584	77%	9	2,718	2,953	4,821	9,536	16,123	22,445	24,683	54%	67,294	-126,191	142,985
	5016	1,001	13,152	6,304	4,302	68%	6	1,457	1,913	3,575	6,138	8,042	10,862	12,007	38%	110,169	-208,354	232,324
	5017	26,397	66,180	39,751	13,921	35%	6	27,697	28,997	32,731	36,409	40,307	53,848	60,014	10%	64,206	93,515	163,308
	5018	9,179	67,820	35,985	19,165	53%	6	13,913	18,647	29,236	34,639	40,307	54,668	61,244	16%	75,900	-112,703	190,898
	5019	2,484	26,921	11,204	8,584	77%	9	2,718	2,953	4,821	9,536	16,123	22,445	24,683	54%	68,685	-129,421	145,317
	5020	39,335	639,404	237,681	218,493	92%	10	42,550	45,765	52,400	152,806	405,558	492,137	565,771	77%	226,597	-175,612	730,775
	5021	4	77,573	43,509	24,717	57%	10	5,374	10,744	29,239	50,980	60,067	67,172	72,372	35%	72,932	-92,966	198,761
	5022	685	267,756	79,952	97,676	122%	9	2,797	4,910	7,947	33,518	126,966	217,877	242,816	88%	134,197	-219,926	316,861
	5023	18,731	96,197	52,275	28,876	55%	9	19,874	21,017	30,310	46,077	73,473	91,564	93,881	42%	30,185	-23,815	96,923
	5024	98,097	485,529	296,510	120,238	41%	9	144,133	190,170	217,129	311,525	392,535	418,108	451,819	29%	138,763	50,834	605,886
	5025	502,474	900,237	615,949	116,819	19%	9	515,548	528,623	546,800	590,493	646,234	697,525	798,881	8%	163,428	257,895	911,606
	5026	290,090	539,540	451,492	74,297	16%	9	337,272	384,454	424,492	448,560	501,965	509,985	524,762	8%	142,151	159,845	728,449
	5027	505,421	687,329	611,201	55,664	9%	9	530,853	556,284	583,019	611,059	661,641	667,811	677,570	6%	188,323	192,354	945,645
CTP	6001																	
	6002																	
	6003																	
	6004																	
	6005																	
ALL-IN no-CTP	10000	607,880	1,525,079	935,433	320,214	34%	7	627,212	646,545	688,940	898,211	1,069,492	1,264,094	1,394,587	22%	493,109	62,660	2,035,098
Equity Cumulative	11000																	
IR Cumulative	12000																	
FX Cumulative	13000																	
Commodity Cumulative	14000																	
CS Cumulative	15000	593,664	1,085,858	775,956	190,873	25%	9	599,625	605,586	633,889	684,657	892,018	1,062,908	1,074,383	17%	188,491	441,287	1,195,251
CTP Cumulative	16000																	

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

EU Statistics for IRC

		Other stats						Percentiles								Extreme Values range (Full Sample)		
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	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																	
	1012																	
	1013																	
	1014																	
	1015																	
	1016																	
Interest Rate	2001																	
	2002																	
	2003																	
	2004																	
	2005	0	907,541	441,910	347,824	79%	8	23,735	47,471	207,230	416,960	650,455	907,541	907,541	52%	343,069	-355,583	1,016,695
	2006	459	114,851	38,488	33,580	87%	13	2,779	4,635	15,443	31,981	43,261	84,223	99,937	47%	47,858	-63,735	127,696
	2007	214,159	816,687	390,811	197,711	51%	12	218,472	222,000	244,601	328,688	430,142	712,836	775,263	27%	254,102	-144,345	872,062
	2008	337,747	1,426,880	775,632	341,889	44%	13	403,305	455,503	531,867	617,271	984,091	1,260,587	1,352,285	30%	413,662	-210,053	1,444,594
	2009																	
	2010																	
	2011																	
	2012																	
	2013	0	114,172	55,222	41,530	75%	12	0	1,393	19,567	61,903	93,379	95,190	103,823	65%	107,414	-127,873	301,783
	2014	526,691	1,044,207	788,768	182,075	23%	11	526,691	526,691	639,695	823,997	921,223	968,405	1,006,306	18%	171,226	441,005	1,125,908
	2015																	
	2016	467,540	1,460,729	847,706	357,659	42%	13	481,978	491,604	505,185	750,014	1,197,061	1,345,862	1,411,630	41%	430,960	-111,906	1,611,934
	2017																	
	2018	0	493,922	170,125	161,520	95%	13	0	7,605	54,156	104,842	323,716	381,488	432,347	71%	195,177	-256,838	523,869
	2019	0	391,297	143,142	134,666	94%	12	0	3,803	50,124	102,286	182,380	340,397	364,321	57%	190,783	-249,802	513,329
	2020																	
	2021	0	943,041	500,323	410,517	82%	7	0	0	115,059	727,860	800,623	898,625	920,833	75%	317,834	-46,826	1,224,510
	2022	0	0	0	0		5	0	0	0	0	0	0	0				
	2023																	
FX	3001																	
	3002																	
	3003																	
	3004																	
	3005																	
	3006																	
	3007																	
Commodities	4001																	
	4002																	
	4003																	
	4004																	
Credit Spread	5001	26,965	242,387	78,268	66,131	84%	11	27,128	27,290	32,757	45,567	109,897	123,774	183,081	54%	122,498	-194,882	295,112
	5002	11,566	130,552	63,671	32,566	51%	12	11,566	15,480	52,326	64,223	75,711	93,799	111,313	18%	36,134	2,733	147,271
	5003	0	158,867	62,719	45,964	73%	13	0	0	38,347	64,986	77,370	106,781	129,214	34%	55,005	-32,756	187,262
	5004	23,045	299,124	130,266	108,165	83%	12	23,665	24,652	31,097	86,907	229,719	293,655	299,124	76%	132,330	-185,127	344,193
	5005	0	96,328	44,688	28,932	65%	14	0	2,172	37,163	44,940	54,576	82,293	90,262	19%	25,754	-2,176	100,841
	5006	347,424	1,030,617	684,486	240,504	35%	16	354,677	365,668	492,645	713,430	879,382	993,565	1,015,580	28%	200,640	231,875	1,034,433
	5007	61,738	198,637	134,809	40,704	30%	13	61,738	73,666	121,498	139,278	154,769	186,549	194,901	12%	98,406	-62,070	331,553
	5008	434,737	932,712	719,083	154,967	22%	14	441,351	486,336	646,835	759,842	774,164	910,387	921,491	9%	168,155	365,292	1,037,913
	5009	36,282	128,012	72,252	26,158	36%	14	36,702	37,032	55,818	76,930	85,319	94,580	106,487	21%	33,416	16,736	150,399
	5010	0	163,526	83,706	54,934	66%	12	4,011	9,720	37,608	95,445	126,759	143,662	153,206	54%	96,353	-87,271	298,139
	5011	159	51,983	14,075	13,657	97%	13	322	1,294	5,221	11,603	18,418	21,366	33,978	56%	43,591	-77,353	97,011
	5012	39,680	299,909	108,207	72,163	67%	13	48,696	55,092	58,032	78,767	135,096	175,702	231,138	40%	94,150	-61,409	315,190
	5013	2,978	33,361	14,720	10,775	73%	14	3,174	3,280	6,806	13,534	20,315	31,677	32,866	50%	27,011	-40,902	67,143
	5014	23,045	299,124	138,245	103,687	75%	13	25,083	26,774	31,805	123,396	215,652	288,511	299,124	74%	140,199	-203,107	357,690
	5015	282	63,587	14,363	17,781	124%	13	1,989	3,464	4,976	7,173	10,414	33,047	45,883	35%	67,294	-126,191	142,985
	5016	1,891	230,774	64,569	89,008	138%	12	3,815	5,429	6,239	16,548	98,152	198,202	212,859	88%	110,169	-208,354	232,324
	5017	4,496	60,374	29,795	17,691	59%	12	8,733	12,200	13,850	28,364	38,301	55,747	58,593	47%	64,206	-93,515	163,308
	5018	12,102	146,755	58,260	45,448	78%	12	13,366	15,801	29,610	43,075	66,247	139,428	146,755	38%	75,900	-112,703	190,898
	5019	282	63,587	14,692	18,530	126%	12	1,847	3,296	4,936	6,951	13,527	33,564	47,358	47%	68,685	-129,421	145,317
	5020	34,989	694,358	281,651	174,623	62%	14	55,642	82,282	173,122	279,845	358,257	439,305	542,528	35%	226,597	-175,612	730,775
	5021	0	145,990	53,371	49,130	92%	11	3,174	6,347	17,933	41,530	84,388	117,951	131,971	65%	72,932	-92,966	198,761
	5022	2,010	286,746	91,736	106,373	116%	12	2,693	3,705	11,288	48,468	136,775	277,555	286,746	85%	134,197	-219,926	316,861
	5023	10,719	52,555	29,512	14,004	47%	6	14,124	17,528	24,337	26,709	34,302	44,299	48,427	17%	30,185	-23,815	96,923
	5024	138,823	587,874	319,901	138,109	43%	12	160,287	180,754	207,458	300,221	429,178	458,784	518,683	35%	138,763	50,834	605,886
	5025	335,427	754,988	538,835	154,634	29%	11	361,652	387,877	403,057	584,751	661,951	719,771	737,380	24%	163,428	257,895	911,606
	5026	212,098	721,739	393,833	148,193	38%	11	215,261	218,423	314,019	362,047	468,598	532,821	627,280	20%	142,151	159,845	728,449
	5027	340,417	737,830	531,501	133,288	25%	9	364,391	388,366	461,290	505,599	651,004	696,612	717,221	17%	188,323	192,354	945,645
CTP	6001																	
	6002																	
	6003																	
	6004																	
	6005																	
ALL-IN no-CTP	10000	494,651	1,877,570	1,128,510	425,048	38%	7	644,408	794,165	993,841	1,052,442	1,243,613	1,594,474	1,736,022	11%	493,109	62,660	2,035,098
Equity Cumulative	11000																	
IR Cumulative	12000						1											
FX Cumulative	13000																	
Commodity Cumulative	14000																	
CS Cumulative	15000	494,651	1,150,550	847,043	221,001	26%	12	515,403	538,162	714,226	855,821	1,022,387	1,103,575	1,127,746	18%	188,491	441,287	1,195,251
CTP Cumulative	16000																	

