Report on variability of Risk Weighted Assets for Market Risk Portfolios

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Abbreviations

APR	All Price Risk (Internal Model for correlation trading activities)
BB	Banking Book
CA	Competent Authorities
CDS	Credit Default Swap
CTP	Correlation Trading Portfolio
DB	Diversification Benefit
HPE	Hypothetical Portfolio Exercise
HS	Historical Simulation
IMV	Initial Market Valuation
IRC	Incremental Risk Charge (Internal Model for Default and Migration Risk)
IRR	Interest Rate Risk
IRS	Interest Rate Swap
Max	Maximum
Min	Minimum
OTC	Over the Counter
P&L	Profit and Loss
RWA	Risk Weighted Assets
SFA	Supervisory Formula Approach
Stdev	Standard Deviation
SVaR	Stressed Value at Risk
TB	Trading Book
TCOR	Task Force on Consistency of Outcomes in Risk Weighted Assets
VaR	Value at Risk

1. Executive summary

This report outlines the conclusions obtained from a market hypothetical portfolio exercise (HPE) which has been conducted by the EBA during 2013 in parallel with a similar exercise performed by the Basel Committee's SIGTB. The main objective of this exercise has been to assess the level of variability observed in market Risk Weighted Assets (RWA) produced by banks' internal models.

The exercise includes 35 general portfolios (28 individual and 7 aggregated), capitalised under the Value at Risk (VaR), Stressed Value at Risk (SVaR) and Incremental Risk Charge (IRC) models, comprising both vanilla and complex products in all major asset classes: Equity; Interest Rates (IRR), Foreign Exchange (FX), Commodities; and Credit. In addition, it also includes 7 portfolios applied for correlation trading activities, capitalised under the VaR, SVaR and All Price Risk (APR) models with the application of a floor based on the standardised specific risk charge.

In addition to assessing the overall level of variability in market RWA produced by banks' internal models it is important to examine the different drivers that might be behind the dispersion observed. In this regard, for VaR[1] the assessment produced intends to differentiate between drivers produced by approaches explicitly contemplated in regulation and those related to other causes.

To this end, participating banks using a Historical Simulation (HS) approach to calculate its VaR were requested to deliver a one-year Profit and Loss (P&L) vector for each of the individual and aggregated portfolios modelled. The main objective of requesting this additional P&L information was to use the data to perform alternative VaR calculations ('VaR Alt') controlling the different modelling options explicitly contemplated in regulation which banks can apply.

Additionally, the P&L vector has been 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 (which has only been performed for the 28 general individual portfolios) is complementary to the assessment of variability based solely on model outcomes.

Overview of the results

The report presents the observed variability measured in terms of the Coefficient of Variation, i.e. standard deviation divided by the average value. As was also observed in the SIGTB 2012 and 2013 exercises, the overall average variability for VaR (33%) is lower than that observed for SVaR (44%), with IRC (77%) and APR (81%) showing a much higher level of dispersion.

Variability observed in VaR

Variability has been assessed for three different VaR metrics: (i) banks' reported 'Value at Risk'; (ii) an 'Alternative Value at Risk' ('VaR Alt') produced by the EBA using the data from the 10 HS banks; and

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[1] However it was not possible to produce a similar assessment for the other capital metrics included in the report.

(iii) a 'Comparable Value at Risk' ('VaR Comp') which includes the reported 'Value at Risk' (VaR) only for those firms that use HS.

According to the results obtained, variability decreases significantly when a homogenised VaR metric is applied. The reduction in the coefficient of variation is around 30% for individual portfolios (more pronounced for IRR, FX and Equity underlying) and 50% for aggregated portfolios. Variability also decreases (except for commodities) when we analyse the reported VaR for the sub-sample of banks using HS. In this case, the reduction for the individual portfolios is around 9% and 14% for the aggregated portfolios.

Nevertheless, it should be stressed that any of these conclusions must be read with caution due to the very limited sample of banks (a maximum of 10) that support these observed results. In addition, this reduction in variability is not always observed. In 4 portfolios (11.4% of the total) variability actually increases for the 'VaR Alt', whilst in 10 of the portfolios (28.6% of the total) variability increases for the 'VaR Comp' metric.

P&L complementary analysis for VaR

The report presents, for the 28 individual non-APR portfolios, a P&L analysis which is complementary to the variability assessment based on the VaR modelling outcome.

One of the conclusions derived from this analysis is that, for banks that use HS, the main driver behind the level in the VaR capital outcome is the level of volatility in the P&L (i.e. how the actual P&L is computed) and not the differences in P&L correlation (which would reflect how the market behaviour is computed in the model).

The analysis also shows that there seems to be a lack of consensus on how banks model in VaR some of the risk factors included in the portfolios. In particular, this is the case for the basis risk between a CDS and its equivalent bond, the basis risk between an index and its components, the forward equity volatility surface or, in general, portfolios including sovereign risk.

IRC and SVaR

The lack of consensus around sovereign risk which has been mentioned above is clearly observed also for IRC risk. The IRC results for those portfolios comprising sovereign positions exhibit a significantly higher level of dispersion than that observed for similar corporate debt portfolios. In this regard, regulatory differences in the treatment of sovereign exposures were identified as a variability driver, (e.g. some jurisdictions allow banks to exclude sovereign exposures from the IRC charge, at least from the default component of risk).

On average, variability for IRC is 77%, which is significantly higher than that observed for VaR. However, IRC variability is very high for the most bespoke portfolios (25 to 28) which may not be too representative. For more 'plain vanilla' portfolios, dispersion decreases to 55%.

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Finally, if we consider only the variability observed in the corporate risk portfolios, it decreases further to 38%. This level of variability would be quite comparable to the dispersion observed in regulatory VaR (33% for individual portfolios) and smaller than the average variation for SVaR (44%).

Variability for SVaR is generally higher than that observed for regulatory VaR (on average 44% vs 33%); however this is not consistently observed across all portfolios. In any case, the fact that the stressed period has not been normalised hinders any meaningful variability analysis for SVaR. It is clear that any variability observed could be produced either by differences in modelling or in the data period used for SVaR computation.

Internal model for correlation activities

Average variability for the APR charge (81%) is higher than that observed for IRC and significantly higher than any of the other metrics considered in this report, with the remarkable exception of the standardised APR calculation, which shows an average level of dispersion of 133%.[2] Most banks are generally reducing their exposure to the Correlation Trading Portfolio (CTP) so these portfolios typically are in run-down mode.

Results for aggregated portfolios: Diversification Benefit

The report analyses the Diversification Benefit observed for VaR SVaR and IRC in the 7 aggregated portfolios (i.e. portfolios 29 to 35). In general, larger aggregated portfolios exhibit greater VaR Diversification Benefit (DB) than smaller ones. Dispersion observed in the DB for the Alt VaR metric is generally lower than for the VaR regulatory metric. As regards Stressed VaR, there is generally more dispersion observed in the DB than for the regulatory VaR.

The SVaR metric for the aggregated portfolios exhibit generally a higher level of variability than for VaR, though for some of the portfolios is the same or lower. Differences in variability for the SVaR capital outcome are not large in any case and dispersion is quite comparable to that observed in VaR. The average SVaR dispersion for the aggregated portfolios is only slightly higher than for VaR (33% vs 32%).

Regarding IRC, the median level of DB (41-42%) is significantly lower than for VaR / SVaR (where it is around 70-80% for the 'all in' portfolios); however, the level of dispersion in the DB is significantly higher than for regulatory VaR (30% vs 5% for the 'all in' portfolio). The resulting IRC variability observed for the aggregated portfolios (41%) is much higher than that obtained for VaR and SVaR, but is clearly less than that observed for correlation trading models

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[2] This extreme variability is due to the use of internal PDs and LGDs in the Supervisory Formula approach generally used under the standardised approach for correlation trading activities.

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Dispersion in capital outcome:

Variability for the capital outcome for the most 'inclusive' portfolios (i.e. 29 and 30) is in the range of 28-26% which is clearly lower than the average dispersion observed for VaR, SVaR and IRC both on an individual and aggregated basis.

On an aggregated basis variability does not seem to be driven by complexity, since it is lower for portfolio 30 than for portfolio 29 (which excludes bespoke positions). In fact, the lowest variability is observed for portfolio 35 which encompass most of the portfolios with higher VaR/SVaR dispersion.

Accordingly, it may be deducted that the idiosyncratic factors which drive variability on an individual portfolio do not compound when they are aggregated; on the contrary they tend to compensate when market risk metrics are summed.

Finally, variability was not influenced in this particular exercise by regulatory add-ons. The max-min range of capital values dispersion for portfolios 29 and 30 remains exactly the same when 3 multipliers are applied instead of the regulatory ones, but the variation coefficient actually increases due to the lower average capital obtained.

2.   Introduction

The Task Force on Consistency of Outcomes in Risk Weighted Assets (TCOR) mandate is to evaluate the sources of material differences in RWAs across banks both in the banking and the trading book in order to separate between intended and unintended variability drivers. TCOR work has focused initially in the assessment of Banking Book (BB) RWA. In this regard, on 26 February 2013 and 5 August 2013 the EBA already published two interim reports on the review of consistency of RWA in the BB http://www.eba.europa.eu/risk-analysis-and-data/review-of-consistency-of-risk-weighted-assets.

As regards Trading Book (TB) the Task Force decided initially to monitor the work on comparability of market RWA conducted by the Trading Book subgroup of the BCBS' Standards Implementation Group (SIG TB). However, during 2013 the EBA conducted a hypothetical portfolio exercise (HPE) for market risk capital charges, in parallel with a similar exercise conducted by the SIGTB. This report outlines the conclusions obtained in this exercise.

2.1   TCOR interaction with previous work conducted by the BCBS

As part of its so-called 'level 3' assessments, the BCBS conducted a Hypothetical Portfolio Exercise (HPE) during 2012 to assess variability in Market Risk Weighted Assets. The exercise comprised a set of 26 test portfolios designed to represent, in simplified form, bank portfolios and to allow a comparison of RWAs generated by VaR, SVaR and IRC models. The conclusions from the 2012 exercise were published in February 2013 http://www.bis.org/press/p130131.htm.

The EBA participated as an observer in the 2012 exercise and benefited from the experience and know how acquired in the process. The EBA collected and analysed the data from the 7 (out of 15) EU banks participating in the Basel exercise. The conclusions from this analysis were reported to the EBA's Board of Supervisors in December 2012.

During 2013 the BCBS conducted a second HPE exercise. Compared to the previous one, the 2013 exercise comprises portfolios which are significantly more comprehensive in scope and include more complex instruments, in particular for correlation trading activities, and a re-run of a number of the vanilla portfolios included in 2012. The report with the conclusions derived from this exercise has been published by the BCBS in a coordinated way with the EBA.

The EBA decided to 'piggyback' on the work of the SIGTB when outlining how the 2013 HPE exercise for Marker Risk capital charges would be conducted. In order to minimise the burden, both on banks and Competent Authorities, and fully benefit from the SIGTB expertise, the EBA decided to apply exactly the same portfolios, definitions and timeline as that provided by the SIGTB. This has facilitated the whole process, avoiding any additional burden for SIGTB banks. It has also allowed the EBA to rely extensively on the Q&A process and data quality checks established for the SIGTB exercise. The EBA is grateful for the SIGTB collaboration throughout the whole exercise.

3. Main features of the 2013 Hypothetical Portfolio Exercise

As previously mentioned, the main change introduced by the SIGTB in 2013 was the inclusion of seven correlation trading portfolios (capitalised under the VaR, SVaR and APR models with the application of a floor based on the standardised specific risk charge). Of course the exercise also included 35 'other' portfolios (28 individual and 7 aggregated capitalised under the VaR, SVaR and IRC models) comprising both vanilla and complex products in all major asset classes: Equity; Interest Rates, Foreign Exchange (FX), Commodities; and Credit.

In addition, banks using an HS approach for VaR have been requested to deliver a one-year P&L vector for each of the individual and aggregated portfolios modelled. The objective of requesting this additional P&L information was to use the data to perform alternative calculations for VaR controlling the different options which banks can apply within regulation.

3.1 Participating banks

As can be seen in the table (1) below, a total of 17 banks from 9 countries participated in the SIGTB exercise. The EBA obtained data from more than half of these participating banks (i.e. 9 institutions from 5 EU Member States) and, in addition, also incorporated the data from 4 EU banks located in Portugal, Spain (2) and Sweden. As a result, the EBA exercise includes 13 banks from 8 EU jurisdictions. 6 of these firms (5 from the SIGTB sample and 1 additional institution from Sweden) also provided data for the APR portfolios.

Country	2012 SIGTB Banks	2013 Non-CRM SIGTB Banks	2013 CRM SIGTB Banks
Belgium	1	0	0
Canada	1	1	0
France	2	2	2
Germany	2	1	1
Italy	1	2	0
Japan	1	1	1
Netherlands	0	2	0
Switzerland	2	2	0
UK	1	2	2
USA	4	4	4
Total	**15**	**17**	**10**
EU SIGTB	7	9	5
Portugal	0	1	0
Spain	0	2	0
Sweden	0	1	1
EU SIGTB + TCOR	7	13	6

Table 1: Participating banks in 2012 / 2013 HPE

3.2 Available data

Participating banks provided an 'Initial Market Valuation' (IMV) for all the modelled portfolios. The reference date for this valuation was 10 May 2013. This information was used to spot possible portfolio interpretation errors. The actual exercise was run from 3 to 14 June (i.e. 10 working days). Banks were requested to provide 10 data points for VaR and SVaR and, as a minimum, two weekly observations for IRC and APR.