Table 44: IRC – modelling choice: source of LGD – 1-2 modelling factors

EU Statistics for IRC

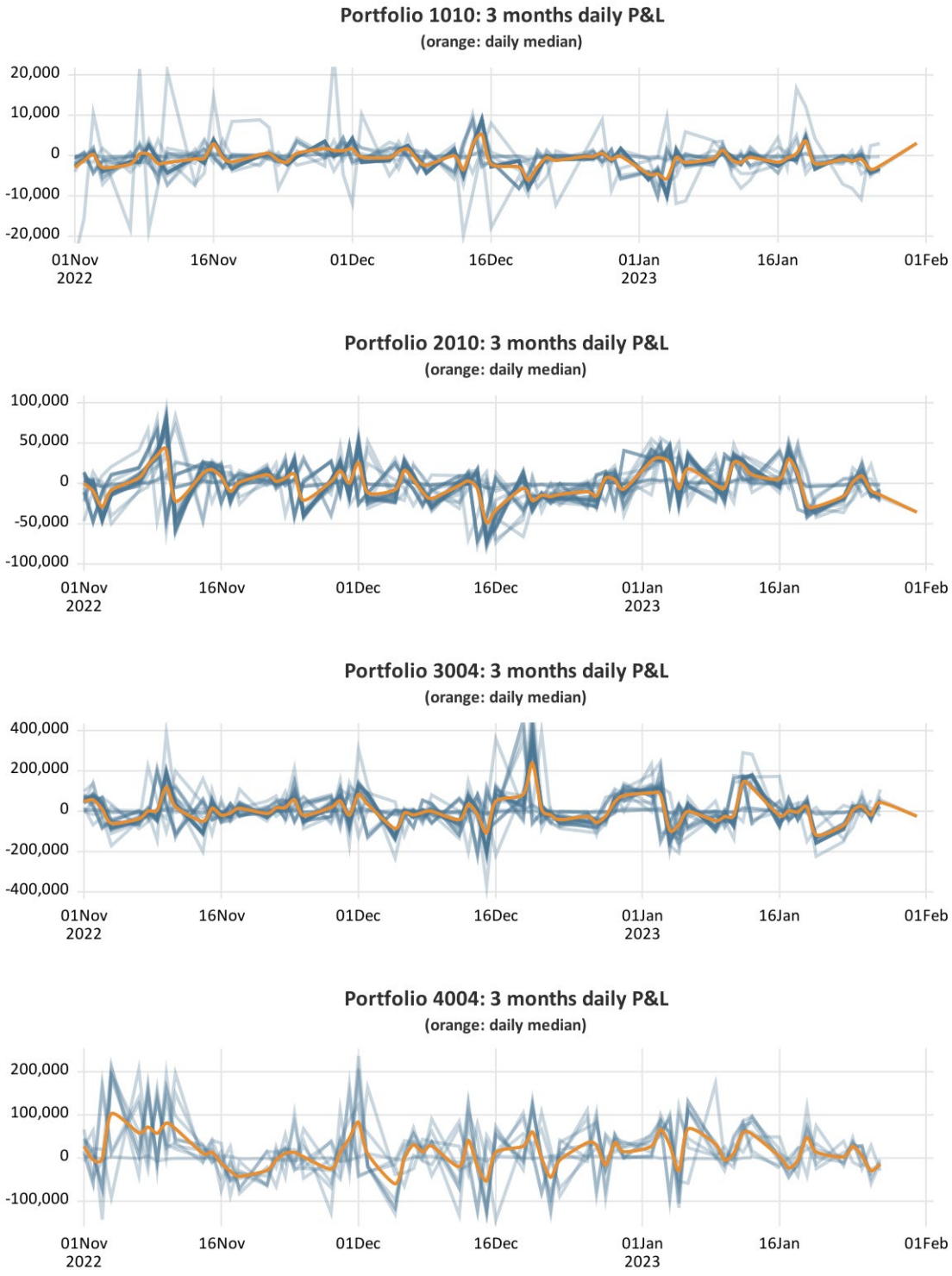
		Other stats						Percentiles									Extreme Values range (Full Sample)		
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	10th	25th	50th (Median)	75th	90th	95th	Interquantile range	STDev_trunc[1]	-2*STDev_trunc	+2*STDev_trunc
Equity	1001																	
	1002																	
	1003																	
	1004																	
	1005																	
	1006																	
	1007																	
	1008																	
	1009																	
	1010																	
	1011																	
	1012																	
	1013																	
	1014																	
	1015																	
	1016																	
Interest Rate	2001																	
	2002																	
	2003																	
	2004																	
	2005	67,815	907,541	446,003	361,306	81%	8	87,734	107,653	184,300	278,045	827,000	907,541	907,541	64%	343,069	-355,583	1,016,695
	2006	5,874	97,458	36,154	22,460	62%	12	9,945	14,430	28,396	33,044	42,393	43,464	67,774	20%	47,858	-63,735	127,696
	2007	61,473	816,687	331,130	217,339	66%	12	124,866	177,893	207,703	237,067	404,466	634,311	727,275	32%	254,102	-144,345	872,062
	2008	79,452	1,426,880	624,341	393,507	63%	12	173,478	259,143	338,460	567,508	745,473	1,167,565	1,297,759	38%	413,662	-210,053	1,444,594
	2009																	
	2010																	
	2011																	
	2012																	
	2013	0	195,967	69,607	55,550	80%	13	0	2,207	21,447	64,926	93,703	122,377	155,867	63%	107,414	-127,873	301,783
	2014	526,691	1,031,002	773,842	172,709	22%	10	526,691	526,691	660,157	788,352	888,138	974,665	1,002,833	15%	171,226	441,005	1,125,908
	2015																	
	2016	94,583	1,460,729	704,385	388,405	55%	12	191,137	292,282	491,604	677,842	837,957	1,234,199	1,352,433	26%	430,960	-111,906	1,611,934
	2017																	
	2018	0	323,716	89,057	91,216	102%	11	0	0	33,693	67,997	117,441	131,763	227,740	55%	195,177	-256,838	523,869
	2019	0	323,716	89,057	91,216	102%	11	0	0	33,693	67,997	117,441	131,763	227,740	55%	190,783	-249,802	513,329
	2020																	
	2021	0	943,041	341,842	399,849	117%	7	0	0	17,581	98,673	658,009	816,555	879,798	95%	317,834	-46,826	1,224,510
	2022						3											
	2023																	
FX	3001																	
	3002																	
	3003																	
	3004																	
	3005																	
	3006																	
	3007																	
Commodities	4001																	
	4002																	
	4003																	
	4004																	
Credit Spread	5001	26,965	242,387	76,075	68,832	90%	9	29,553	32,141	38,184	49,703	74,546	147,497	194,942	32%	122,498	-194,882	295,112
	5002	11,566	106,045	57,610	32,802	57%	9	11,566	11,566	42,350	52,866	83,098	89,446	97,745	32%	36,134	2,733	147,271
	5003	0	125,618	62,739	32,079	51%	11	14,507	29,014	50,577	69,756	75,113	77,370	101,494	20%	55,005	-32,756	187,262
	5004	24,172	299,124	141,578	116,124	82%	9	27,225	30,278	39,899	94,280	244,429	299,124	299,124	72%	132,330	-185,127	344,193
	5005	7,240	79,197	47,343	19,317	41%	11	19,223	31,205	38,352	48,736	54,177	71,318	75,258	17%	25,754	-2,176	100,841
	5006	357,094	1,010,568	654,539	175,450	27%	12	414,994	466,403	553,788	640,843	776,039	801,323	897,028	17%	200,640	231,875	1,034,433
	5007	24,573	192,410	106,248	58,729	55%	7	35,723	46,872	61,738	121,498	140,889	162,463	177,437	39%	98,406	-62,070	331,553
	5008	434,737	993,071	713,819	173,612	24%	14	441,351	481,696	609,414	722,782	774,164	952,503	972,215	12%	168,155	365,292	1,037,913
	5009	36,282	140,218	82,157	33,745	41%	12	36,827	38,497	53,045	83,568	99,222	126,431	133,505	30%	33,416	16,736	150,399
	5010	2,679	163,526	87,116	53,941	62%	10	15,675	28,672	44,852	90,778	125,807	156,730	160,128	47%	96,353	-87,271	298,139
	5011	159	55,495	15,535	19,977	129%	11	295	431	3,815	5,221	18,726	51,983	53,739	66%	43,591	-77,353	97,011
	5012	54,707	232,842	110,750	63,282	57%	12	55,765	56,770	58,032	74,331	157,073	185,016	206,688	46%	94,150	-61,409	315,190
	5013	2,978	61,845	20,784	19,083	92%	13	3,159	3,280	6,622	13,111	32,600	46,279	54,443	66%	27,011	-40,902	67,143
	5014	17,086	309,690	147,258	121,532	83%	11	21,764	26,441	39,642	123,396	272,592	299,124	304,407	75%	140,199	-203,107	357,690
	5015	282	34,080	13,086	11,673	89%	11	1,383	2,484	5,852	7,173	21,522	28,917	31,499	57%	67,294	-126,191	142,985
	5016	1,001	230,774	67,810	97,994	145%	10	1,402	1,802	3,466	11,986	152,612	201,459	216,117	96%	110,169	-208,354	232,324
	5017	12,200	66,180	28,151	16,565	59%	9	12,200	12,200	14,400	26,678	31,596	40,162	53,171	37%	64,206	-93,515	163,308
	5018	9,179	146,755	58,381	53,046	91%	9	11,267	13,356	28,412	32,598	67,820	146,755	146,755	41%	75,900	-112,703	190,898
	5019	282	34,080	13,086	11,673	89%	11	1,383	2,484	5,853	7,173	21,522	28,917	31,499	57%	68,685	-129,421	145,317
	5020	54,751	429,194	248,461	122,192	49%	13	77,804	98,236	172,346	218,721	339,177	382,011	405,205	33%	226,597	-175,612	730,775
	5021	20,604	145,990	68,229	38,096	56%	10	26,001	31,399	45,651	61,949	74,684	120,755	133,372	24%	72,932	-92,966	198,761
	5022	3,251	286,746	90,589	105,305	116%	11	5,520	7,788	18,556	47,846	122,193	286,746	286,746	74%	134,197	-219,926	316,861
	5023	18,731	96,197	42,562	27,483	65%	8	20,693	22,655	24,337	33,176	46,168	80,290	88,244	31%	30,185	-23,815	96,923
	5024	98,097	462,073	292,371	131,434	45%	11	118,460	138,823	212,015	220,766	415,216	429,178	445,626	32%	138,763	50,834	605,886
	5025	403,057	900,237	591,319	165,820	28%	10	403,057	403,057	439,000	586,654	693,995	769,513	834,875	23%	163,428	257,895	911,606
	5026	218,423	532,821	404,733	97,602	24%	10	254,059	289,694	362,047	416,269	481,337	505,619	519,220	14%	142,151	159,845	728,449
	5027	400,353	687,329	547,012	89,109	16%	10	427,775	455,196	497,733	537,300	604,618	654,637	670,983	10%	188,323	192,354	945,645
CTP	6001																	
	6002																	
	6003																	
	6004																	
	6005																	
ALL-IN no-CTP	10000	494,651	1,525,079	988,050	299,993	30%	8	568,469	642,287	921,771	1,021,360	1,061,858	1,220,597	1,372,838	7%	493,109	62,660	2,035,098
Equity Cumulative	11000																	
IR Cumulative	12000																	
FX Cumulative	13000																	
Commodity Cumulative	14000																	
CS Cumulative	15000	494,651	1,109,089	825,778	203,702	25%	11	513,516	532,381	713,891	855,821	951,943	1,085,858	1,097,474	14%	188,491	441,287	1,195,251
CTP Cumulative	16000																	

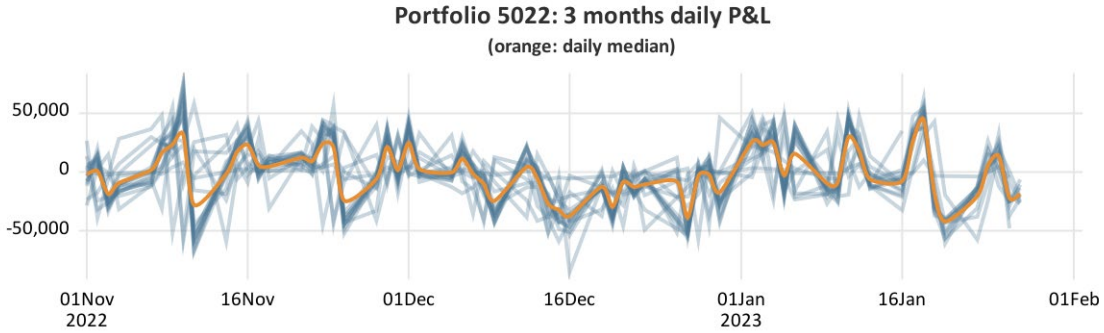
Table 45: IRC – modelling choice: source of LGD – >2 modelling factors

EU Statistics for IRC

		Other stats						Percentiles										
																	Extreme Values range (Full Sample)	
	Port. ID	Min	Max	Ave.	STDev	Coefficient of variation (STDev/Mean)	Num obs.	5th	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																	
	1012																	
	1013																	
	1014																	
	1015																	
	1016																	
Interest Rate	2001																	
	2002																	
	2003																	
	2004																	
	2005	0	564,760	241,087	241,708	100%	7	0	0	53,339	125,915	445,127	544,822	554,791	79%	343,069	-355,583	1,016,695
	2006	4	114,851	31,400	39,691	126%	11	232	459	3,255	15,443	44,963	89,995	102,423	86%	47,858	-63,735	127,696
	2007	125,544	757,995	422,802	217,709	51%	10	127,331	129,118	328,378	392,686	516,355	743,033	750,514	22%	254,102	-144,345	872,062
	2008	168,053	1,302,555	725,959	369,656	51%	11	193,271	218,488	489,439	747,697	1,035,438	1,092,717	1,197,636	36%	413,662	-210,053	1,444,594
	2009																	
	2010																	
	2011																	
	2012																	
	2013	4,619	114,172	46,557	40,789	88%	8	7,876	11,133	17,281	28,812	76,152	99,541	106,857	63%	107,414	-127,873	301,783
	2014	646,782	1,044,207	820,867	130,453	16%	8	675,253	703,725	741,836	779,483	919,050	961,160	1,002,683	11%	171,226	441,005	1,125,908
	2015																	
	2016	176,092	1,378,898	806,722	426,840	53%	11	200,242	224,392	486,363	778,563	1,196,952	1,213,718	1,296,308	42%	430,960	-111,906	1,611,934
	2017																	
	2018	36,029	493,922	214,483	157,525	73%	11	37,028	38,026	67,597	234,136	315,203	391,297	442,610	65%	195,177	-256,838	523,869
	2019	36,029	391,297	186,540	134,266	72%	10	36,928	37,826	53,067	184,702	282,377	347,155	369,226	68%	190,783	-249,802	513,329
	2020																	
	2021	230,118	869,014	564,494	254,280	45%	5	264,411	298,704	401,583	593,897	727,860	812,552	840,783	29%	317,834	-46,826	1,224,510
	2022	0	0	0	0		5	0	0	0	0	0	0	0				
	2023																	
FX	3001																	
	3002																	
	3003																	
	3004																	
	3005																	
	3006																	
	3007																	
Commodities	4001																	
	4002																	
	4003																	
	4004																	
Credit Spread	5001	20,347	123,446	53,533	33,864	63%	11	23,819	27,290	29,282	34,612	74,859	96,347	109,897	44%	122,498	-194,882	295,112
	5002	53,960	130,552	78,379	22,589	29%	10	55,621	57,282	62,635	75,062	85,774	99,070	114,811	16%	36,134	2,733	147,271
	5003	0	158,867	77,657	47,670	61%	11	0	0	60,305	90,167	107,386	109,446	134,157	28%	55,005	-32,756	187,262
	5004	22,953	224,815	77,591	67,075	86%	9	22,990	23,027	28,973	74,667	79,533	156,035	190,425	47%	132,330	-185,127	344,193
	5005	0	96,328	48,395	30,044	62%	12	0	3,799	39,006	44,940	61,696	86,439	91,195	23%	25,754	-2,176	100,841
	5006	347,424	1,030,617	686,831	232,603	34%	11	360,833	374,242	568,087	633,154	891,911	976,562	1,003,590	22%	200,640	231,875	1,034,433
	5007	114,128	198,637	140,116	24,126	17%	11	117,754	121,379	124,604	133,001	147,283	163,106	180,872	8%	98,406	-62,070	331,553
	5008	567,132	915,449	731,365	139,616	19%	10	568,300	569,468	598,176	732,494	866,545	902,089	908,769	18%	168,155	365,292	1,037,913
	5009	36,928	122,460	81,411	24,921	31%	10	47,580	58,231	66,007	79,530	93,426	111,383	116,921	17%	33,416	16,736	150,399
	5010	0	199,174	87,496	63,478	73%	11	3,647	7,293	30,803	102,772	120,190	144,762	171,968	59%	96,353	-87,271	298,139
	5011	3	96,190	16,815	26,053	155%	12	262	585	4,193	9,829	18,376	18,882	53,699	63%	43,591	-77,353	97,011
	5012	39,680	299,909	129,816	78,491	60%	9	49,439	59,198	69,939	126,891	135,096	213,756	256,833	32%	94,150	-61,409	315,190
	5013	7,359	21,960	12,451	4,416	35%	9	7,679	8,000	9,354	12,636	13,948	16,277	19,118	20%	27,011	-40,902	67,143
	5014	14,963	215,652	73,986	70,304	95%	10	16,543	18,123	24,310	52,557	78,412	183,491	199,572	53%	140,199	-203,107	357,690
	5015	3,070	63,587	13,056	17,533	134%	11	3,099	3,127	4,817	7,498	10,623	21,326	42,457	38%	67,294	-126,191	142,985
	5016	5,784	64,802	16,819	20,130	120%	8	5,798	5,812	6,249	7,512	17,810	33,073	48,938	48%	110,169	-208,354	232,324
	5017	4,496	60,374	38,076	16,468	43%	9	13,278	22,059	36,137	36,680	43,246	57,784	59,079	9%	64,206	93,515	163,308
	5018	12,102	73,480	43,289	19,385	45%	9	18,507	24,912	35,913	36,680	61,303	65,765	69,622	26%	75,900	-112,703	190,898
	5019	3,070	63,587	13,320	18,458	139%	10	3,096	3,121	4,815	6,613	10,223	25,552	44,570	36%	68,685	-129,421	145,317
	5020	34,989	694,358	280,904	255,324	91%	11	37,162	39,335	49,048	220,513	468,274	639,404	666,881	81%	226,597	-175,612	730,775
	5021	0	106,569	30,898	31,280	101%	11	2	4	9,142	28,119	45,296	52,898	79,734	66%	72,932	-92,966	198,761
	5022	685	267,756	82,391	100,147	122%	10	1,281	1,878	7,588	42,109	158,775	211,642	239,699	91%	134,197	-219,926	316,861
	5023	10,719	90,406	43,864	26,529	60%	7	13,980	17,240	25,334	46,077	54,591	70,138	80,272	37%	30,185	-23,815	96,923
	5024	177,849	587,874	329,132	128,434	39%	10	191,256	204,664	227,912	319,943	365,860	495,764	541,819	23%	138,763	50,834	605,886
	5025	335,427	707,237	555,754	117,348	21%	10	359,030	382,632	513,556	588,618	636,528	652,886	680,062	11%	163,428	257,895	911,606
	5026	212,098	721,739	434,826	145,284	33%	10	247,194	282,291	337,258	446,354	501,959	557,760	639,749	20%	142,151	159,845	728,449
	5027	340,417	737,830	601,775	125,758	21%	8	398,168	455,920	582,802	636,350	668,775	701,765	719,797	7%	188,323	192,354	945,645
CTP	6001																	
	6002																	
	6003																	
	6004																	
	6005																	
ALL-IN no-CTP	10000	607,880	1,877,570	1,090,535	482,433	44%	6	623,990	640,101	728,794	989,847	1,324,678	1,641,657	1,759,613	29%	493,109	62,660	2,035,098
Equity Cumulative	11000																	
IR Cumulative	12000						1											
FX Cumulative	13000																	
Commodity Cumulative	14000																	
CS Cumulative	15000	590,187	1,150,550	806,456	220,555	27%	10	591,752	593,316	614,898	720,115	1,024,548	1,066,509	1,108,529	25%	188,491	441,287	1,195,251
CTP Cumulative	16000																	

Figure 39: Additional P&L charts with examples of low IQD




Portfolio 5022: 3 months daily P&L
(orange: daily median)
50,000
0
-50,000
01Nov 2022
16Nov
01Dec
16Dec
01Jan 2023
16Jan
01Feb

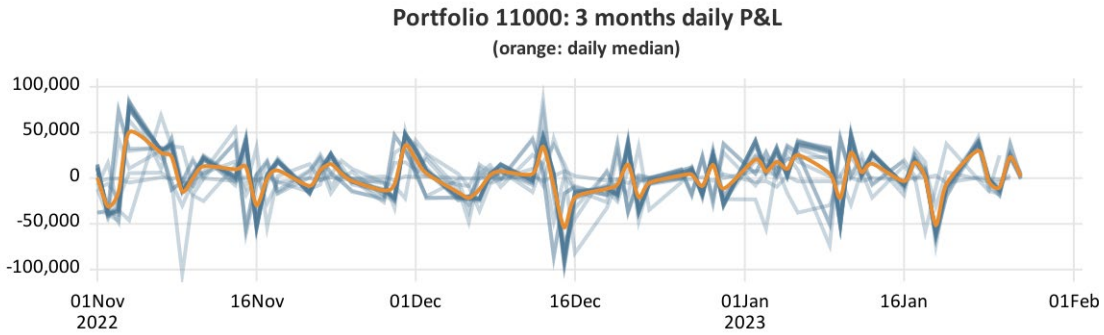
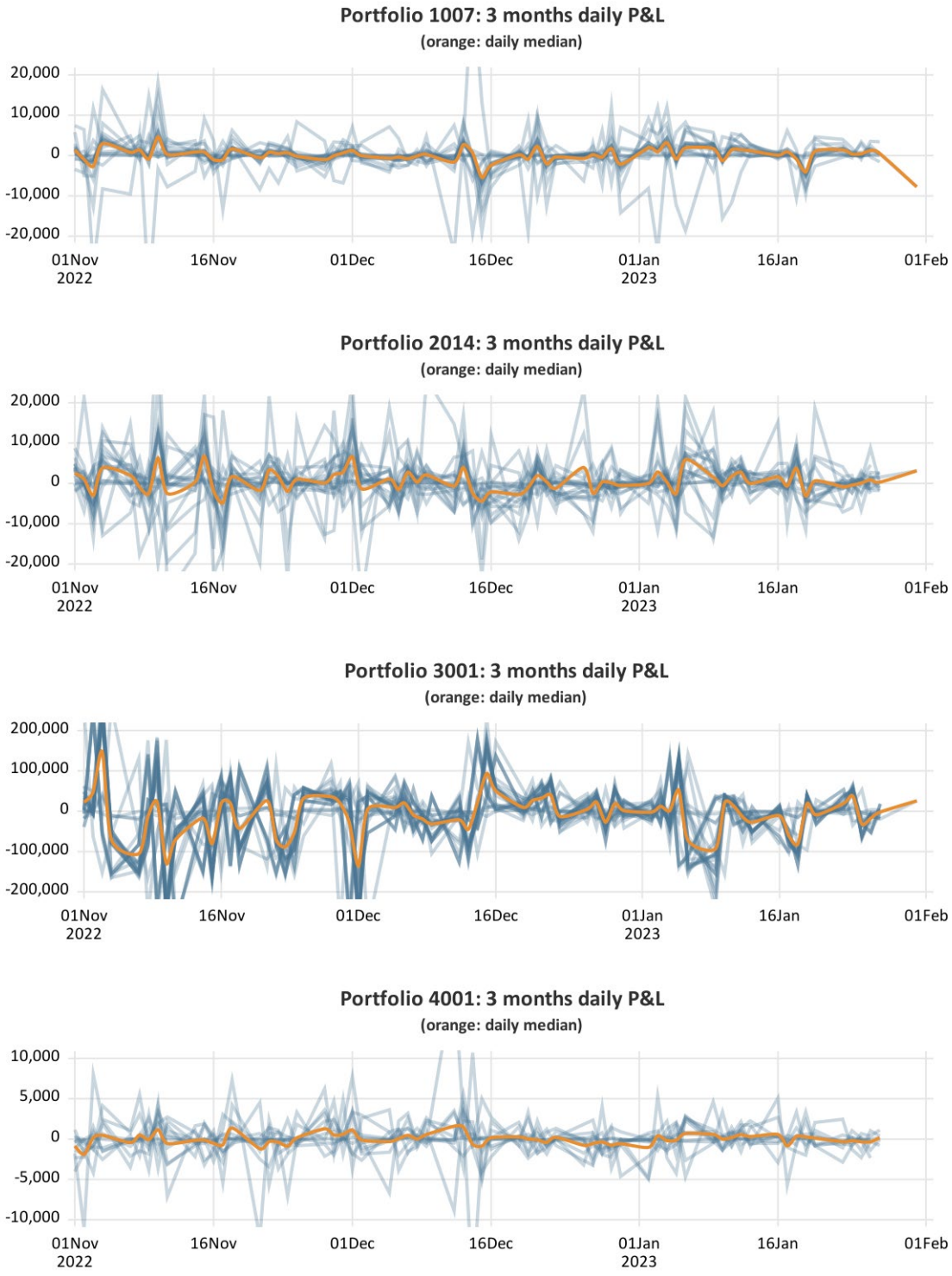
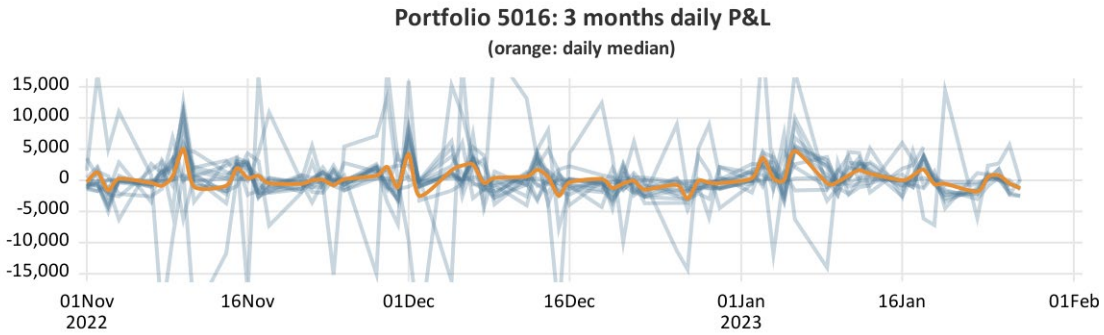