However, not all possible data points were available for the analysis performed by the EBA. Some of the portfolios were not delivered due to banks' model limitations and, in addition, some of the data points received were considered as outlier values and excluded from the analysis.

3.2.1 Portfolios not provided by banks

For the purpose of the exercise, only data produced by fully validated and implemented models (i.e. used for capital purposes) was accepted. In this regard, one of the participating banks did not have permission to model specific risk, so this firm did not provide any IRC data.

In addition, despite having regulatory permission, there were also cases in which the trading area did not have internal authorisation from management to operate in some of the instruments or underlyings included in the portfolios, or in which some of the features of the derivatives were not to be contemplated in the bank risk metrics. As a result not all of the 13 participating banks were able to model all the portfolios included in the exercise.

3.2.2 Portfolios excluded by the EBA

Apart from the portfolios that banks were not able to model, the EBA also excluded some outlier[3] values from the variability analysis. For EU banks participating in the SIGTB exercise, the EBA excluded those portfolios which were identified as outliers by the SIGTB. This analysis in Basel was largely based on model (as well as initial valuation) outcomes, giving banks a chance to correct apparent interpretation errors. The EBA has conducted a similar analysis for the additional 4 EU banks.

VaR and SVaR charges have been treated consistently, since the methodology for both risk metrics should be broadly the same (i.e. the only change for SVaR relates to the period applied). Accordingly, an exclusion of an individual portfolio from the VaR implied the same exclusion from the SVaR. The outlier detection analysis has only been performed for VaR, since for the SVaR metric the use of a non-homogenised stressed period hinders any meaningful data analysis.

However, due to its different nature and modelling standards, the IRC metric has been treated separately. Thus, exclusion for the VaR & SVaR did not imply necessarily that the IRC data would also be eliminated from the analysis, and vice versa.

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[3] The data collection process aims at ensuring the reliability and validity of the data obtained. In this regard, it is obvious that an unwanted variability driver (which would pollute the results obtained) would be produced by potential misunderstandings around the portfolios and the specific instruments included in them. In addition, the presence of clear outliers in the data used to assess variability is deemed inappropriate, since these data points are likely to weigh heavily in the results, providing a distorted image of the normal level of variability observed.

In all cases, suspected errors were followed up with the banks through written procedure or, for those banks included in the SIGTB sample, on-site visits, and banks were offered the opportunity to resubmit the results. Where banks provided valid explanations for outlier results, the original data was also retained in the analysis.

3.2.3 Portfolios included in data analysis

As mentioned previously, the exercise comprises 35 non-APR portfolios (28 individual and 7 aggregated). After this outlier detection process, 9 of the non-APR individual portfolios out of the 364 possible ones (13 banks modelling 28 portfolios) were excluded from VaR & SVaR (2.5% of the total) whilst only one individual portfolio was excluded for IRC.

Regarding the non-APR aggregated portfolios (i.e. 29-35) several data points were eliminated from the analysis, mainly because too many of the individual portfolios that form part of the aggregated portfolio were missing (especially for 2 banks) making the capital charges stemming from these portfolios non-comparable with those provided by the rest of banks.

The table (2) below shows the number of non-correlation trading portfolios which have been included in the data analysis. The table indicates the portfolios which were not provided by banks and those which were excluded after the outlier analysis.

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24	P25	P26	P27	P28	P29	P30	P31	P32	P33	P34	P35
Value at Risk																																			
Not provided	0	1	1	1	3	2	3	0	0	0	1	1	0	1	0	1	3	3	0	0	0	0	1	1	3	1	6	3	1	1	1	0	1	3	1
Excluded	0	0	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	1	0	0	0	1	1	2	0	0	0	2	2	2	0	2	2	0
Total	13	12	11	12	10	11	10	13	13	12	12	11	13	11	13	12	10	10	12	13	13	13	11	11	8	12	7	10	10	10	10	13	10	8	12
Stressed Value at Risk																																			
Not provided	0	1	1	1	3	2	3	0	0	0	1	1	0	1	0	1	3	3	0	0	0	0	1	1	3	1	6	3	1	1	1	0	1	3	1
Excluded	0	0	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	1	0	0	0	1	1	2	0	0	0	2	2	2	0	2	2	0
Total	13	12	11	12	10	11	10	13	13	12	12	11	13	11	13	12	9	9	12	13	13	13	11	11	8	12	7	10	10	10	10	13	10	8	12
Incremental Risk Charge																																			
Not provided								3											2	2	1	1	2	2	7	2	7	3	2	1			3		2
Excluded								0											0	0	0	1	0	0	0	0	0	0	1	1			0		0
Total								10											11	11	12	11	11	11	6	11	6	10	10	11			10		11

Table 2: Portfolios included in the exercise

As can be seen, portfolios 25 and 27 (8 and 7 data points respectively for VaR & SVaR and 6 for IRC) are those which show less data contributors.

For APR portfolios the 6 participating institutions have provided data for the 7 individual portfolios, and no data points have been eliminated for any of the risk metrics assessed.

3.3 Potential sources of variability in market capital charges

The main objective of the exercise is to assess the level of variability in market risk RWA produced by banks' internal models. Of course, RWA is a regulatory concept that is obtained as a combination of banks' modelling choices (some of which are explicitly contemplated in regulation) and 'supervisory actions'.

3.3.1 Variability stemming from banks' modelling choices.

The Market Risk Internal Model Framework allows firms a relevant degree of freedom on many of the methodological elements incorporated in the Internal Models. For example, when modelling VaR, institutions can choose to use a look-back period longer than the minimum (i.e. the immediate previous year), use a weighting scheme for the data series, calculate the 10 day VaR directly or, alternatively, obtain a 1 day VaR and re-scale it using the square root of 10, etc.

Likewise, when modelling IRC firms can decide between several sources of PDs and LGDs, resort to different approaches to model the co-movement among obligors in their portfolios, and have many degrees of freedom when choosing the transition matrices applied or when deciding on the liquidity horizons assigned to a particular instrument.

It should be highlighted that all these possibilities are, in principle, acceptable under the current regulatory framework and it is up to banks and competent authorities to agree during the validation process on the most appropriate ones to be applied by each bank. Thus, given the wide range of approaches which institutions using an internal model can choose to implement, some degree of variability among the resulting capital requirements is granted.

At the same time, these differences in implementation are clearly not the only factors behind variability. There are other modelling choices which are not explicitly contemplated in regulation, such as differences in simulation engines and data sources, differences in the methods used to compute risk factors when data is not directly observable (such as with volatilities and/or correlations), the absence of some of the risk factors considered, differences in approximations when re-pricing positions etc.

In this regard, the report tries to distinguish between those variability drivers caused by approaches explicitly contemplated in regulation and those related to other causes. This distinction between both types of drivers is relevant not only for analysis purposes, but also to inform any policy recommendations or guidance that the EBA might decide to issue going forward.

As explained in section 3.6 of this report, the data contained in the P&L vector submitted by banks using HS has been used to assess the relative importance of both types of variability drivers. Of course, as stated in section 3.4, any tentative conclusions should be read with great caution due to the very limited set of banks participating in this exercise.

3.3.2 Variability stemming from supervisory actions.

Another source of potential variability is originated by supervisory actions taken by competent authorities. In particular, the use of regulatory add-ons, both on VaR/SVaR multipliers as well as in the form of additional capital charges, and the application of limits to the diversification benefits applied by banks are likely to increase the observed variability in capital.

In most cases, these supervisory actions have been established to address known flaws, model limitations, or to add an additional layer of prudence; thus, they typically result in higher capital requirements than would otherwise be the case, but, in addition, they can also increase the variation in market RWAs between banks, particularly across jurisdictions. The application of regulatory add-ons on the multipliers applied in VaR and SVaR has been included as part of the analysis, but none of the other supervisory actions was contemplated in this report.

It is worth noting that, though the effect in capital levels of these supervisory actions can be substantial, a portfolio exercise is not suited to reflect such differences, in particular for diversification benefits and direct capital add-ons, since these effects are entirely-portfolio dependant. To assess such an effect it would be necessary to have a much more realistic portfolio, comprising thousands of instruments and including partial-model approval. Accordingly, these regulatory drivers cannot be properly assessed through a limited portfolio exercise.

3.4 Limitations of the exercise

Apart from the impossibility of assessing the effect of most supervisory actions in a meaningful way, there are data limitations that should be carefully considered as caveats when reading any of the preliminary conclusions presented in this report.

Given the limited number of banks included in the exercise, it is not possible to robustly (from a statistical perspective) infer the relative importance of drivers of variability, and these will in any case vary across asset classes. As acknowledged in the BCBS report, lack of data is an issue for the SIGTB exercise, however it is even more significant in the case of the EBA, since the data sample available contains just 13 banks (against 18 in Basel). Of course, data issues are especially significant for correlation trading portfolios, where only 6 banks have provided information.

Regarding the alternative VaR calculations produced with the P&L vectors, this type of analysis is only possible for institutions applying HS. Accordingly, firms using Montecarlo or Parametric VaR are not subject to the same level of assessment. This also raises data availability issues, in particular for this exercise only 9 banks have provided 1-day P&L vectors. An additional firm provided 10-day P&L which was used to calculate alternative VaR metric, but could not be used to assess P&L correlation and volatility.

The SVaR metric could not be assessed since the P&L vector was not requested. In any case banks calculated their SVaR using the Stressed period they were currently using for capital purposes, which reflects the specificity of their actual trading portfolio. Accordingly the P&L would have been useless for data analysis purposes. Of course, the fact that the stressed period has not been normalised also hinders any meaningful variability analysis. It is clear that any variability observed could be produced either by differences in modelling or in the different data periods used for SVaR computation.

It is possible to perform this kind of analysis for SVaR in any future exercise, but of course it is necessary to request that banks perform their calculations using a common one-year stressed period (such as 2008). This might involve some additional burden; however, unless a common stressed period is established, it is not possible to assess modelling performance for SVaR across institutions in a meaningful way.

Nevertheless, this type of P&L analysis is not possible for IRC and internal models used for correlation trading activities; this is due to the higher level of confidence (99,9% vs 99%) and longer capital horizon (1 year vs 10-days) applied in these metrics.

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3.5 P& L data cleaning

Apart from the outlier detection process for the risk metrics, described in section 3.2.2 of this report, the EBA has also introduced minor changes in some of the P&L vectors provided by banks applying HS.

This 'data cleaning' was produced as a result of the joint analysis of all the available P&L vectors. In particular, this analysis showed that certain banks were reporting gains as losses or vice versa (i.e. movements in their P&L daily values showed a nearly perfect negative correlation with the other banks) or had filled the template without leaving empty cells for local bank holidays (i.e. their P&L graphical representations would show a similar pattern to the others but would consistently begin to lag one or two days behind the rest consistently at the same point in time).

In particular, the following changes were introduced:

- Bank 2 provided for all portfolios the 1 day P&L data scaled-up using the square root of 10 and then divided by a thousand, accordingly the vector was divided by the square root of 10 and multiplied by a thousand before factoring the data in the analysis.
- Bank 4: at the same point in time their P&L vector began to lag behind other bank's vectors; accordingly, the P&L series has been consistently shifted 2 days around data point 117 for all portfolios.
- Portfolio 9: bank 6 – the reported losses are gains and vice versa (they have been swapped accordingly).
- Portfolio 10: 4 out of 9 banks (2, 4, 5 & 7) reported losses as gains and vice versa (they have been swapped accordingly).
- Portfolio 18: bank 1 – the reported losses are gains and vice versa (they have been swapped accordingly). Around data point 129 the P&L vector for bank 5 began to lag behind other bank's vectors, it has been shifted 1 day.

Regarding the aggregated portfolios, instead of using directly the P&L provided by banks, the P&L vector has been recalculated, summing the corresponding P&L vectors from their constituent individual portfolios after conducting the described data cleaning.

In addition, portfolio 14 (which seems to have been interpreted in two different ways, producing large variability not related to differences in modelling) has not been aggregated to portfolios 29 (non-exotic), 30 (all-in) and 33 (FX).

Finally, instead of 1-day P&L data, bank 10 reported a 10-day overlapped P&L vector. This data was used to calculate the 'alternative VaR'; however this data could not be used to assess correlation and variability in the 1 day P&L vector.

3.6 Use of the P&L data to assess variability drivers.

As mentioned previously, banks using an HS approach for VaR computation were requested to deliver a one-year P&L vector for each one of the individual portfolios modelled. Out of the 13 participating banks 10 use HS, whilst 2 apply Montecarlo and 1 calculates VaR using a parametric approach.

Accordingly, the EBA has used this data from the 10 banks using HS to calculate a 1-day VaR, re-scaled to 10 days applying the square root of time, using the same one-year period and without applying any data weighing scheme.

It is important to highlight that this homogeneous VaR has only been calculated in order to eliminate some of the potential drivers of variability[4], but this alternative calculation produced by the EBA should not be seen in any way as showing any preference for these particular modelling choices.

In addition, the P&L vector has also been used to assess the degree of P&L correlation across banks, as well as the level of volatility shown in each bank's vector. However 1 of the 10 banks using HS provided 10-day P&L data, instead of 1-day, so this data could not be incorporated into the analysis.

This detailed information for each of the 28 non-correlation trading individual portfolios is presented in the report. Since each individual portfolio is modelling a particular set of risk factors the analysis provides useful insight about the degree of market consensus around those specific risk factors, in terms of market dynamics (i.e. graphical representation of P&L vectors and correlation across institutions) and, also importantly, volatility levels.

This analysis was not produced for the 7 aggregated portfolios. In this regard it should be noted that in many cases the aggregated P&L includes only part of the portfolios modelled (i.e. since banks were not able to model all the individual portfolios) so, considering the relatively low number of portfolios considered, differences in P&L vectors may be biased by the absence of some of these individual portfolios. Additionally, since the P&L incorporates all the different risk factors included in the individual portfolios, the analysis would not be that relevant.