Portfolio 11000: 3 months daily P&L
(orange: daily median)
100,000
50,000
0
-50,000
-100,000
01Nov 2022
16Nov
01Dec
16Dec
01Jan 2023
16Jan
01Feb

Figure 40: Additional P&L charts with examples of high IQD




Portfolio 5016: 3 months daily P&L
(orange: daily median)
15,000
10,000
5,000
0
-5,000
-10,000
-15,000
01Nov 2022
16Nov
01Dec
16Dec
01Jan 2023
16Jan
01Feb

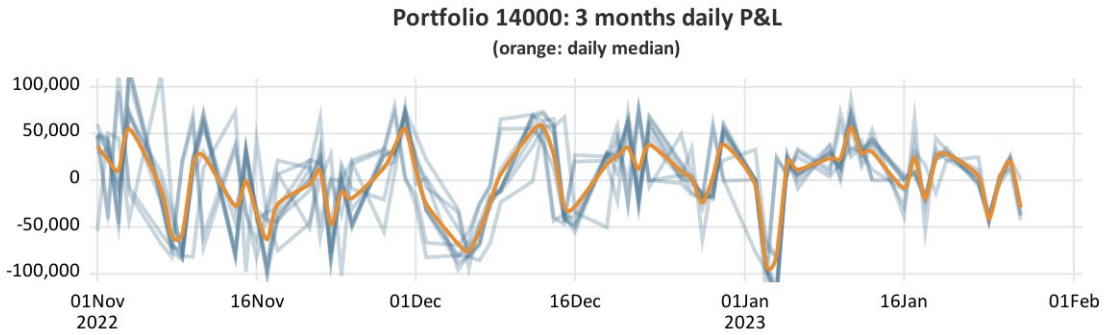

Portfolio 14000: 3 months daily P&L
(orange: daily median)
100,000
50,000
0
-50,000
-100,000
01Nov 2022
16Nov
01Dec
16Dec
01Jan 2023
16Jan
01Feb

Figure 41: Comparison between IMV and truncated STD deviation method to select outliers for risk measures

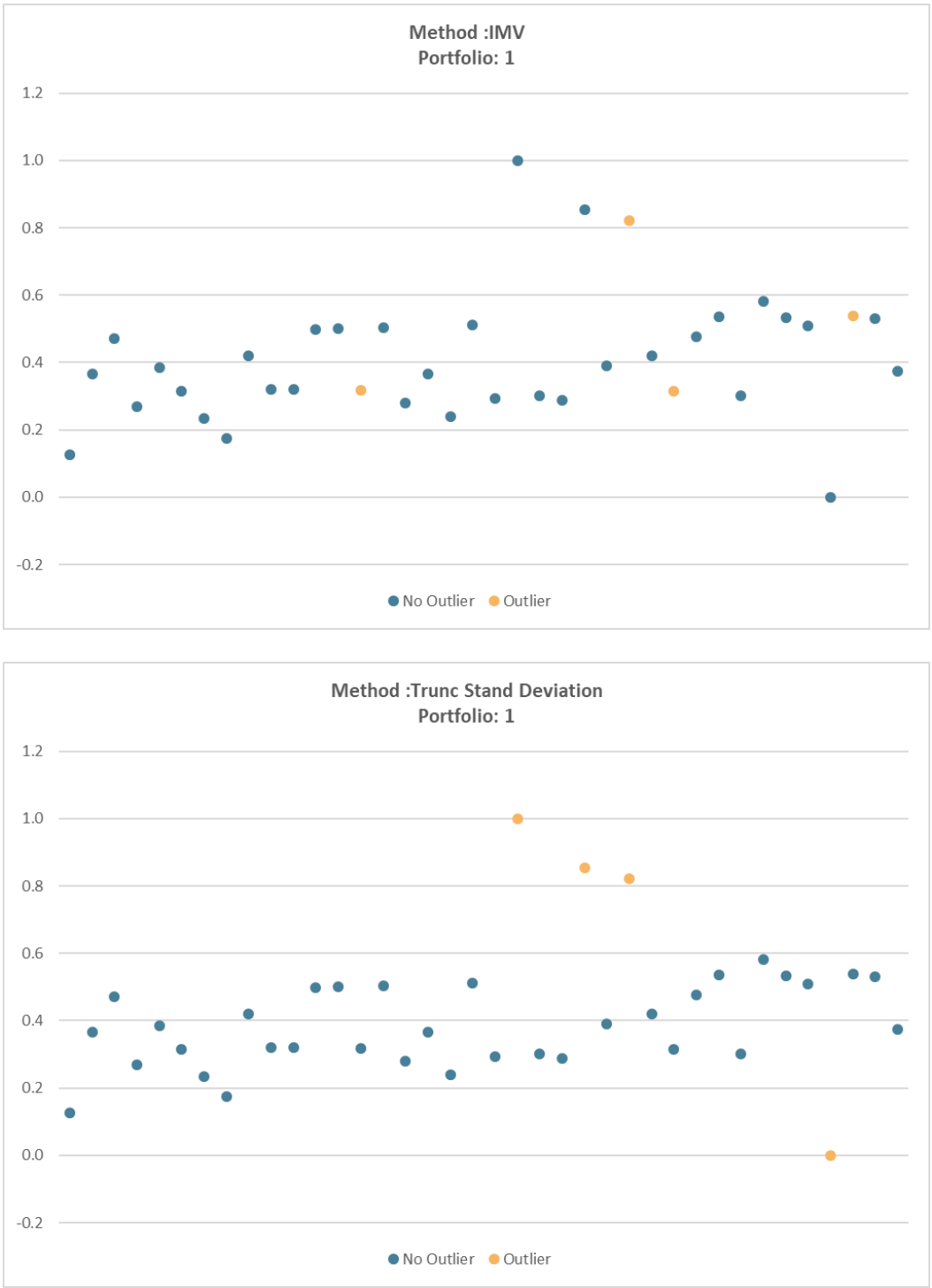


Figure 26. Example of dispersion in VaR submission for portfolio 1. Above the chart, marked in yellow: the portfolios which would have been excluded based on the IMV methodology outlier, which was used in 2019 (and before) to detect outliers among risk measures. Below the chart: the same submission, 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.

Table 46: EU Statistics for SBM OFR

EU Statistics for SBM OFR

		Main statistics								Percentiles			
	Port. ID	Min	Max	Ave	STDev	STDev_trunc[1]	MAD (median absolute deviation)	Coefficient of variation (STDev/Ave)	Num obs.[2]	25th	50th (Median)	75th	Interquantile range
Equity	1001	613,843	1,274,834	737,142	136,883	433,271	19,964	19%	30	644,596	653,126	826,286	12%
	1002	1,162,646	1,214,957	1,187,029	11,188	20,296	3,594	1%	24	1,182,523	1,183,782	1,190,752	0%
	1003	27,970	41,315	32,952	3,333	4,552	1,193	10%	24	31,016	32,361	33,992	5%
	1004	5,468	15,175	8,751	2,571	3,571	1,479	29%	22	6,879	8,439	10,087	19%
	1005	595,730	160,542,510	89,895,405	45,933,365	71,212,041	16,352,410	51%	26	84,173,981	92,201,712	104,656,689	11%
	1006	17,425	30,776	25,901	3,882	4,707	2,809	15%	24	22,932	26,209	29,083	12%
	1007	51,380	194,390	95,863	37,518	52,653	14,562	39%	19	70,082	90,689	115,112	24%
	1008	26,607	64,773	44,608	8,235	10,805	3,314	19%	22	42,199	47,048	48,481	7%
	1009	155,677	215,968	175,114	11,670	20,037	3,880	7%	25	170,961	176,119	179,205	2%
	1010	93,707	105,285	100,870	2,330	3,695	843	2%	25	100,164	101,059	101,543	1%
	1011	592,281	1,150,167	693,402	119,288	457,910	22,574	17%	27	607,131	707,078	764,066	11%
	1012	580,709	1,118,732	677,382	115,304	459,826	19,700	17%	27	594,921	688,228	745,925	11%
	1013	164,744	225,771	177,218	19,607	30,327	992	11%	27	166,822	166,932	175,432	3%
	1014	565,017	856,930	706,729	79,739	378,586	57,514	11%	28	648,627	730,933	771,366	9%
	1015	630,243	1,018,765	731,498	97,689	575,490	35,811	13%	21	665,555	706,372	750,740	6%
	1016	74,335	821,552	445,897	303,883	303,883	289,563	68%	12	147,027	436,590	758,627	68%
Interest Rate	2001	323,761	341,890	331,270	6,074	6,180	3,998	2%	38	325,963	329,875	337,708	2%
	2002	480,995	572,341	511,701	20,542	32,041	11,389	4%	35	495,948	509,773	518,950	2%
	2003	32,050	34,712	33,282	703	913	524	2%	37	32,727	33,194	33,748	2%
	2004	140,312	182,982	160,515	9,170	11,826	4,073	6%	35	156,062	161,614	165,082	3%
	2005	149,548	651,631	467,963	120,216	209,838	33,992	26%	14	425,570	465,186	534,521	11%
	2006	109,080	254,166	185,560	35,539	48,494	12,723	19%	28	175,119	181,785	209,462	9%
	2007	210,218	441,776	326,316	64,499	74,657	47,574	20%	29	299,627	324,074	382,840	12%
	2008	160,656	417,079	314,541	68,106	79,401	29,501	22%	29	289,515	317,663	336,570	8%
	2009	337,365	362,612	350,513	5,042	8,774	2,518	1%	38	348,298	351,230	353,016	1%
	2010	291,394	307,000	298,148	5,423	5,521	3,655	2%	39	293,505	296,522	304,011	2%
	2011	664,304	709,320	681,086	13,051	15,807	9,441	2%	38	669,234	685,061	691,781	2%
	2012	347,442	693,698	540,399	54,908	113,894	16,048	10%	32	522,931	540,008	558,376	3%
	2013	102,982	301,497	179,380	64,220	62,362	53,137	36%	37	107,746	216,951	221,687	35%
	2014	44,049	233,658	159,334	56,282	51,632	25,035	35%	28	115,989	131,294	224,598	32%
	2015	3,107	119,286	32,523	29,858	47,936	1,194	92%	26	21,527	23,460	23,505	4%
	2016	212,966	363,499	284,431	24,413	127,065	7,703	9%	29	274,217	282,253	297,409	4%
	2017	495,770	771,731	615,654	111,451	234,416	35,207	18%	31	524,831	541,780	753,099	18%
	2018	27,978	45,492	43,753	3,103	24,101	645	7%	35	43,804	44,616	45,103	1%
	2019	6,966	44,063	22,128	4,737	24,580	271	21%	35	21,769	22,229	22,381	1%
	2020	43,371	49,649	45,318	1,296	2,294	844	3%	34	44,234	45,122	45,962	2%
	2021	79,009	176,896	122,162	22,621	32,677	9,577	19%	29	115,335	119,792	139,886	10%
	2022	462,503	739,586	604,308	90,749	101,140	31,547	15%	29	540,653	556,012	715,525	14%
	2023	489,749	664,750	579,650	37,832	95,832	18,548	7%	30	564,066	571,062	606,786	4%
FX	3001	1,156,723	1,196,934	1,176,420	8,711	16,859	2,371	1%	31	1,173,608	1,175,805	1,179,387	0%
	3002	460,360	1,087,529	732,391	131,010	213,820	48,189	18%	31	694,520	743,060	792,254	7%
	3003	581,757	940,577	757,597	100,329	100,329	64,340	13%	33	685,749	747,154	855,324	11%
	3004	1,207,902	1,926,753	1,611,368	135,033	381,522	49,079	8%	32	1,565,439	1,636,841	1,664,017	3%
	3005	1,313,638	1,747,877	1,531,857	102,038	150,423	44,439	7%	30	1,475,545	1,517,550	1,564,424	3%
	3006	69,325	1,136,184	332,687	240,565	543,176	8,224	72%	27	242,435	260,324	276,542	7%
	3007	967,251	1,419,035	1,073,405	110,363	194,853	54,013	10%	24	1,002,271	1,031,268	1,085,769	4%
Commodities	4001	40,461	274,018	172,216	90,396	97,196	25,613	53%	14	67,779	209,642	241,971	56%
	4002	688,706	878,202	820,716	55,301	131,022	30,209	7%	12	788,058	846,480	859,526	4%
	4003	803,698	2,013,000	1,778,535	344,987	733,954	61,427	19%	12	1,646,726	1,951,357	1,981,307	9%
	4004	727,183	2,791,289	2,059,768	544,447	1,163,332	177,386	26%	12	1,909,600	2,087,776	2,411,834	12%
Credit Spread	5001	32,439	37,879	34,922	1,566	2,213	680	5%	20	34,094	34,774	35,520	2%
	5002	93,614	112,690	102,586	5,099	5,788	2,379	5%	17	98,086	103,126	105,282	4%
	5003	68,796	85,815	77,061	4,398	8,647	3,241	6%	22	74,375	77,155	79,770	3%
	5004	1,486	7,791	4,427	1,883	9,901	1,084	43%	16	2,792	4,907	5,257	31%
	5005	173,589	211,051	194,055	10,481	29,714	8,945	5%	22	187,724	190,686	201,320	3%
	5006	179,839	348,708	250,091	31,895	66,414	5,987	13%	20	246,063	253,970	259,601	3%
	5007	59,533	193,903	116,637	53,273	59,536	33,870	46%	19	67,029	114,074	174,068	44%
	5008	274,367	387,735	302,233	29,140	98,602	3,338	10%	24	286,057	290,984	316,605	5%
	5009	87,384	138,488	98,735	16,420	22,901	2,283	17%	22	90,563	93,472	95,129	2%
	5010	62,919	162,919	114,406	18,545	29,869	3,061	16%	22	108,770	112,870	126,469	8%
	5011	84,111	229,493	146,622	31,471	46,639	19,619	22%	22	129,524	138,297	170,145	14%
	5012	40,532	103,194	69,489	10,742	20,304	2,379	16%	20	68,094	71,109	72,227	3%
	5013	83,063	193,455	139,990	30,675	30,860	17,012	22%	23	118,633	133,641	155,629	13%
	5014	577	8,042	1,761	1,726	11,665	738	98%	17	757	1,830	1,834	42%
	5015	8,949	52,081	39,990	8,660	32,725	1,774	22%	21	38,056	39,521	41,617	4%
	5016	24,227	147,831	77,393	52,052	60,549	7,381	67%	18	38,635	41,904	139,473	57%
	5017	38,910	153,936	87,250	50,020	51,229	12,645	57%	18	44,301	52,988	148,490	54%
	5018	74,007	294,321	159,812	101,272	103,183	13,633	63%	18	76,197	87,999	288,551	58%
	5019	15,471	52,062	23,409	10,227	32,702	1,527	44%	21	18,124	19,016	28,648	23%
	5020	401,846	493,129	463,152	16,365	76,290	4,795	4%	24	458,619	465,279	468,928	1%
	5021	210,974	284,731	241,345	21,728	38,784	17,234	9%	18	218,661	248,518	250,755	7%
	5022	261,795	540,399	383,111	79,429	109,088	29,956	21%	20	327,859	354,700	455,092	16%
	5023	290,336	1,487,893	890,945	385,252	385,252	283,793	43%	15	522,091	987,766	1,246,840	41%
	5024	191,564	936,893	463,113	225,068	267,333	108,506	49%	20	297,413	454,824	506,021	26%
	5025	163,447	422,557	298,744	71,235	78,308	45,389	24%	19	264,766	284,247	358,309	15%
	5026	113,178	199,243	131,288	24,866	38,811	4,524	19%	18	118,213	125,808	126,130	3%
	5027	54,600	103,334	78,351	9,564	32,727	2,731	12%	19	73,576	79,287	80,924	5%
CTP	6001								2				
	6002								2				
	6003								2				
	6004								2				
	6005								2				
ALL-IN no-CTP	10000	3,042,724	7,912,681	4,802,498	1,207,030	2,881,725	442,666	25%	11	4,112,536	4,776,895	5,157,663	11%
Equity Cumulative	11000	1,029,593	1,458,286	1,185,171	83,832	138,014	32,259	7%	20	1,142,958	1,183,910	1,217,869	3%
IR Cumulative	12000	512,147	1,088,679	916,351	154,895	466,993	31,584	17%	28	847,566	982,331	1,002,674	8%
FX Cumulative	13000	1,490,851	2,753,308	2,029,730	299,306	788,693	180,343	15%	30	1,822,323	2,024,923	2,168,627	9%
Commodity Cumulative	14000	755,170	926,125	855,293	50,901	136,619	34,923	6%	12	820,553	873,058	893,207	4%
CS Cumulative	15000	690,506	920,568	783,303	84,725	185,713	67,010	11%	19	714,860	777,861	885,459	11%
CTP Cumulative	16000												

[1] *STDev trunc* is the standard deviation computed excluding values below the *5th* and above the *95th* percentile

[2] Refers to the number of banks included in the computation of the statistics

*** For the aggregated portfolios (60 to 66), banks that reported at least a missing portfolio IMV among the ones composing the aggregate are not included in the computation of the benchmarks for that particular aggregate portfolio.*

Figure 42: Difference in total number of submissions

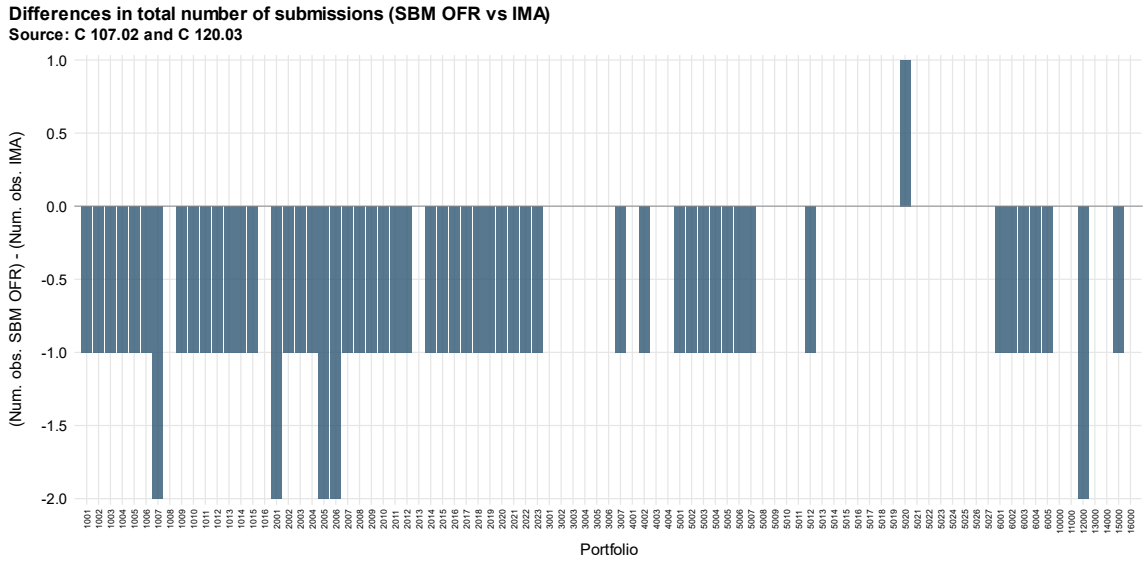
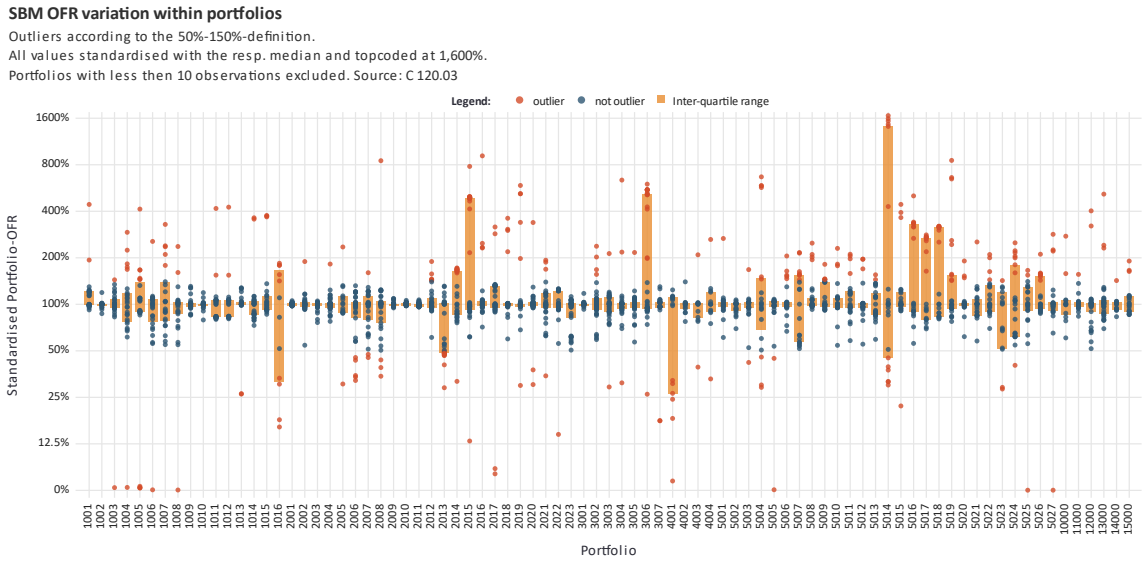