Finally, the analysis was not performed for the 7 correlation trading portfolios due to the lack of participating institutions (6 in total, out of which only 4 apply HS) and the low relevance of the VaR metric for this kind of activity.

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[4] One of the clear limitations of this approach is that it is only suitable for banks using Historical Simulation. 10 out of the 13 banks included in the EBA sample applied this methodology.

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3.7 Overview of the results obtained.

3.7.1 VaR

Analyses conducted by the EBA for VaR

With the information available, the EBA has performed two types of analyses:

1. An assessment of the variability in the risk metrics outcomes provided by banks (VaR, SVaR, IRC and APR) as well as two additional VaR metrics produced by the EBA:

   i. An 'Alternative Value at Risk' (VaR Alt) produced by the EBA using the data from the 10 HS banks to calculate a homogeneous 1-day VaR, re-scaled to 10 days applying the square root of time, using the same one-year period and without applying any data weighing scheme; and

   ii. A 'Comparable Value at Risk' (VaR Comp) which includes banks' reported 'Value at Risk' (VaR), but only for the set of portfolios provided by banks applying HS.

2. An analysis of correlation and dispersion in the P&L vectors provided by banks applying HS to calculate VaR.

Analysis of variability for VaR

As has been mentioned the report presents the observed variability for banks' reported 'Value at Risk' (VaR), the 'Alternative Value at Risk' (VaR Alt) produced by the EBA using the data from the 10 HS banks and the 'Comparable Value at Risk' (VaR Comp) which includes HS banks' reported 'Value at Risk' (VaR).

In the table (3) below there is a summary of the variability results (measured using the coefficient of variation – Standard Deviation / Mean) obtained for the three VaR measures, for both individual and aggregated portfolios.

		VaR	VaR Alt	% Change	VaR Comp	% Change
INDIV. PORT.	Equity	32%	21%	-35%	32%	-1%
	Interest Rate	36%	22%	-38%	25%	-31%
	FX	30%	19%	-36%	26%	-12%
	Commodities	26%	22%	-16%	28%	8%
	Credit Spread	40%	32%	-21%	39%	-3%
	TOTAL	33%	23%	-29%	30%	-9%
AGGREGATED PORT.		32%	16%	-51%	27%	-14%

Table 3: VaR / VaR Alt / VaR Comp aggregated results

As can be seen, variability decreases significantly when a homogenised VaR metric (VaR Alt) is applied. The reduction in the coefficient of variation is around 30% for individual portfolios (more pronounced for IRR, FX and Equity underlying) and 50% for the aggregated portfolios[5].

It is worth noting that variability also decreases (except for commodities) when we analyse the reported VaR for the sub-sample of banks using HS (i.e. VaR Comp); in this case, the reduction for the individual portfolios is around 9% and 14% for the aggregated portfolios. Of course, the choice between applying Montecarlo, Parametric or HS is one of the possibilities which are contemplated in regulation.

In any case, the results obtained support the conclusion that variability (i) decreases when a common calculation methodology is applied (i.e. HS in this case) and (ii) decreases significantly more when the rest of variables contemplated in regulation are controlled.

Of course it is worth highlighting the limited sample of banks (a maximum of 10) that support these observed results. In addition, this reduction in variability is not always observed. In 4 portfolios (4, 25, 27 & 28 – 11.4% of the total) variability actually increases for the 'VaR Alt', whilst in 10 of the portfolios (number 4, 10, 11, 16, 17, 18, 25, 27, 30 & 35 – 28.6% of the total) variability increases for the 'VaR Comp' metric.

P&L complementary analysis

The P&L analysis is complementary to that produced to assess variability based on the VaR modelling outcome. Results based solely on the regulatory VaR metric might overestimate (or underestimate) the degree of consensus amongst banks for some of the portfolios and risk factors modelled.

For each individual portfolio, the P&L vectors provided by banks using HS are compared. The report provides a graphical representation of the vector as well as a measure of the correlation coefficient across all banks. Finally, a measure of the level of volatility observed in the P&L is also provided.

The P&L analysis provides more in depth information for assessing how banks are really modelling each one of the portfolios, and also helps to spot outlier institutions and show that, on occasions, banks may be modelling a particular portfolio in two different ways. For example, in portfolios 13 and 15 all firms but two are highly correlated in their P&L vectors, however these two firms are highly correlated between themselves[6].

One of the conclusions derived from this analysis is that, for banks that use HS, the main driver behind the level of the VaR capital outcome is the level of volatility in the P&L (i.e. how the actual P&L is

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[5] The results observed for 'VaR Alt' in the aggregated portfolios may be biased by the exclusion of portfolio 14 from the aggregated P&L analysis.

[6] Of course, in order to derive any additional conclusions it is necessary to follow up these developments with the individual banks.

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computed) and not the differences in P&L correlation[7] (which would reflect how the market behaviour is computed in the model).

This produces some non-intuitive results; for example portfolio 3, whose main underlying risk factor is the S&P volatility surface which is not directly observable (i.e. so called 'level 3') in the market, shows (as it would be expected for a non-observable risk factor) a very low level of correlation in their P&L, but also a relatively common level of volatility. As a consequence, this portfolio shows less dispersion in 'Alt VaR' than portfolio 4, which is characterised by a very high level of correlation together with rather dispersed volatilities.

The analysis also shows that there seems to be a lack of consensus on how banks model in VaR some of the risk factors included in the portfolios, in particular:

- Basis risk between a CDS and its equivalent Bond (portfolio 26)
- Basis between an Index and its components (portfolio 25)
- Forward volatility surface (portfolio 4)
- Sovereign risk portfolios (portfolios 8, 19 & 20).

There seems to be greater market consensus around the behaviour of corporate risk than for sovereign risk (portfolios 8, 19 & 20 vs 21, 22, 23 & 24). This is rather surprising considering that the level of liquidity is generally much greater for sovereign than for sorporate positions.

Finally, it has also been observed that dispersion for certain OTC portfolios (not necessarily 'plain vanilla') is quite low compared with others based on 'level 1' liquid assets (again, such as sovereign bonds).

3.7.2 IRC

The lack of consensus around sovereign risk is also verified for IRC risk, which shows a significantly higher level of dispersion when we compare the level of variability observed in similar portfolios that differ in the type of underlying credit risk (i.e. sovereign vs corporate). In this regard, regulatory differences in the treatment of sovereign exposures were also identified as a driver, e.g. some jurisdictions allow banks to exclude sovereign exposures from the IRC charge (at least from the default component of risk).

The IRC average variability is 77%, which is significantly higher than that observed for VaR. However, for more 'plain vanilla' portfolios (19-24) it decreases to 55%, and if we take only the corporate risk portfolios (21-24) it decreases further to 38%, which would be quite comparable to the dispersion observed in regulatory VaR (33% for individual portfolios) and smaller than the average variation for SVaR (44%).

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[7] For a VaR metric calculated using a 1-day P&L over a one-year look-back period, what determines the capital figure is the size of the second and third largest losses in the P&L vector, regardless of the exact dates in which those losses actually occurred.

3.7.3 SVaR

Variability for SVaR is generally higher than that observed for regulatory VaR (on average 44% vs 33%), however this is not consistently observed across all portfolios. In any case, the fact that the stressed period has not been normalised hinders any meaningful variability analysis for the SVaR metric.

In this regard, it is clear that any variability observed could be produced either by differences in modelling or in the data period used for SVaR computation.

3.7.4 Internal model for correlation activities

Average variability for the APR charge (81%) is higher than for IRC, and significantly higher than any of the other metrics considered in this report, with the remarkable exception of the standardised APR calculation, which shows an average level of dispersion of 133%. This extreme variability is due to the use of internal PDs and LGDs in the Supervisory Formula Approach (SFA) generally used under the standardised approach for correlation trading activities.

These results should be read in the context where most banks are generally reducing their exposure to the CTP, as these portfolios typically are in run-down mode.

3.7.5 Results for aggregated portfolios: Diversification Benefit

The report analyses the Diversification Benefit observed for VaR SVaR and IRC in the 7 aggregated portfolios (i.e. portfolios 29 to 35). In general, larger aggregated portfolios exhibit greater VaR Diversification Benefit (DB) than smaller ones. Dispersion observed in the DB for the Alt VaR metric is generally lower than for the VaR regulatory metric.

As regards Stressed VaR, the level of dispersion is generally higher than for VaR, though for some of the portfolios is the same or lower. There is also generally more dispersion in the DB observed. Differences in variability for the SVaR capital are not large in any case and dispersion is quite comparable to that observed in VaR, the average SVaR dispersion for the aggregated portfolios being only slightly higher than for VaR (33% vs 32%).

Regarding IRC, the median level of DB (41-42%) is significantly lower than for VaR / SVaR (where it is around 70-80% for the 'all in' portfolios) however the level of dispersion in the DB is significantly higher than for regulatory VaR (30% vs 5% for the 'all in' portfolio). The resulting variability observed in the aggregated portfolios (41%) is much higher than that obtained for VaR and SVaR, but is clearly less than that observed for correlation trading models

3.7.6 Dispersion in capital outcome:

Variability for the capital outcome for the most 'inclusive' portfolios (i.e. 29 and 30) is in the range of 28-26%, which is clearly lower than the average dispersion observed for VaR, SVaR and IRC both on an individual and aggregated basis.

On an aggregated basis variability does not seem to be driven by complexity, since it is lower for portfolio 30 than for portfolio 29 (which excludes bespoke positions). In fact, the lowest variability is observed for portfolio 35 which encompass most of the portfolios with higher VaR/SVaR dispersion.

Accordingly, it may be deducted that the idiosyncratic factors which drive variability on an individual portfolio do not compound when they are aggregated; on the contrary, they tend to compensate when market risk metrics are summed.

Finally, variability was not influenced in this particular exercise by regulatory add-ons. The max-min range of capital values dispersion for portfolios 29 and 30 remains exactly the same when 3 multipliers are applied instead of the regulatory ones, but the variation coefficient actually increases due to the lower capital average obtained.

A detailed breakdown of the results is provided in the following sections. Portfolios have been grouped by type of underlying: 3.8 Equity, 3.9 Interest Rate, 3.10 FX, 3.11 Commodity, 3.12 Credit, 3.13 Aggregated, 3.14 Correlation Trading.

3.8 Equity portfolios

The following 7 portfolios have been assessed:

Portfolio number	Description
1	Equity index futures on FTSE 100
2	Bullish leveraged trade on Google
3	Volatility trade: short short-term vega and long long-term vega on S&P 500
4	Volatility trade: long/short put on FTSE 100
5	Equity variance swaps on Eurostoxx 50
6	Barrier option on S&P 500
7	Quanto index call on Eurostoxx 50

The sample size for each of the 7 portfolios is as follows (see section 3.2.3 for further details):

	P1	P2	P3	P4	P5	P6	P7
VaR	13	12	11	12	10	11	10
SVaR	13	12	11	12	10	11	10

The following table (4) presents the minimum, maximum, median, mean, and standard deviation as well as the variability (standard deviation / mean) for the 3 alternative VaR metrics assessed in this report as well as for the Stressed VaR.

		Equity Portfolios							Dispersion
		P1	P2	P3	P4	P5	P6	P7	2013
VaR	Min	76.62	61.85	68.99	94.30	95.12	123.50	171.10	32%
	Max	228.81	187.81	230.03	201.34	326.39	309.94	346.81	
	Median	141.61	106.30	130.71	143.02	173.60	187.09	316.97	
	Mean	158.58	119.85	133.26	140.02	195.45	203.99	287.25	
	Stdev	48.92	43.65	47.75	35.94	80.23	67.52	62.29	
	Stdev/Mean	31%	36%	36%	26%	41%	33%	22%	
VaR Alt	Min	107.00	67.26	59.41	78.42	107.08	123.98	169.42	21%
	Max	147.86	129.59	99.64	191.25	227.71	261.76	265.56	
	Median	121.67	79.78	76.90	95.87	158.93	178.72	229.15	
	Mean	122.18	86.38	76.76	108.81	156.43	181.73	223.75	
	Stdev	10.89	18.27	12.92	34.45	41.97	48.41	30.61	
	Stdev/Mean	9%	21%	17%	32%	27%	27%	14%	
VaR Comp	Min	76.62	76.37	82.62	94.30	106.09	123.50	258.91	32%
	Max	228.81	187.81	230.03	365.73	326.39	309.94	346.81	
	Median	190.73	113.58	151.39	164.83	224.75	223.94	321.03	
	Mean	168.41	130.25	144.56	170.67	212.99	221.30	313.79	
	Stdev	51.50	44.68	44.89	81.87	79.11	70.71	30.61	
	Stdev/Mean	31%	34%	31%	48%	37%	32%	10%	
SVaR	Min	216.02	111.37	132.29	145.42	141.60	142.67	249.94	54%
	Max	625.92	399.19	833.56	600.63	1,165.33	1,269.14	662.17	
	Median	416.12	170.91	535.00	284.92	214.26	262.64	508.81	
	Mean	395.40	199.03	496.12	292.69	307.53	374.51	489.90	
	Stdev	110.57	99.23	207.45	118.24	304.99	335.83	156.59	
	Stdev/Mean	28%	50%	42%	40%	99%	90%	32%	

Table 4: Dispersion results - Portfolios 1 to 7

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With the sole exception of Portfolio 4, variability for the homogenised VaR (i.e. VaR Alt) is significantly less than that observed for the regulatory VaR metric, and overall variability decreases by one third (i.e. from 32% to 21%) for the VaR Alt. In general, variability also decreases for banks using HS, again with the sole exception of Portfolio 4. A more detailed analysis of the differences observed in these three risk metrics by individual portfolio is provided in section 3.1.1.