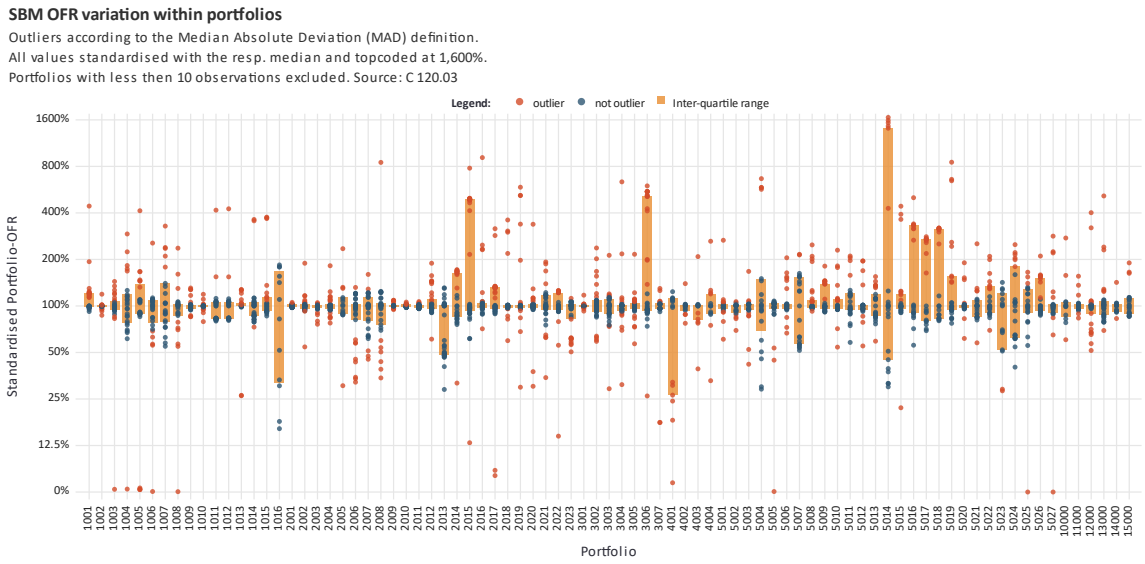
Figure 43: BM OFR variation within portfolios: 50%-150%-outliers



50%-150% outlier definition

- Outliers are defined as values outside the interval [0.5 · ex, 1.5 · ex].
- ex is the median of portfolio-OFRs.

Figure 44: SBM OFR variation within portfolios: MAD-outliers

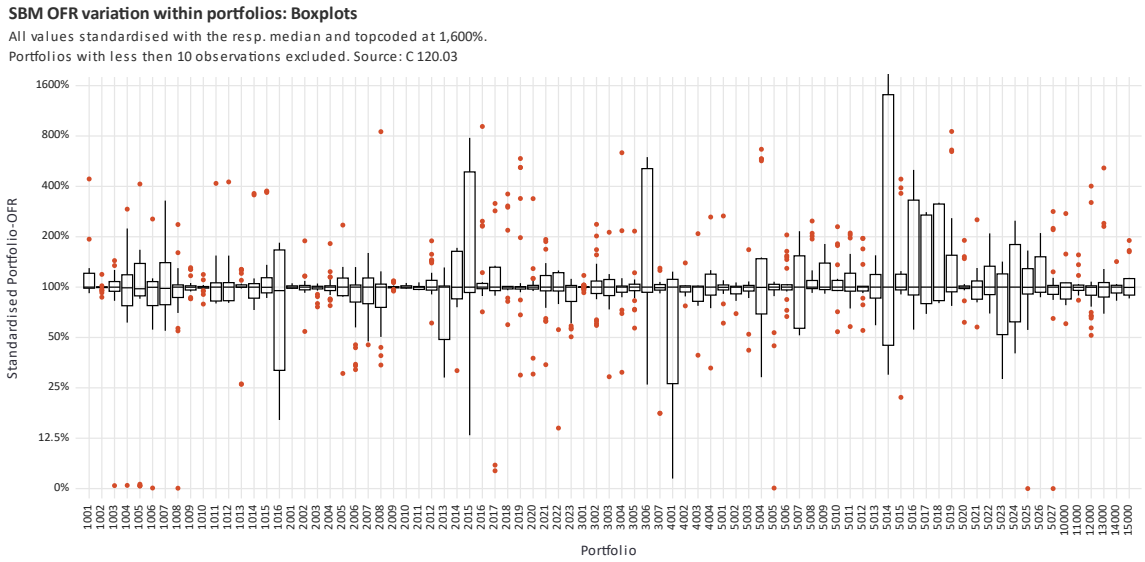


Median Absolute Deviation (MAD) outlier definition

• Outliers are defined as values outside the interval [ex − 2 ·MAD, ex + 2 ·MAD].

• MAD is the Median Absolute Deviation, i.e., MAD = median(|xi − ex|), where xi are the OFR observations of the respective portfolio and ex is their median.

Figure 45: SBM OFR variation within portfolios: Boxplots



Boxplots with 1.5 IQR outlier definition

- Outliers are defined as values outside the interval [Q25 − 1.5 · IQR,Q75 + 1.5 · IQR].
- IQR is the Interquartile Range, i.e., IQR = Q75 − Q25.

Figure 46: SBM OFR variation within EQ portfolio (EBA outliers' definition)

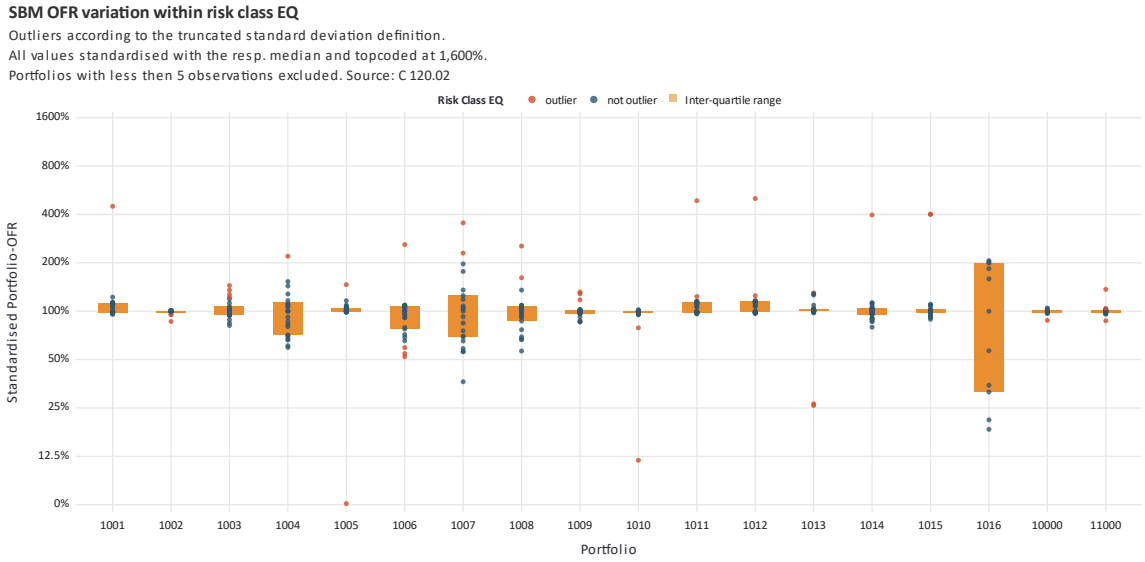


Figure 47: SBM OFR variation within FX portfolio (EBA outliers' definition)

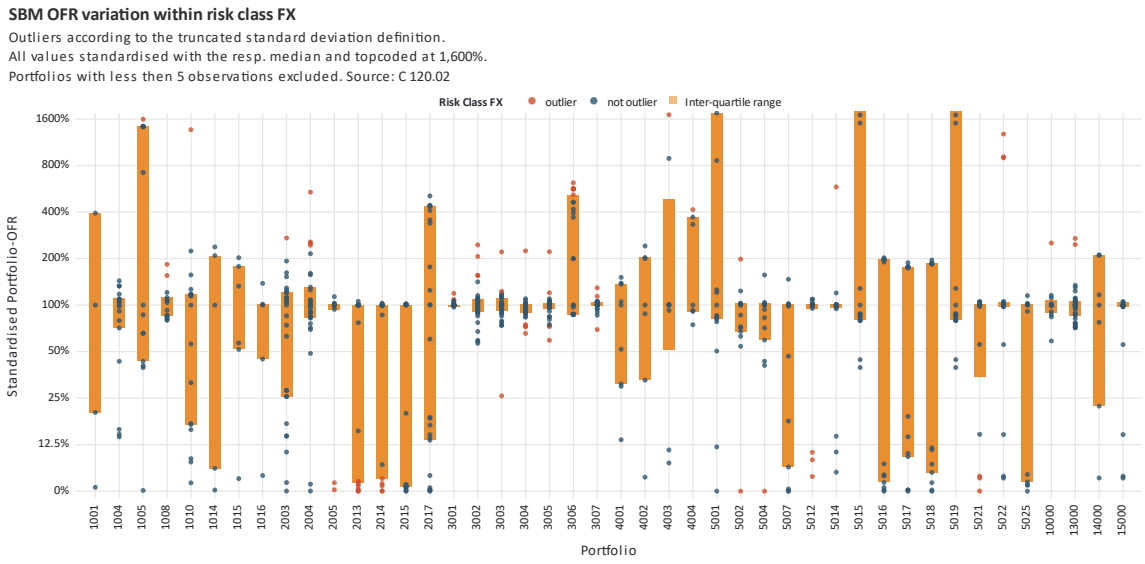


Figure 48: SBM OFR variation within GIRR portfolio (EBA outliers' definition)

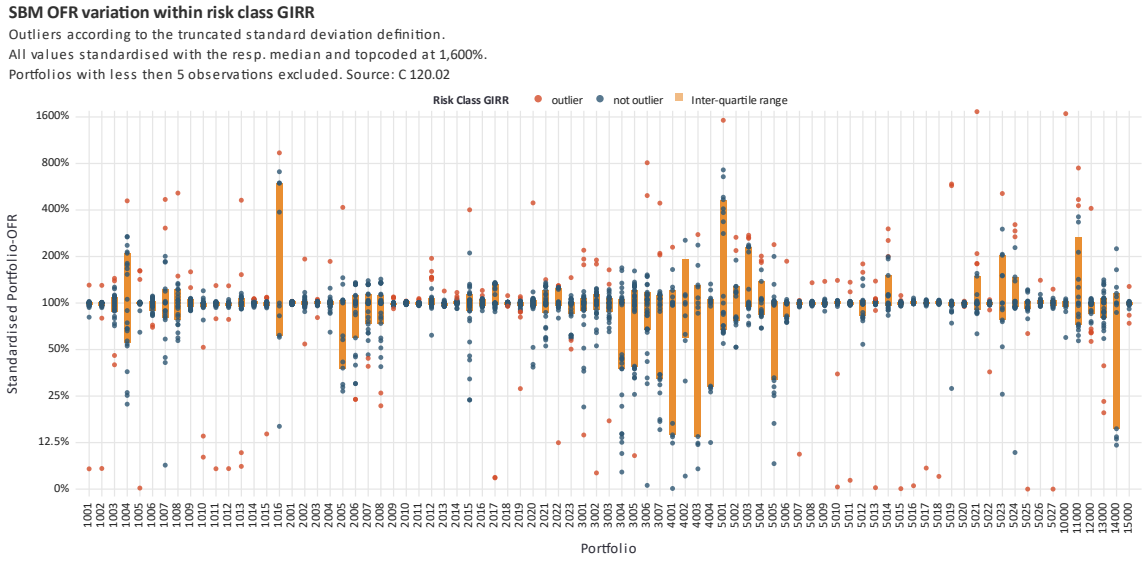


Figure 49: SBM OFR variation within CS portfolio (EBA outliers' definition)

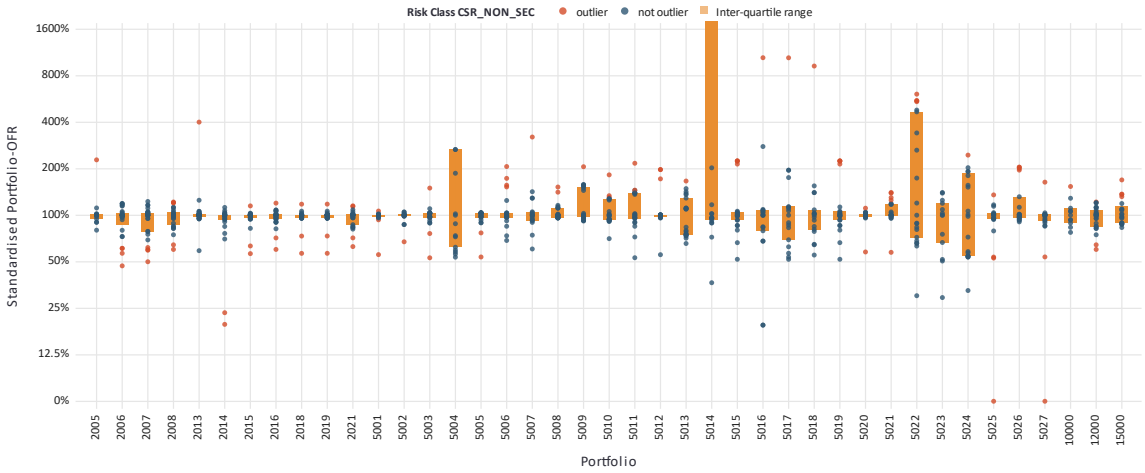


Figure 50: SBM OFR variation within CO portfolio (EBA outliers' definition)

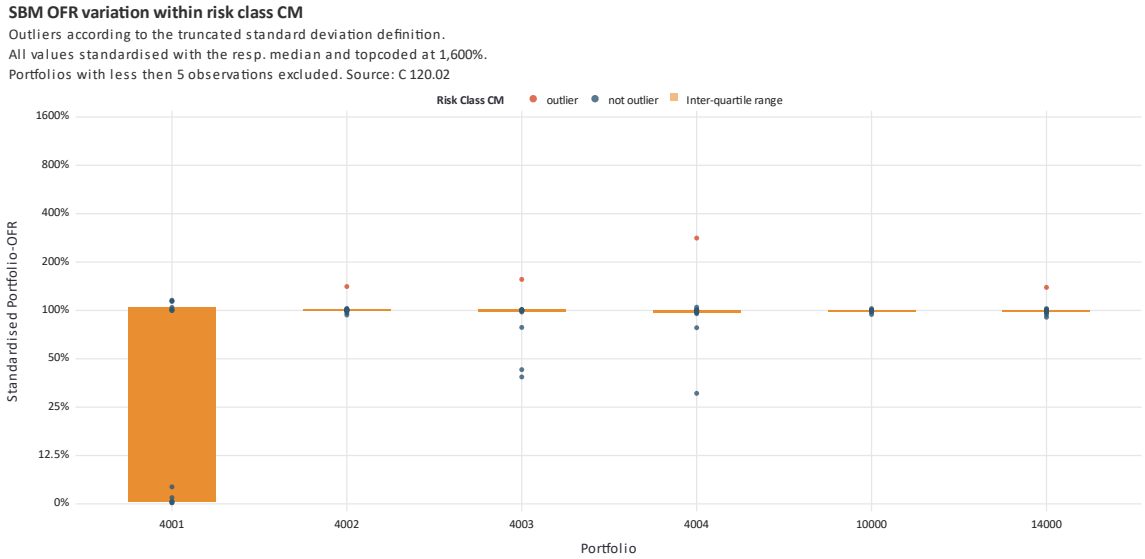


Figure 51: SBM OFR VaR and SVaR variation within portfolios: Interquartile Dispersion (IQD)

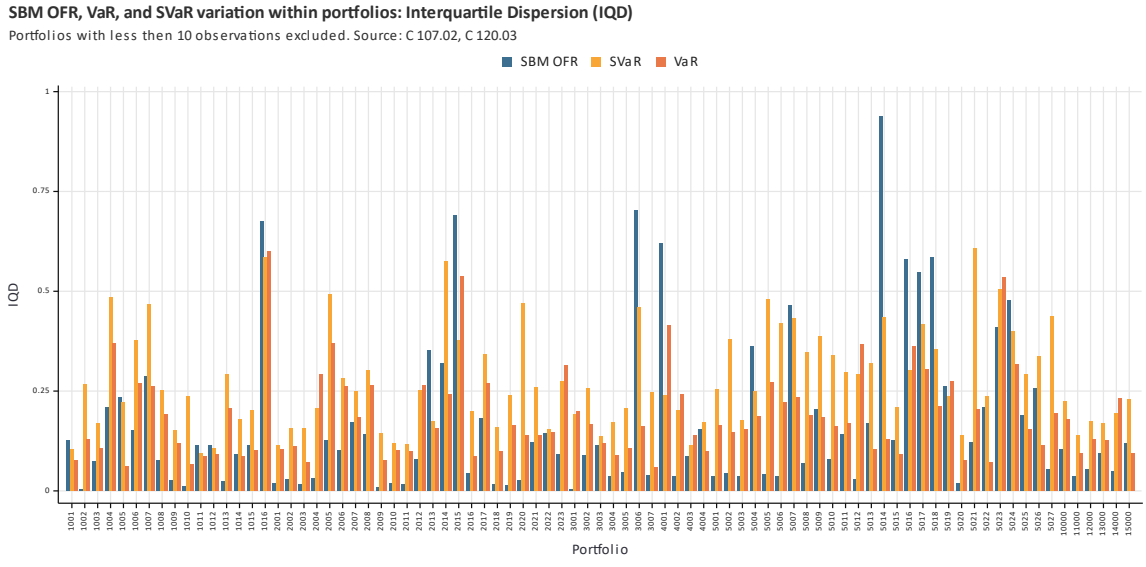


Figure 52: IQD-Ratio of SBM-OFR to VaR

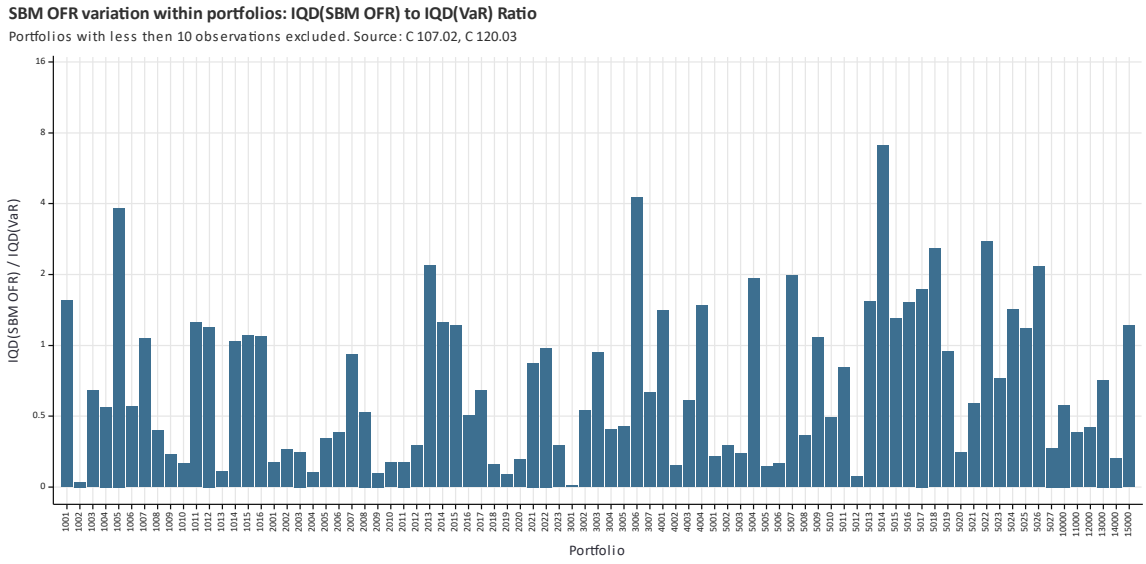


Figure 53: SBM OFR VaR and SVaR variation within EQ portfolios: Interquartile Dispersion (IQD)

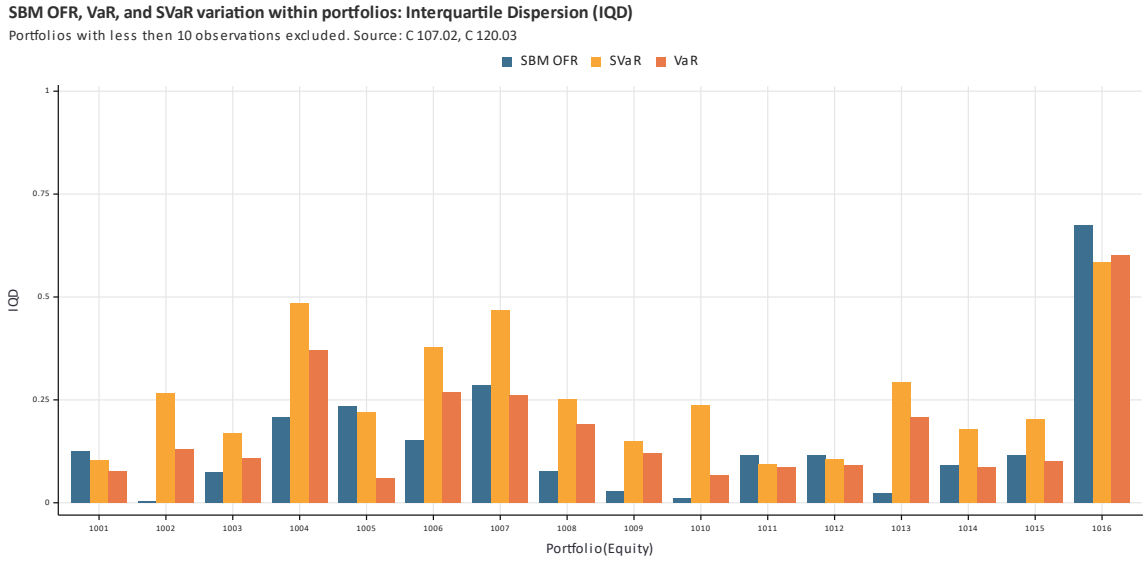


Figure 54: SBM OFR VaR and SVaR variation within IR portfolios: Interquartile Dispersion (IQD)