There is evidence that more bespoke portfolios (such as 5 and 6) have greater variability in the three VaR metrics considered than plain vanilla ones. This is not the case for portfolio 7; however the fact that an option is 'quanto' (i.e. payment is done in a different currency than the underlying) does not add much complexity to the instrument.

The following charts (1 and 2) show scatter plots of the VaR and VaR Alt results for the equity portfolios.
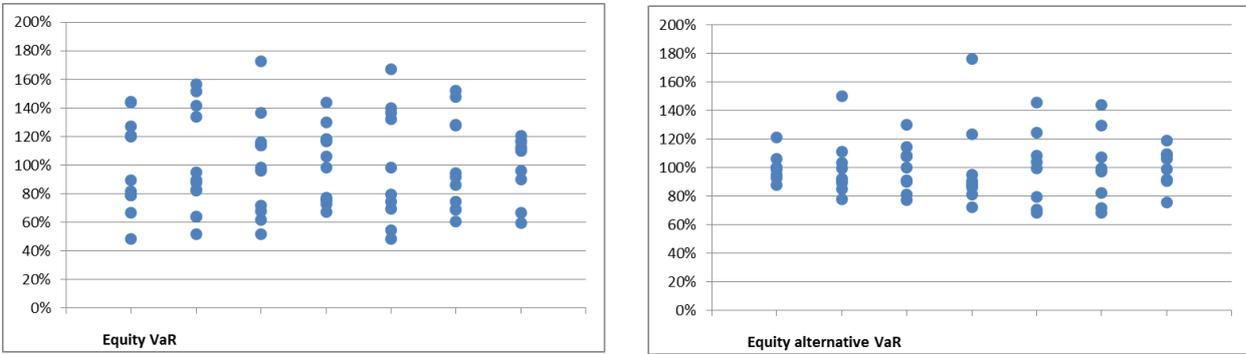
Charts 1 & 2: VaR and VaR Alt normalised dispersion – Portfolios 1 to 7

Regarding Stressed VaR (see scatter plots in chart 3 below) the level of dispersion is generally higher than for VaR, except for Portfolio 1. Variability is greater for the two bespoke portfolios (5 & 6).

Chart 3: SVaR normalised dispersion – Portfolios 1 to 7

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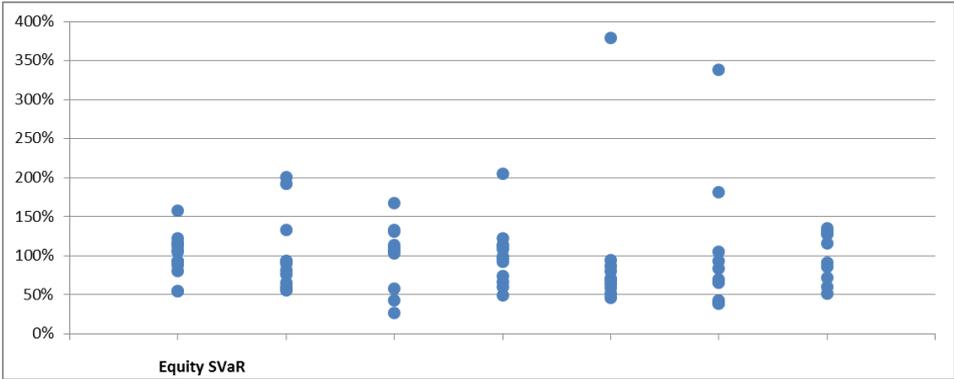
3.8.1 Individual portfolio analysis.

Equity Portfolios: Number 1 – equity index futures

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
1 *Equity*	**Equity Index Futures** ***Long delta*** -Long 30 contracts ATM 3-month front running FTSE 100 index futures ** Futures price is based on the index level at NYSE Liffe London market close on Friday, May 10th, 2013.* *1 contract corresponds to 10 equities underlying*	GBP	×	×	

50-day P&L vector

P1	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		100	95	100	100	100	91	100	98
Bank 2	100		95	100	100	100	90	100	98
Bank 3	95	95		94	95	95	88	95	94
Bank 4	100	100	94		100	100	90	100	98
Bank 5	100	100	95	100		100	90	100	98
Bank 6	100	100	95	100	100		91	100	98
Bank 7	91	90	88	90	90	91		91	89
Bank 8	100	100	95	100	100	100	91		98
Bank 9	98	98	94	98	98	98	89	98	
P&L Stdev	14.72	14.91	14.75	18.06	14.77	14.70	17.58	14.78	14.41
Mean	15.41								
Stdev	1.30								
Stdev / Mean	8.44%								

Correlations across one-year daily P&L observations

		Equity Portfolios						
		P1	P2	P3	P4	P5	P6	P7
VaR	Min	76.62	61.85	68.99	94.30	95.12	123.50	171.10
	Max	228.81	187.81	230.03	201.34	326.39	309.94	346.81
	Median	141.61	106.30	130.71	143.02	173.60	187.09	316.97
	Mean	158.58	119.85	133.26	140.02	195.45	203.99	287.25
	Stdev	48.92	43.65	47.75	35.94	80.23	67.52	62.29
	Stdev/Mean	31%	36%	36%	26%	41%	33%	22%
VaR Alt	Min	107.00	67.26	59.41	78.42	107.08	123.98	169.42
	Max	147.86	129.59	99.64	191.25	227.71	261.76	265.56
	Median	121.67	79.78	76.90	95.87	158.93	178.72	229.15
	Mean	122.18	86.38	76.76	108.81	156.43	181.73	223.75
	Stdev	10.89	18.27	12.92	34.45	41.97	48.41	30.61
	Stdev/Mean	9%	21%	17%	32%	27%	27%	14%
VaR Comp	Min	76.62	76.37	82.62	94.30	106.09	123.50	258.91
	Max	228.81	187.81	230.03	365.73	326.39	309.94	346.81
	Median	190.73	113.58	151.39	164.83	224.75	223.94	321.03
	Mean	168.41	130.25	144.56	170.67	212.99	221.30	313.79
	Stdev	51.50	44.68	44.89	81.87	79.11	70.71	30.61
	Stdev/Mean	31%	34%	31%	48%	37%	32%	10%

Main Risk Factors

- Material risk factors are spot prices of FTSE components.
- No optionality

Comments

- Due to the type of underlying (observable market data) and lack of optionality, the P&L vector of banks using HS is very similar, with very high correlation (with banks 3 & 7 showing a bit less correlation than the others) and a very similar level of volatility across banks.
- Accordingly, this portfolio shows the lowest level of dispersion for 'VaR Alt' (9%).
- However, the dispersion increases very significantly when we look at VaR and 'VaR Comp' figures.
- Thus, dispersion seems to be produced mainly by modelling options contemplated in regulation.

Equity Portfolios: Number 2 – bullish leverage trade

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
2 Equity	**Bullish Leveraged Trade** **_Long gamma & long vega_** -Long 100 contracts OTC Google (GOOG) OTM 3-month call options (1 contract = 100 shares underlying) *Strike price is out-of-the-money by 10% relative to the stock price at market close on Friday, May 10th, 2013.*	USD	×	×	

50-day P&L vector

P2	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		80	63	64	86	78	94	67	87
Bank 2	80		45	64	71	61	81	45	72
Bank 3	63	45		67	46	90	63	76	63
Bank 4	64	64	67		47	78	65	51	59
Bank 5	86	71	46	47		61	84	60	75
Bank 6	78	61	90	78	61		76	78	72
Bank 7	94	81	63	65	84	76		64	85
Bank 8	67	45	76	51	60	78	64		71
Bank 9	87	72	63	59	75	72	85	71	
P&L Stdev	18.98	16.16	18.39	14.85	15.84	20.02	24.70	18.01	14.96
Mean	17.99								
Stdev	2.93								
Stdev / Mean	16.28%								

Correlations across one-year daily P&L observations

		Equity Portfolios						
		P1	P2	P3	P4	P5	P6	P7
VaR	Min	76.62	61.85	68.99	94.30	95.12	123.50	171.10
	Max	228.81	187.81	230.03	201.34	326.39	309.94	346.81
	Median	141.61	106.30	130.71	143.02	173.60	187.09	316.97
	Mean	158.58	119.85	133.26	140.02	195.45	203.99	287.25
	Stdev	48.92	43.65	47.75	35.94	80.23	67.52	62.29
	Stdev/Mean	31%	36%	36%	26%	41%	33%	22%
VaR Alt	Min	107.00	67.26	59.41	78.42	107.08	123.98	169.42
	Max	147.86	129.59	99.64	191.25	227.71	261.76	265.56
	Median	121.67	79.78	76.90	95.87	158.93	178.72	229.15
	Mean	122.18	86.38	76.76	108.81	156.43	181.73	223.75
	Stdev	10.89	18.27	12.92	34.45	41.97	48.41	30.61
	Stdev/Mean	9%	21%	17%	32%	27%	27%	14%
VaR Comp	Min	76.62	76.37	82.62	94.30	106.09	123.50	258.91
	Max	228.81	187.81	230.03	365.73	326.39	309.94	346.81
	Median	190.73	113.58	151.39	164.83	224.75	223.94	321.03
	Mean	168.41	130.25	144.56	170.67	212.99	221.30	313.79
	Stdev	51.50	44.68	44.89	81.87	79.11	70.71	30.61
	Stdev/Mean	31%	34%	31%	48%	37%	32%	10%

Main Risk Factors

- Material risk factors are spot prices of Google and Google implied volatilities.

Comments

- The underlying value is Google, (observable market data), but in this case there is optionality.
- The volatility surface (i.e. for every maturity, volatilities for the different prices should be constructed) is not directly observable.
- The P&L vector of banks using HS is relatively similar, in terms of correlation and volatility across banks.
- Though significantly higher than for portfolio 1, it shows a relatively low level of dispersion for 'VaR Alt'.
- However the dispersion increases significantly when we look at VaR and 'VaR Comp' figures.
- Thus, dispersion seems to be increased by modelling options contemplated in regulation.

Equity Portfolios: Number 3 – Volatility trade number 1

Portfolio # *Risk Factor*	Strategy	Base Currency	VaR	Stressed VaR	IRC
3 *Equity*	**Volatility Trade #1 Short short-term vega & long long-term vega** **-**Short straddle 3-month ATM* S&P 500 OTC options (30 contracts) -Long straddle 2-year ATM S&P 500 Index OTC options (30 contracts) 1 contract corresponds to 100 equities underlying - effective date May 10th 2013 * Strike price is based on the index level at NYSE market close on May 10th 2013.	USD	×	×	
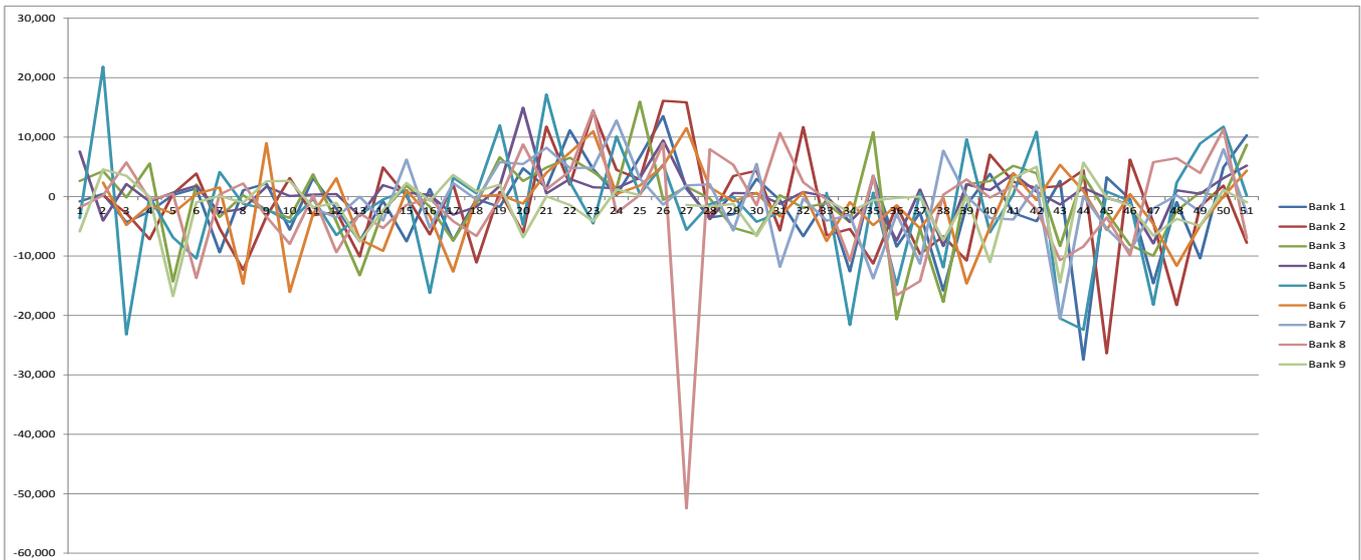
50-day P&L vector

P3	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		14	44	34	32	19	2	35	17
Bank 2	14		11	11	9	60	5	18	3
Bank 3	44	11		33	43	11	18	21	44
Bank 4	34	11	33		22	4	4	17	18
Bank 5	32	9	43	22		2	24	21	38
Bank 6	19	60	11	4	2		2	14	-2
Bank 7	2	5	18	4	24	2		8	-1
Bank 8	35	18	21	17	21	14	8		11
Bank 9	17	3	44	18	38	-2	-1	11	
P&L Stdev	7.25	8.16	7.95	7.84	9.94	7.34	6.97	9.57	6.53

Mean	7.95
Stdev	1.08
Stdev / Mean	13.55%

Correlations across one-year daily P&L observations

		Equity Portfolios						
		P1	P2	P3	P4	P5	P6	P7
VaR	Min	76.62	61.85	68.99	94.30	95.12	123.50	171.10
	Max	228.81	187.81	230.03	201.34	326.39	309.94	346.81
	Median	141.61	106.30	130.71	143.02	173.60	187.09	316.97
	Mean	158.58	119.85	133.26	140.02	195.45	203.99	287.25
	Stdev	48.92	43.65	47.75	35.94	80.23	67.52	62.29
	Stdev/Mean	31%	36%	36%	26%	41%	33%	22%
VaR Alt	Min	107.00	67.26	59.41	78.42	107.08	123.98	169.42
	Max	147.86	129.59	99.64	191.25	227.71	261.76	265.56
	Median	121.67	79.78	76.90	95.87	158.93	178.72	229.15
	Mean	122.18	86.38	76.76	108.81	156.43	181.73	223.75
	Stdev	10.89	18.27	12.92	34.45	41.97	48.41	30.61
	Stdev/Mean	9%	21%	17%	32%	27%	27%	14%
VaR Comp	Min	76.62	76.37	82.62	94.30	106.09	123.50	258.91
	Max	228.81	187.81	230.03	365.73	326.39	309.94	346.81
	Median	190.73	113.58	151.39	164.83	224.75	223.94	321.03
	Mean	168.41	130.25	144.56	170.67	212.99	221.30	313.79
	Stdev	51.50	44.68	44.89	81.87	79.11	70.71	30.61
	Stdev/Mean	31%	34%	31%	48%	37%	32%	10%

Main Risk Factors
- Material risk factors are spot prices of S&P and, specially, implied volatilities.

Comments
- Despite the fact that both options are ATM, the portfolio is not entirely delta neutral due to the different maturities of the long/short straddle; however, the effect of delta is limited, and the main risk factor stems from the implied volatility surface.
- The volatility surface (i.e. for every maturity, volatilities for the different prices should be constructed) is not directly observable.
- The P&L vector of banks using HS is quite different in terms of correlation (very low), but the level of volatility across banks is quite similar.
- Since the main driver behind VaR is volatility (and not correlation), the portfolio shows a relatively low level of dispersion for 'VaR Alt'.
- However, the dispersion increases very significantly when we look at VaR and 'VaR Comp' figures.
- Thus, dispersion seems to be increased by modelling options contemplated in regulation.

Equity Portfolios: Number 4 – Volatility trade number 2 (smile effect)

Portfolio # *Risk Factor*	Strategy	Base Currency	VaR	Stressed VaR	IRC
4 *Equity*	**Volatility Trade #2 (Smile effect) Long/short puts on FTSE 100** - Long 40 contracts of 3-month put options on FTSE 100 index (with a strike price that is 10% OTM* based on the end-of-day index value) - Short 40 contracts of 3-month put options on FTSE 100 index (with a strike price that is 10% ITM* based on the end-of-day index value) * Strike price is based on the index level at NYSE Liffe London market close on May 10th 2013 - 1 contract corresponds to 10 equities underlying	GBP	×	×	

50-day P&L vector

P4	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		99	94	98	99	97	98	99	94
Bank 2	99		93	98	98	97	98	98	94
Bank 3	94	93		92	91	90	92	93	91
Bank 4	98	98	92		98	96	98	98	93
Bank 5	99	98	91	98		98	98	98	93
Bank 6	97	97	90	96	98		96	98	92
Bank 7	98	98	92	98	98	96		98	95
Bank 8	99	98	93	98	98	98	98		94
Bank 9	94	94	91	93	93	92	95	94	
P&L Stdev	13.25	14.06	11.50	17.61	13.74	11.73	23.41	13.76	14.21
Mean	14.81								
Stdev	3.46								
Stdev / Mean	23.38%								

Correlations across one-year daily P&L observations

		Equity Portfolios						
		P1	P2	P3	P4	P5	P6	P7
VaR	Min	76.62	61.85	68.99	94.30	95.12	123.50	171.10
	Max	228.81	187.81	230.03	201.34	326.39	309.94	346.81
	Median	141.61	106.30	130.71	143.02	173.60	187.09	316.97
	Mean	158.58	119.85	133.26	140.02	195.45	203.99	287.25
	Stdev	48.92	43.65	47.75	35.94	80.23	67.52	62.29
	Stdev/Mean	31%	36%	36%	26%	41%	33%	22%
VaR Alt	Min	107.00	67.26	59.41	78.42	107.08	123.98	169.42
	Max	147.86	129.59	99.64	191.25	227.71	261.76	265.56
	Median	121.67	79.78	76.90	95.87	158.93	178.72	229.15
	Mean	122.18	86.38	76.76	108.81	156.43	181.73	223.75
	Stdev	10.89	18.27	12.92	34.45	41.97	48.41	30.61
	Stdev/Mean	9%	21%	17%	32%	27%	27%	14%
VaR Comp	Min	76.62	76.37	82.62	94.30	106.09	123.50	258.91
	Max	228.81	187.81	230.03	365.73	326.39	309.94	346.81
	Median	190.73	113.58	151.39	164.83	224.75	223.94	321.03
	Mean	168.41	130.25	144.56	170.67	212.99	221.30	313.79
	Stdev	51.50	44.68	44.89	81.87	79.11	70.71	30.61
	Stdev/Mean	31%	34%	31%	48%	37%	32%	10%

Main Risk Factors

Material risk factors are spot prices of FTSE and FTSE implied volatilities.

Comments

- The underlying is the FTSE, (observable market data).
- The volatility surface (i.e. for every maturity, volatilities for the different prices should be constructed) is not directly observable.
- The P&L vector of banks using HS is very similar in terms of correlation (very high), however, the level of volatility across banks is quite different.
- Since the main driver behind VaR is volatility (and not correlation), it is the equity portfolio which shows the highest level of dispersion for 'VaR Alt'.
- In this case, the dispersion increases for 'VaR Comp' figures (i.e. dispersion increases for banks using HS when modelling options contemplated in regulation are introduced) but, at the same time, dispersion is lower when all VaR figures are computed.

Equity Portfolios: Number 5 – Equity Variance Swap

Portfolio # *Risk Factor*	Strategy	Base Currency	VaR	Stressed VaR	IRC
5 *Equity*	**Equity Variance Swaps on Eurostoxx 50 (SX5E)** - Long ATM variance swap on Eurostoxx 50 with a maturity of 2 years, Vega notional amount of €50 k. The payoff is based on the following realized variance formula: $$\frac{252}{n-2}\sum_{i=1}^{n-1}[\ln(\frac{S_{i+1}}{S_i})]^2$$	EUR	×	×	

50 -day P&L vector

P5	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8
Bank 1		95	91	67	75	82	80	91
Bank 2	95		91	67	77	85	84	92
Bank 3	91	91		67	76	78	84	90
Bank 4	67	67	67		57	65	55	65
Bank 5	75	77	76	57		70	72	79
Bank 6	82	85	78	65	70		78	80
Bank 7	80	84	84	55	72	78		83
Bank 8	91	92	90	65	79	80	83	
P&L Stdev	13.64	16.58	23.44	18.56	18.87	15.73	22.05	27.36
Mean	19.53							
Stdev	4.22							
Stdev / Mean	21.59%							

Correlations across one-year daily P&L observations

		Equity Portfolios						
		P1	P2	P3	P4	P5	P6	P7
VaR	Min	76.62	61.85	68.99	94.30	95.12	123.50	171.10
	Max	228.81	187.81	230.03	201.34	326.39	309.94	346.81
	Median	141.61	106.30	130.71	143.02	173.60	187.09	316.97
	Mean	158.58	119.85	133.26	140.02	195.45	203.99	287.25
	Stdev	48.92	43.65	47.75	35.94	80.23	67.52	62.29
	Stdev/Mean	31%	36%	36%	26%	41%	33%	22%
VaR Alt	Min	107.00	67.26	59.41	78.42	107.08	123.98	169.42
	Max	147.86	129.59	99.64	191.25	227.71	261.76	265.56
	Median	121.67	79.78	76.90	95.87	158.93	178.72	229.15
	Mean	122.18	86.38	76.76	108.81	156.43	181.73	223.75
	Stdev	10.89	18.27	12.92	34.45	41.97	48.41	30.61
	Stdev/Mean	9%	21%	17%	32%	27%	27%	14%
VaR Comp	Min	76.62	76.37	82.62	94.30	106.09	123.50	258.91
	Max	228.81	187.81	230.03	365.73	326.39	309.94	346.81
	Median	190.73	113.58	151.39	164.83	224.75	223.94	321.03
	Mean	168.41	130.25	144.56	170.67	212.99	221.30	313.79
	Stdev	51.50	44.68	44.89	81.87	79.11	70.71	30.61
	Stdev/Mean	31%	34%	31%	48%	37%	32%	10%

Main Risk Factors

Material risk factors are spot prices of Eurostoxx constituents and Eurostoxx implied volatilities

Comments

- 8 out of the 9 banks using HS were able to model this portfolio.
- The P&L vector of banks using HS is relatively similar in terms of correlation (quite high), however, the level of volatility across banks is quite different.
- As a result of both factors this equity portfolio shows the second highest level of dispersion for 'VaR Alt' (together with portfolio 6).
- The dispersion increases for 'VaR Comp' and, especially, VaR figures (i.e. dispersion increases by modelling options contemplated in regulation).

Equity Portfolios: Number 6 – Barrier option

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
6 Equity	**Barrier Option** - Long 40 contracts of 3-month ATM* S&P 500 down-and-in put options with a barrier level that is 10% OTM* and continuous (monitoring frequency. 1 contract corresponds to 100 equities underlying * Strike price is based on the index level at NYSE market close on May 10th 2013.	USD	×	×	

50-day P&L vector

P6	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8
Bank 1		99	49	47	73	64	96	48
Bank 2	99		54	52	75	67	97	53
Bank 3	49	54		75	79	86	61	93
Bank 4	47	52	75		69	76	59	78
Bank 5	73	75	79	69		82	79	80
Bank 6	64	67	86	76	82		73	89
Bank 7	96	97	61	59	79	73		60
Bank 8	48	53	93	78	80	89	60	
P&L Stdev	19.88	24.28	25.53	30.38	16.78	20.80	26.36	33.04
Mean	24.63							
Stdev	5.08							
Stdev / Mean	20.63%							

Correlations across one-year daily P&L observations

		Equity Portfolios						
		P1	P2	P3	P4	P5	P6	P7
VaR	Min	76.62	61.85	68.99	94.30	95.12	123.50	171.10
	Max	228.81	187.81	230.03	201.34	326.39	309.94	346.81
	Median	141.61	106.30	130.71	143.02	173.60	187.09	316.97
	Mean	158.58	119.85	133.26	140.02	195.45	203.99	287.25
	Stdev	48.92	43.65	47.75	35.94	80.23	67.52	62.29
	Stdev/Mean	31%	36%	36%	26%	41%	33%	22%
VaR Alt	Min	107.00	67.26	59.41	78.42	107.08	123.98	169.42
	Max	147.86	129.59	99.64	191.25	227.71	261.76	265.56
	Median	121.67	79.78	76.90	95.87	158.93	178.72	229.15
	Mean	122.18	86.38	76.76	108.81	156.43	181.73	223.75
	Stdev	10.89	18.27	12.92	34.45	41.97	48.41	30.61
	Stdev/Mean	9%	21%	17%	32%	27%	27%	14%
VaR Comp	Min	76.62	76.37	82.62	94.30	106.09	123.50	258.91
	Max	228.81	187.81	230.03	365.73	326.39	309.94	346.81
	Median	190.73	113.58	151.39	164.83	224.75	223.94	321.03
	Mean	168.41	130.25	144.56	170.67	212.99	221.30	313.79
	Stdev	51.50	44.68	44.89	81.87	79.11	70.71	30.61
	Stdev/Mean	31%	34%	31%	48%	37%	32%	10%

Main Risk Factors

Material risk factors are spot prices of S&P and S&P implied volatilities

Comments

- 8 out of the 9 banks using HS were able to model this portfolio.
- Similar to portfolio 5 the P&L vector of banks using HS is relatively similar in terms of correlation (quite high), however, the level of volatility across banks is also quite different.
- As a result of both factors this equity portfolio shows the second highest level of dispersion for 'VaR Alt' (together with portfolio 5).
- Again, as in the previous portfolio, the dispersion increases for 'VaR Comp' and VaR, though not to the same extent.