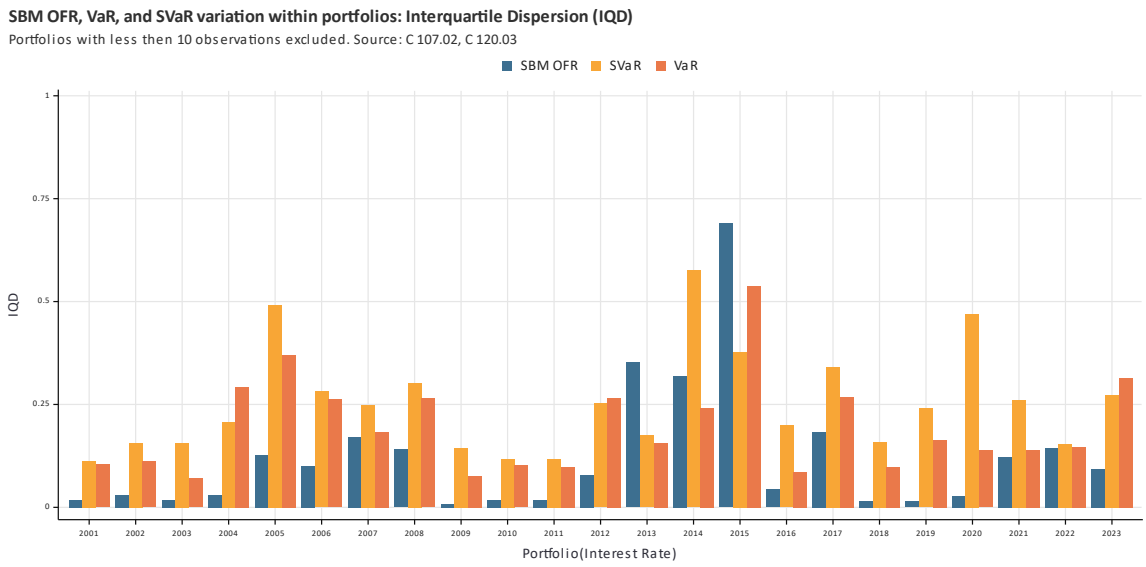


Figure 55: SBM OFR VaR and SVaR variation within FX portfolios: Interquartile Dispersion (IQD)

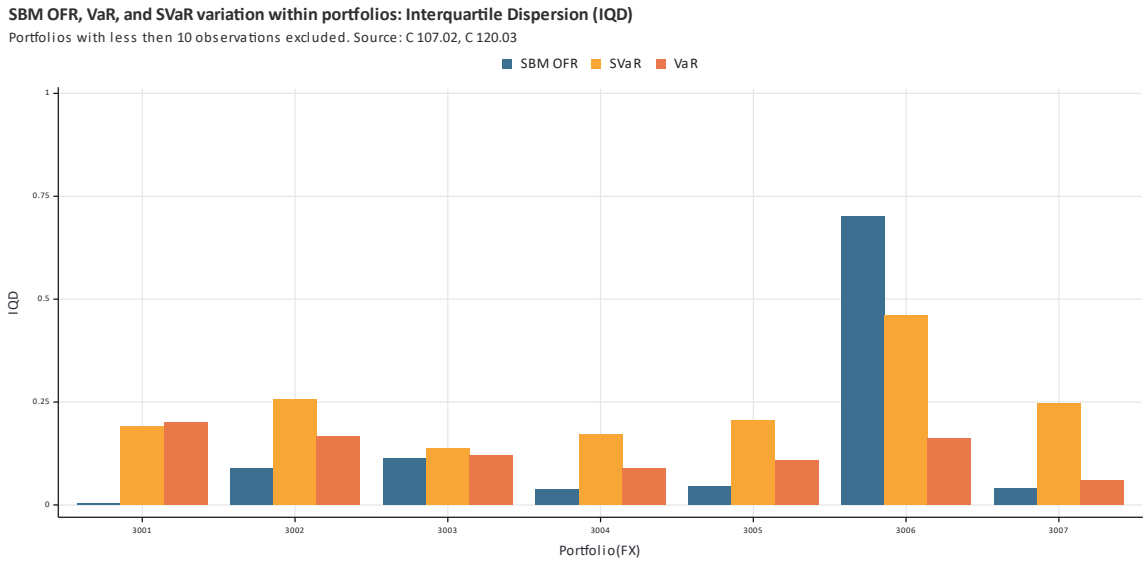


Figure 56: SBM OFR VaR and SVaR variation within CO portfolios: Interquartile Dispersion (IQD)

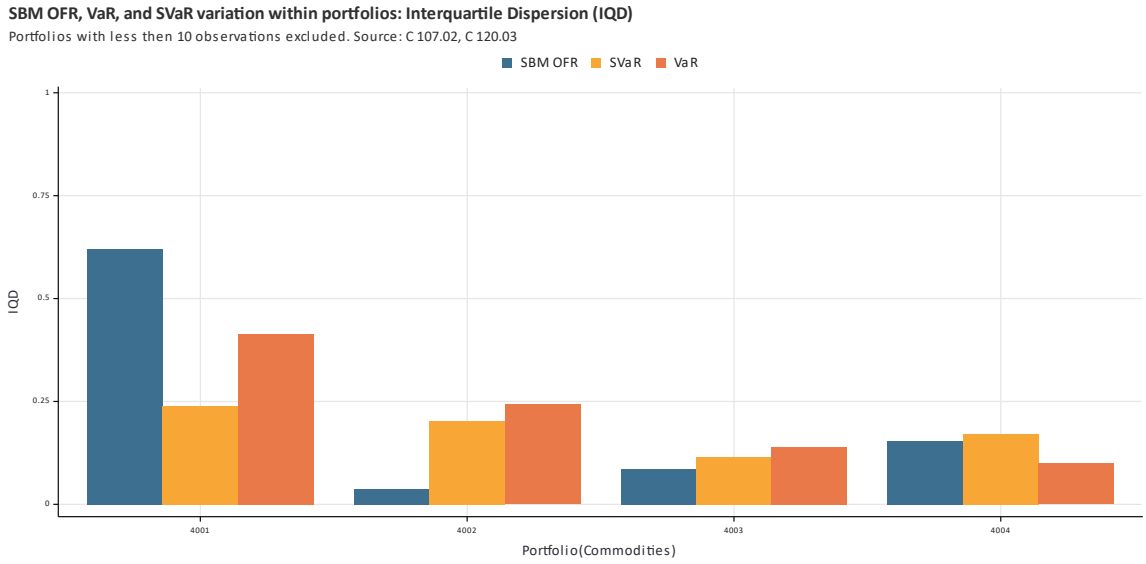


Figure 57: SBM OFR VaR and SVaR variation within CS portfolios: Interquartile Dispersion (IQD)

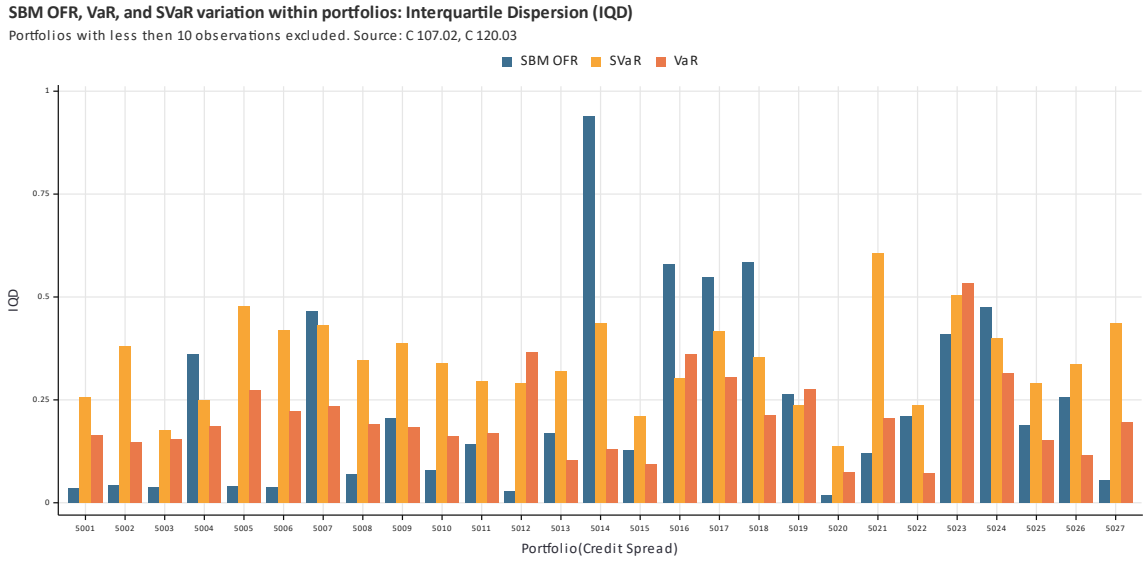


Figure 58: Frequency of SBM risk component within SBM risk classes relative to total number of submissions per portfolio

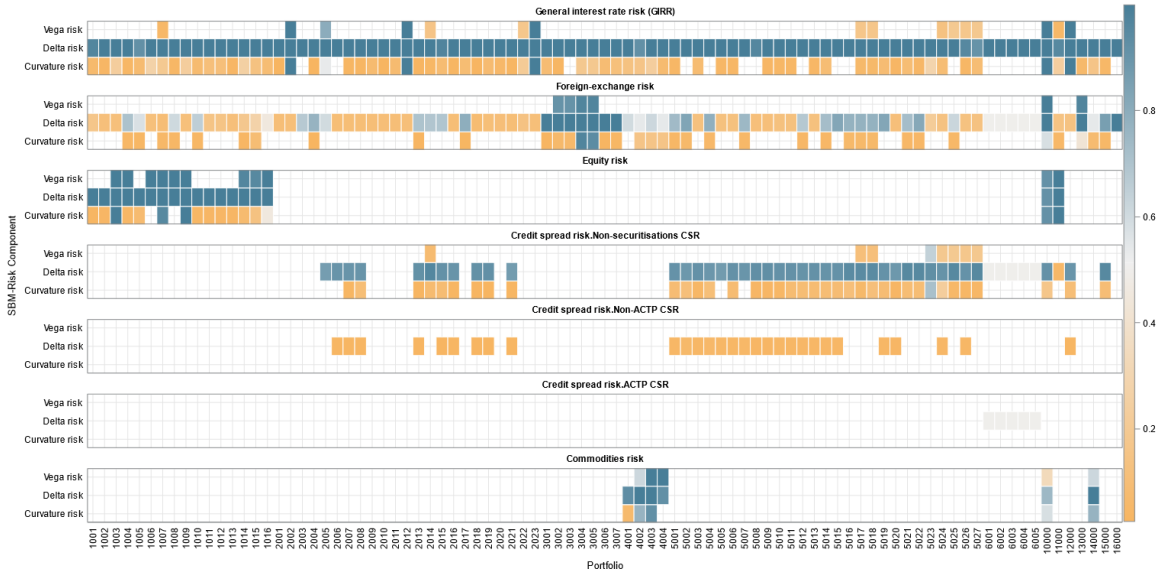
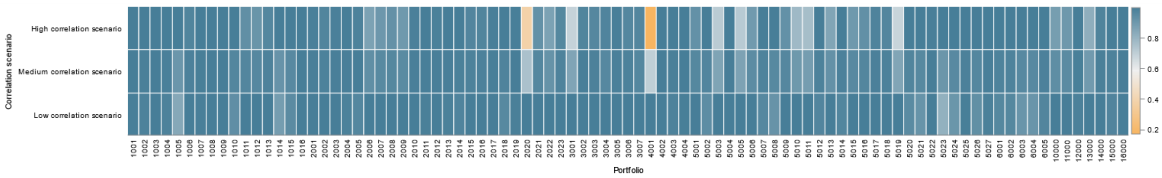


Figure 59: Median OFR per correlation scenario



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