Equity Portfolios: Number 7 – Quanto index call

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
6 *Equity*	**Quanto index call** - 3Year USD Quanto Call on Eurostoxx 50	USD	×	×	
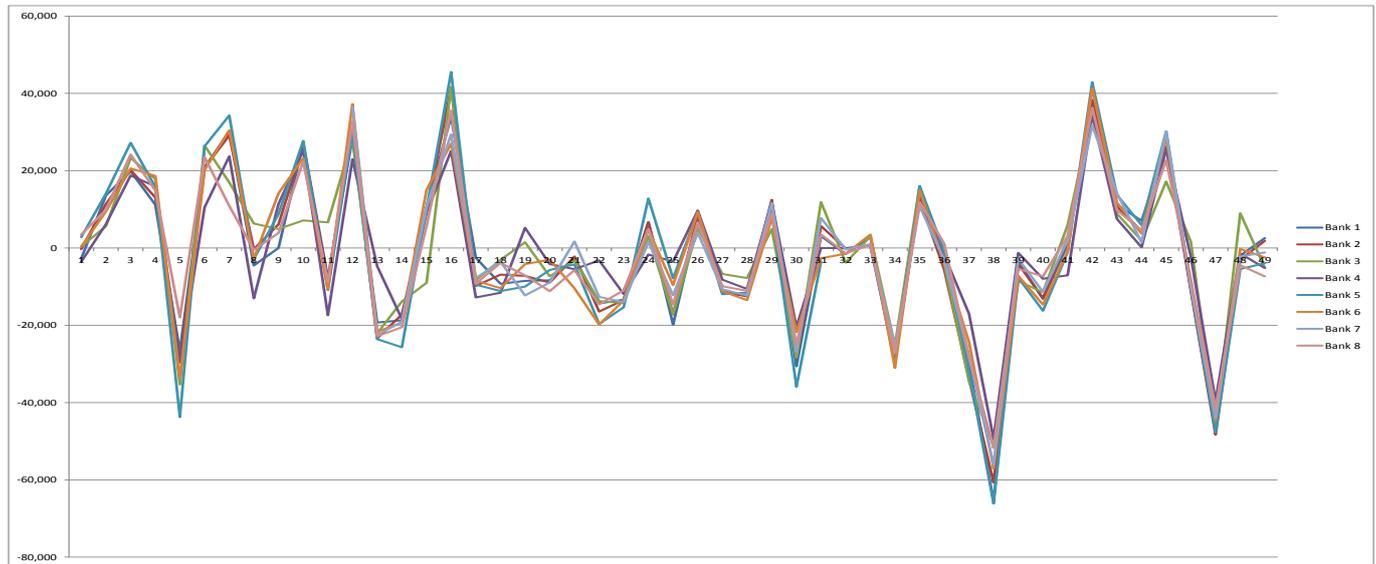
50-day P&L vector

P7	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8
Bank 1		99	91	93	98	97	97	98
Bank 2	99		91	93	98	97	97	98
Bank 3	91	91		83	89	88	89	91
Bank 4	93	93	83		95	95	91	94
Bank 5	98	98	89	95		98	97	97
Bank 6	97	97	88	95	98		95	97
Bank 7	97	97	89	91	97	95		97
Bank 8	98	98	91	94	97	97	97	
P&L Stdev	22.76	23.03	18.42	20.14	26.07	23.61	22.20	19.94
Mean	22.02							
Stdev	2.28	Correlations across one-year daily P&L observations						
Stdev / Mean	10.33%							

		Equity Portfolios						
		P1	P2	P3	P4	P5	P6	P7
VaR	Min	76.62	61.85	68.99	94.30	95.12	123.50	171.10
	Max	228.81	187.81	230.03	201.34	326.39	309.94	346.81
	Median	141.61	106.30	130.71	143.02	173.60	187.09	316.97
	Mean	158.58	119.85	133.26	140.02	195.45	203.99	287.25
	Stdev	48.92	43.65	47.75	35.94	80.23	67.52	62.29
	Stdev/Mean	31%	36%	36%	26%	41%	33%	22%
VaR Alt	Min	107.00	67.26	59.41	78.42	107.08	123.98	169.42
	Max	147.86	129.59	99.64	191.25	227.71	261.76	265.56
	Median	121.67	79.78	76.90	95.87	158.93	178.72	229.15
	Mean	122.18	86.38	76.76	108.81	156.43	181.73	223.75
	Stdev	10.89	18.27	12.92	34.45	41.97	48.41	30.61
	Stdev/Mean	9%	21%	17%	32%	27%	27%	14%
VaR Comp	Min	76.62	76.37	82.62	94.30	106.09	123.50	258.91
	Max	228.81	187.81	230.03	365.73	326.39	309.94	346.81
	Median	190.73	113.58	151.39	164.83	224.75	223.94	321.03
	Mean	168.41	130.25	144.56	170.67	212.99	221.30	313.79
	Stdev	51.50	44.68	44.89	81.87	79.11	70.71	30.61
	Stdev/Mean	31%	34%	31%	48%	37%	32%	10%

Main Risk Factors

Material risk factors are EUR- and USD swap curves, spot prices of Eurostoxx constituents, Eurostoxx implied volatilities and FX-rate returns

Comments

- 8 out of the 9 banks using HS were able to model this portfolio.
- Apart from equity risk, the portfolio incorporates FX risk.
- The underlying (Eurostoxx) is denominated in a different currency than the payment (USD). This does not add much complexity to the portfolio.
- Similar to portfolios 1 & 4 the P&L vector of banks using HS is very similar in terms of correlation (very high).
- The level of volatility across banks is also quite similar (lowest dispersion in volatilities after portfolio 1).
- As a result of both factors, this equity portfolio shows the second lowest level of dispersion for 'VaR Alt'.
- The dispersion increases for 'VaR', but this is not the case for 'VaR Comp'.

3.9   Interest Rate portfolios

The following 5 portfolios have been assessed:

Portfolio number	Description
8	Curve flattener trade: Long long-term and short short-term treasuries
9	Interest rate swap
10	2 year swaption on 10 year interest rate swap
11	LIBOR range accrual
12	Inflation zero coupon swap

The sample size for each of the 5 portfolios is as follows (see section 3.2.3 for further details):

	P8	P9	P10	P11	P12
VaR	13	13	12	12	11
SVaR	13	13	12	12	11
IRC	10				

The following table (5) presents the minimum, maximum, median, mean, and standard deviation as well as the variability (standard deviation / mean) for the 3 alternative VaR metrics assessed in this report, as well as for the Stressed VaR. The IRC is also provided for portfolio 8 (comprising sovereign bonds).

		Interest Rate Portfolios					Dispersion
		P8	P9	P10	P11	P12	2013
VaR	Min	102.14	78.27	35.77	101.38	111.96	36%
	Max	276.09	186.94	78.09	481.81	691.88	
	Median	167.83	154.89	49.03	248.93	186.74	
	Mean	165.17	147.38	50.26	258.19	226.81	
	Stdev	44.24	30.63	11.65	99.23	157.47	
	Stdev/Mean	27%	21%	23%	38%	69%	
VaR Alt	Min	123.88	90.14	30.38	71.03	112.01	22%
	Max	285.52	163.42	50.89	257.66	169.33	
	Median	157.19	154.53	38.79	166.59	166.47	
	Mean	171.64	141.09	39.29	164.87	155.31	
	Stdev	46.59	25.89	7.03	57.54	19.06	
	Stdev/Mean	27%	18%	18%	35%	12%	
VaR Comp	Min	138.52	99.28	35.77	101.38	111.96	25%
	Max	276.09	186.94	78.09	481.81	222.64	
	Median	167.86	155.57	49.03	252.16	179.62	
	Mean	177.36	153.08	50.10	254.75	179.27	
	Stdev	39.69	25.50	11.98	104.52	35.29	
	Stdev/Mean	22%	17%	24%	41%	20%	
SVaR	Min	96.61	99.28	30.75	246.06	183.47	34%
	Max	265.71	252.11	130.33	980.73	433.07	
	Median	177.20	145.76	58.95	487.53	401.33	
	Mean	175.59	161.29	67.02	535.76	361.52	
	Stdev	40.49	54.50	32.90	210.67	89.76	
	Stdev/Mean	23%	34%	49%	39%	25%	
IRC	Min	11.57					91%
	Max	424.86					
	Median	108.28					
	Mean	151.14					
	Stdev	137.64					
	Stdev/Mean	91%					

Table 5: Dispersion results - Portfolios 8 to 12

Variability for the homogenised VaR (i.e. VaR Alt) is clearly lower than that observed for the regulatory VaR metric, and overall variability decreases by nearly 40% (i.e. from 36% to 22%) for the VaR Alt, however this significant decrease is biased by portfolio 12, where an outlier value for a non-HS bank increases the variability significantly for the VaR metric (60%). The following charts (4 and 5) show scatter plots of the VaR and VaR Alt results for the interest rate portfolios.
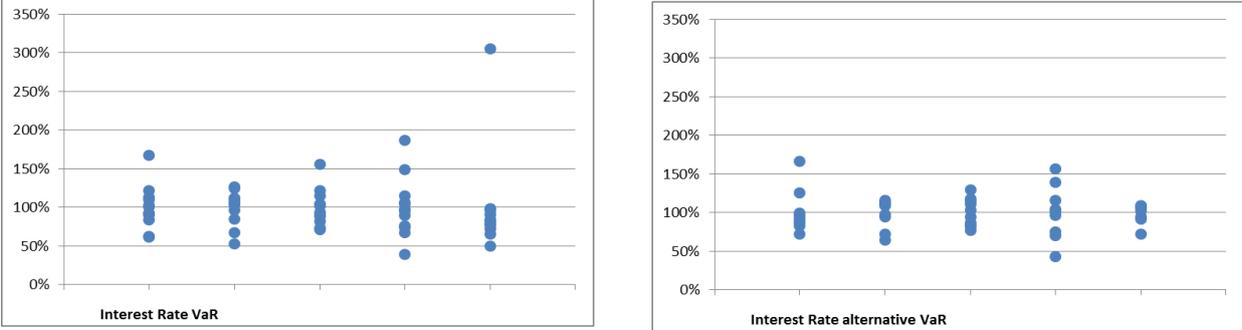
Charts 4 & 5: VaR and VaR Alt normalised dispersion – Portfolios 8 to 12

In general, variability also decreases for banks using HS, though for portfolios 10 and 11 it slightly increases. A more detailed analysis of the differences observed in these three risk metrics by individual portfolio is provided in section 3.9.1.

It is significant that portfolio 8, which comprises very liquid sovereign bonds shows clearly more dispersion than OTC portfolios such as 9 (IRS) or 10 (Swaption) in all VaR metrics (but especially on the Alternative VaR). This is surprising considering that the selected bonds have very little or no market price uncertainty and are fully observable in the market, whilst modelling an OTC derivative implies a number of non-observable inputs (especially for the Swaption portfolio).

Regarding the IRC metric (see scatter plots in chart 6 below) variability is also very high for this portfolio (93%). This result for the IRC metric for sovereign risk is also verified for portfolios 19 & 20, which show higher dispersion than similar 'plain vanilla' corporate portfolios (21 to 24).
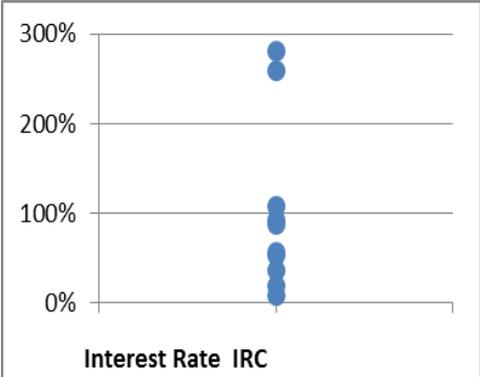
Chart 6: IRC normalised dispersion – Portfolio 8

There is some evidence that more bespoke portfolios, such as 11 ('Range Accrual') show greater variability in the three VaR metrics considered than plain vanilla ones. This is not the case for portfolio 12, which shows a very low dispersion for the Alt VaR metric. As mentioned above, due to the presence in portfolio 12 of a very high VaR figure delivered by a non-HS bank, variability is very high for the VaR regulatory charge.

As regards Stressed VaR, (see scatter plots in chart 7 below) the level of dispersion is higher than for VaR for three of the 5 portfolios. However, due to the extreme variability in VaR produced by the outlier value in portfolio 12, the average SVaR dispersion for these portfolios is actually lower than for VaR.
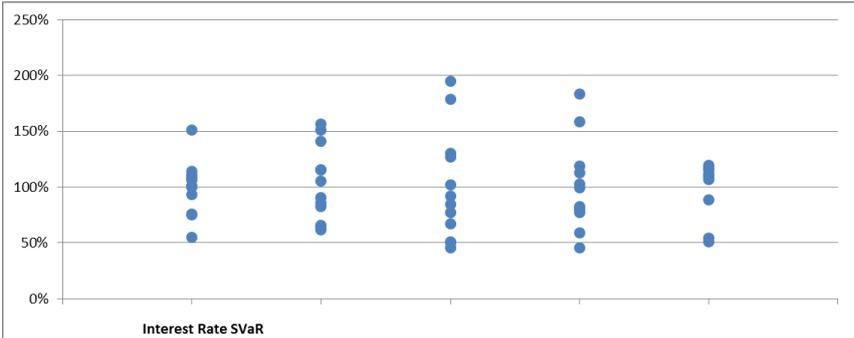
Chart 7: SVaR normalised dispersion – Portfolios 8 to 12

Interest Rate Portfolios: Number 8 – Curve Flattener Trade.

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
8 Interest Rate	**Curve Flattener Trade** ***Long long-term & short short-term treasuries*** -Long €5MM 10-year German Treasury bond (ISIN: DE0001102309 Expiry February 2nd 2023) -Short €20MM 2-year German Treasury note (ISIN: DE0001137404 Expiry December 12th 2014)	EUR	×	×	×
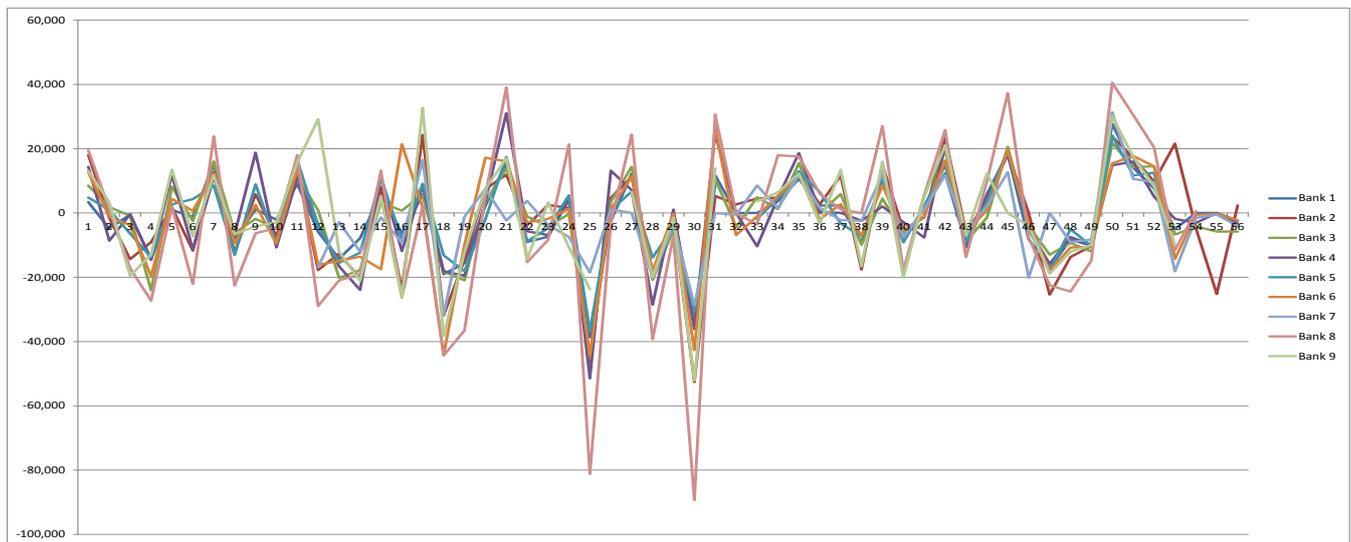
50-day P&L vector

P8	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		88	93	86	91	86	78	93	85
Bank 2	88		91	83	86	86	84	89	91
Bank 3	93	91		86	91	88	83	91	88
Bank 4	86	83	86		84	81	75	83	79
Bank 5	91	86	91	84		82	75	88	82
Bank 6	86	86	88	81	82		80	86	85
Bank 7	78	84	83	75	75	80		77	87
Bank 8	93	89	91	83	88	86	77		85
Bank 9	85	91	88	79	82	85	87	85	
P&L Stdev	15.82	19.34	17.01	22.27	17.49	18.62	17.39	29.60	19.70
Mean	19.69								
Stdev	3.92								
Stdev / Mean	19.92%								

Correlations across one-year daily P&L observations

		Interest Rate Portfolios				
		P8	P9	P10	P11	P12
VaR	Min	102.14	78.27	35.77	101.38	111.96
	Max	276.09	186.94	78.09	481.81	691.88
	Median	167.83	154.89	49.03	248.93	186.74
	Mean	165.17	147.38	50.26	258.19	226.81
	Stdev	44.24	30.63	11.65	99.23	157.47
	Stdev/Mean	27%	21%	23%	38%	69%
VaR Alt	Min	123.88	90.14	30.38	71.03	112.01
	Max	285.52	163.42	50.89	257.66	169.33
	Median	157.19	154.53	38.79	166.59	166.47
	Mean	171.64	141.09	39.29	164.87	155.31
	Stdev	46.59	25.89	7.03	57.54	19.06
	Stdev/Mean	27%	18%	18%	35%	12%
VaR Comp	Min	138.52	99.28	35.77	101.38	111.96
	Max	276.09	186.94	78.09	481.81	222.64
	Median	167.86	155.57	49.03	252.16	179.62
	Mean	177.36	153.08	50.10	254.75	179.27
	Stdev	39.69	25.50	11.98	104.52	35.29
	Stdev/Mean	22%	17%	24%	41%	20%

Main Risk Factors

Material risk factors are interest rates and sovereign spreads

Comments

- Apart from interest rate risk, the portfolio incorporates credit risk.
- The correlation in the P&L vectors is relatively high, however the underlying bonds are both observable and liquid assets, so a high correlation would be expected (even higher than that observed, especially comparing it with that shown in portfolios 9 & 10).
- Quite remarkably, the level of volatility in the P&L is very different across banks.
- As a result of both factors this portfolio shows the second highest level of dispersion for 'VaR Alt'.
- The dispersion is significantly higher than for 'pure' interest rate portfolios (such as 9 & 10), and thus sovereign credit risk seems to be an important variability driver.
- The dispersion observed is the same for 'VaR'; however dispersion is lower for 'VaR Comp'.
- This would suggest that the variability is entirely related to banks' modelling and not to options contemplated in regulation.

Interest Rate Portfolios: Number 9 – Interest rate Swap.

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
9 *Interest Rate*	**Interest rate swap - Bloomberg code eusw10v3 curncy** - Receive fixed rate and pay floating rate - Fixed leg:, pay annually - Floating leg: 3-month Euribor rate, pay quarterly - Notional: €5mm, - Roll convention and calendar: standard - Effective date May 10th 2013 (i.e. rates to be used are those at the market as of May 10th) - Maturity date May 10th 2023	EUR	✕	✕	
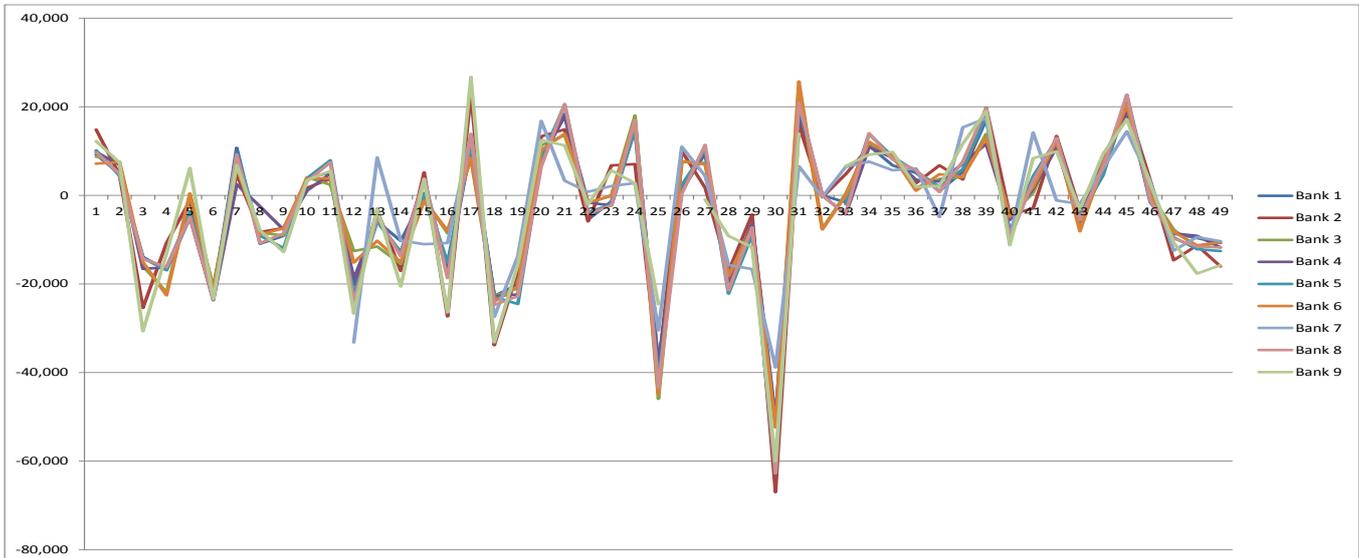
50-day P&L vector

P9	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		95	97	98	98	97	86	99	93
Bank 2	95		96	95	95	95	91	95	97
Bank 3	97	96		97	96	100	87	97	93
Bank 4	98	95	97		97	97	85	98	93
Bank 5	98	95	96	97		96	85	99	93
Bank 6	97	95	100	97	96		87	97	93
Bank 7	86	91	87	85	85	87		86	94
Bank 8	99	95	97	98	99	97	86		93
Bank 9	93	97	93	93	93	93	94	93	
P&L Stdev	16.83	17.17	16.47	16.90	16.99	16.62	16.56	17.34	17.02
Mean	16.88								
Stdev	0.27								
Stdev / Mean	1.62%								

Correlations across one-year daily P&L observations

		Interest Rate Portfolios				
		P8	**P9**	**P10**	**P11**	**P12**
VaR	Min	102.14	78.27	35.77	101.38	111.96
	Max	276.09	186.94	78.09	481.81	691.88
	Median	167.83	154.89	49.03	248.93	186.74
	Mean	165.17	147.38	50.26	258.19	226.81
	Stdev	44.24	30.63	11.65	99.23	157.47
	Stdev/Mean	27%	21%	23%	38%	69%
VaR Alt	Min	123.88	90.14	30.38	71.03	112.01
	Max	285.52	163.42	50.89	257.66	169.33
	Median	157.19	154.53	38.79	166.59	166.47
	Mean	171.64	141.09	39.29	164.87	155.31
	Stdev	46.59	25.89	7.03	57.54	19.06
	Stdev/Mean	27%	18%	18%	35%	12%
VaR Comp	Min	138.52	99.28	35.77	101.38	111.96
	Max	276.09	186.94	78.09	481.81	222.64
	Median	167.86	155.57	49.03	252.16	179.62
	Mean	177.36	153.08	50.10	254.75	179.27
	Stdev	39.69	25.50	11.98	104.52	35.29
	Stdev/Mean	22%	17%	24%	41%	20%

Main Risk Factors

Material risk factors are interest rates

Comments

- The correlation in the P&L vectors is high, and the level of volatility in the P&L is very similar across banks.
- This is notable, considering the underlying is an OTC derivative (i.e. an Interest Rate Swap).
- As a result of both factors this portfolio shows the second lowest level of dispersion for 'VaR Alt'.
- The dispersion observed is slightly bigger for 'VaR', however dispersion is slightly lower for 'VaR Comp'.
- This would suggest that the variability in this case is more related to banks' modelling and not so much to options contemplated in regulation.

Interest Rate Portfolios: Number 10 – 2 year Swaption.

Portfolio # *Risk Factor*	Strategy	Base Currency	VaR	Stressed VaR	IRC
10 *Interest Rate*	**2-year swaption on 10-year interest rate swap**	EUR	×	×	
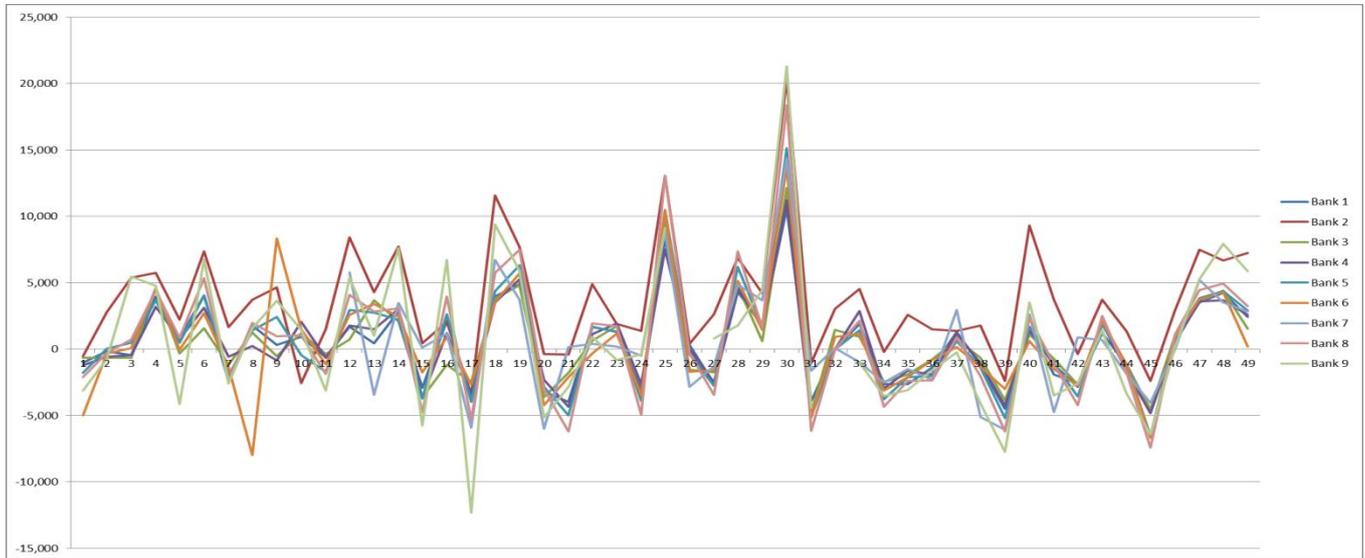
50-day P&L vector

P10	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		87	96	93	97	94	85	86	91
Bank 2	87		87	82	89	87	87	81	91
Bank 3	96	87		92	95	96	86	89	91
Bank 4	93	82	92		91	90	82	83	82
Bank 5	97	89	95	91		94	85	91	91
Bank 6	94	87	96	90	94		86	88	90
Bank 7	85	87	86	82	85	86		76	90
Bank 8	86	81	89	83	91	88	76		82
Bank 9	91	91	91	82	91	90	90	82	
P&L Stdev	4.19	4.82	4.09	4.48	4.84	4.44	5.11	5.91	6.66
Mean	4.95								
Stdev	0.80								
Stdev / Mean	16.07%								

Correlations across one-year daily P&L observations

		Interest Rate Portfolios				
		P8	**P9**	**P10**	**P11**	**P12**
VaR	Min	102.14	78.27	35.77	101.38	111.96
	Max	276.09	186.94	78.09	481.81	691.88
	Median	167.83	154.89	49.03	248.93	186.74
	Mean	165.17	147.38	50.26	258.19	226.81
	Stdev	44.24	30.63	11.65	99.23	157.47
	Stdev/Mean	27%	21%	23%	38%	69%
VaR Alt	Min	123.88	90.14	30.38	71.03	112.01
	Max	285.52	163.42	50.89	257.66	169.33
	Median	157.19	154.53	38.79	166.59	166.47
	Mean	171.64	141.09	39.29	164.87	155.31
	Stdev	46.59	25.89	7.03	57.54	19.06
	Stdev/Mean	27%	18%	18%	35%	12%
VaR Comp	Min	138.52	99.28	35.77	101.38	111.96
	Max	276.09	186.94	78.09	481.81	222.64
	Median	167.86	155.57	49.03	252.16	179.62
	Mean	177.36	153.08	50.10	254.75	179.27
	Stdev	39.69	25.50	11.98	104.52	35.29
	Stdev/Mean	22%	17%	24%	41%	20%

Main Risk Factors

Material risk factors are EUR-swap curve and Swaption implied volatility returns

Comments

- Though not to the same extent as for portfolio 9, the correlation in the P&L vectors is also high, and the level of volatility in the P&L is relatively similar across banks.
- This is notable considering that the underlying is an OTC complex option (i.e. a Swaption)
- As a result of both factors this portfolio shows, together with 9, the second lowest level of dispersion for 'VaR Alt'.
- The dispersion observed is bigger for 'VaR' and 'VaR Comp'.
- This is also the case for portfolios 11 & 12, which also incorporate bespoke derivatives.
- This would suggest that the variability for non-plain-Vanilla derivatives is related both to banks' modelling choices and as well as options contemplated in regulation.

Interest Rate Portfolios: Number 11 – Libor Range Accrual.

Portfolio # *Risk Factor*	Strategy	Base Currency	VaR	Stressed VaR	IRC
11 *Interest Rate*	**LIBOR Range Accrual** Structured coupon indexed on the number of days in the interest rate period when the Libor fixes in a predetermined range	USD	×	×	
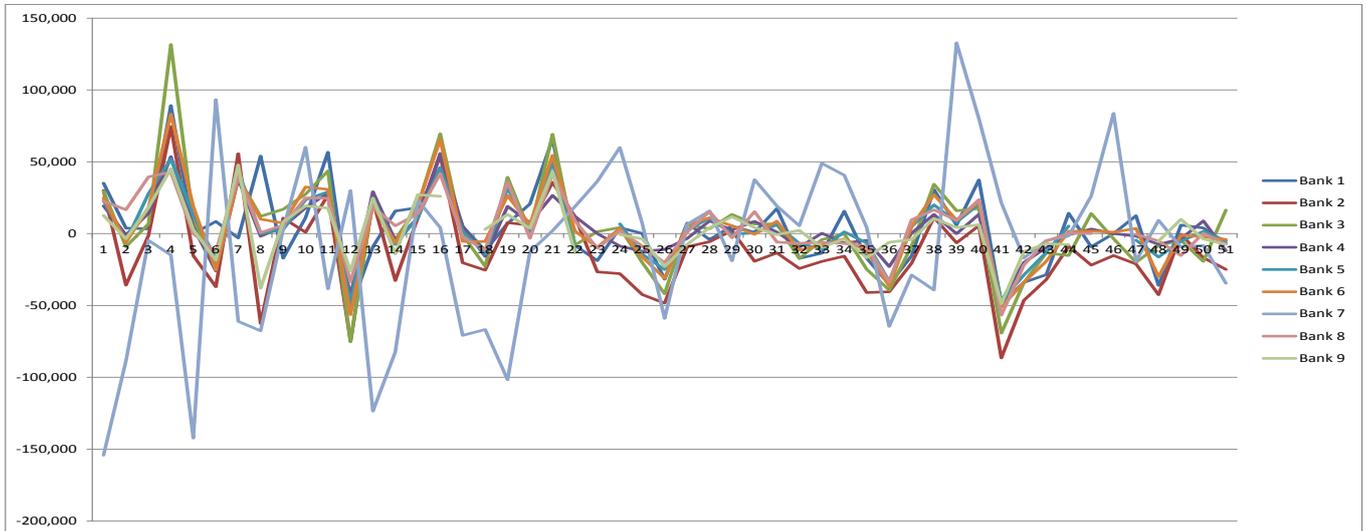
50-day P&L vector

P11	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		69	73	61	74	77	-12	69	59
Bank 2	69		85	85	90	90	-9	82	92
Bank 3	73	85		77	87	89	-8	81	77
Bank 4	61	85	77		82	83	-12	84	81
Bank 5	74	90	87	82		94	-15	88	81
Bank 6	77	90	89	83	94		-11	87	83
Bank 7	-12	-9	-8	-12	-15	-11		-12	-8
Bank 8	69	82	81	84	88	87	-12		78
Bank 9	59	92	77	81	81	83	-8	78	
P&L Stdev	24.64	30.66	32.54	17.55	24.94	28.62	69.71	24.48	17.77
Mean	25.15								
Stdev	5.12								
Stdev / Mean	20.37%								

Correlations across one-year daily P&L observations

		Interest Rate Portfolios				
		P8	P9	P10	P11	P12
VaR	Min	102.14	78.27	35.77	101.38	111.96
	Max	276.09	186.94	78.09	481.81	691.88
	Median	167.83	154.89	49.03	248.93	186.74
	Mean	165.17	147.38	50.26	258.19	226.81
	Stdev	44.24	30.63	11.65	99.23	157.47
	Stdev/Mean	27%	21%	23%	38%	69%
VaR Alt	Min	123.88	90.14	30.38	71.03	112.01
	Max	285.52	163.42	50.89	257.66	169.33
	Median	157.19	154.53	38.79	166.59	166.47
	Mean	171.64	141.09	39.29	164.87	155.31
	Stdev	46.59	25.89	7.03	57.54	19.06
	Stdev/Mean	27%	18%	18%	35%	12%
VaR Comp	Min	138.52	99.28	35.77	101.38	111.96
	Max	276.09	186.94	78.09	481.81	222.64
	Median	167.86	155.57	49.03	252.16	179.62
	Mean	177.36	153.08	50.10	254.75	179.27
	Stdev	39.69	25.50	11.98	104.52	35.29
	Stdev/Mean	22%	17%	24%	41%	20%

Main Risk Factors

Material risk factors are USD-swap curve and Swaption implied volatility returns

Comments

- 9 banks provided data for this portfolio; however Bank 7 was identified as an outlier based on its VaR results and excluded from the data analysis.
- The outlier condition of Bank 7 can also be observed in the P&L chart, correlation matrix and volatility level.
- Analysing the data from the 8 remaining banks, it can be observed that the correlation in the P&L vectors is relatively high, though the level of volatility in the P&L is quite different across banks.
- As a result of both factors this portfolio shows the highest level of dispersion for 'VaR Alt'.
- The dispersion observed is bigger for 'VaR' and 'VaR Comp'.
- This is also the case for portfolios 10 & 12, which also incorporate bespoke derivatives.
- This would suggest that the variability for non-plain-Vanilla derivatives is related both to banks' modelling choices and to options contemplated in regulation.

EBA European Banking Authority

Interest Rate Portfolios: Number 12 – Inflation Zero Coupon Swap.

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
12 Interest Rate	**Inflation zero coupon swap** EURHICPX index 10Y maturity par zero coupon swap	EUR	✗	✗	
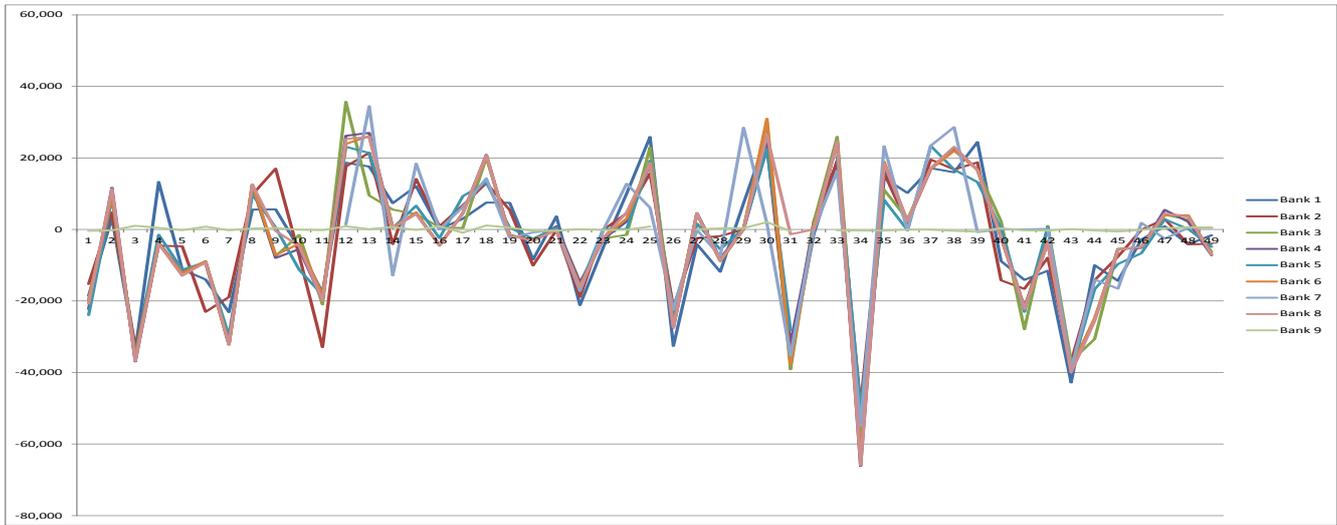
50-day P&L vector

P12	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		84	89	92	90	92	58	92	40
Bank 2	84		77	80	79	80	59	82	36
Bank 3	89	77		95	92	95	54	92	47
Bank 4	92	80	95		96	100	56	95	44
Bank 5	90	79	92	96		96	55	90	43
Bank 6	92	80	95	100	96		56	94	46
Bank 7	58	59	54	56	55	56		58	22
Bank 8	92	82	92	95	90	94	58		44
Bank 9	40	36	47	44	43	46	22	44	
P&L Stdev	16.72	17.43	17.91	17.61	15.93	17.51	19.14	16.62	0.57

Mean	17.36
Stdev	0.91
Stdev / Mean	5.22%

Correlations across one-year daily P&L observations

		Interest Rate Portfolios				
		P8	P9	P10	P11	P12
VaR	Min	102.14	78.27	35.77	101.38	111.96
	Max	276.09	186.94	78.09	481.81	691.88
	Median	167.83	154.89	49.03	248.93	186.74
	Mean	165.17	147.38	50.26	258.19	226.81
	Stdev	44.24	30.63	11.65	99.23	157.47
	Stdev/Mean	27%	21%	23%	38%	69%
VaR Alt	Min	123.88	90.14	30.38	71.03	112.01
	Max	285.52	163.42	50.89	257.66	169.33
	Median	157.19	154.53	38.79	166.59	166.47
	Mean	171.64	141.09	39.29	164.87	155.31
	Stdev	46.59	25.89	7.03	57.54	19.06
	Stdev/Mean	27%	18%	18%	35%	12%
VaR Comp	Min	138.52	99.28	35.77	101.38	111.96
	Max	276.09	186.94	78.09	481.81	222.64
	Median	167.86	155.57	49.03	252.16	179.62
	Mean	177.36	153.08	50.10	254.75	179.27
	Stdev	39.69	25.50	11.98	104.52	35.29
	Stdev/Mean	22%	17%	24%	41%	20%

Main Risk Factors

Material risk factors are EUR-swap curve and real rates

Comments

- 9 banks provided data for this portfolio; however bank 9 was identified as an outlier based on their VaR results and excluded from the data analysis.
- The outlier condition of Bank 9 can also be observed in the P&L chart, correlation matrix and, especially, P&L volatility level (extremely low).
- Analysing the data from the 8 remaining banks it can be observed that the correlation in the P&L vectors is relatively high, and the level of volatility in the P&L is quite similar across banks.
- As a result of both factors this portfolio shows the lowest level of dispersion for 'VaR Alt'.
- The dispersion observed is for 'VaR' is the highest (69%), and dispersion also grows for 'VaR Comp' but clearly not to the same extent.
- This has been caused by a rather extreme value in VaR obtained from a bank that uses Montecarlo Simulation to calculate its VaR.

3.10 Foreign Exchange (FX) portfolios

The following 4 portfolios have been assessed:

Portfolio number	Description
12	Covered FX Call: Short EUR/USD and short put EUR call USD option
14	Mark to market cross-currency basis swap: 2 year USD 3M LIBOR vs RUR 3M EURIBOR Swap
15	Knock-out currency option
16	Double no-touch binary currency option

The sample size for each of the 4 portfolios is as follows (see section 2.2 for further details):

	P13	P14	P15	P16
VaR	13	11	13	12
SVaR	13	11	13	12

The following table (6) presents the minimum, maximum, median, mean, and standard deviation as well as the variability (standard deviation / mean) for the 3 alternative VaR metrics assessed in this report, as well as for the Stressed VaR.

		FX Portfolios				Dispersion
		P13	P14	P15	P16	2013
VaR	Min	288.33	13.82	67.73	133.07	30%
	Max	472.23	89.77	314.57	341.28	
	Median	372.26	69.88	181.20	192.28	
	Mean	364.87	61.20	170.29	202.79	
	Stdev	52.88	23.50	67.50	55.75	
	Stdev/Mean	14%	38%	40%	27%	
VaR Alt	Min	350.18	39.04	65.43	104.57	19%
	Max	522.73	73.33	189.23	149.61	
	Median	441.96	44.52	121.21	121.83	
	Mean	440.97	48.53	122.49	123.09	
	Stdev	52.67	10.93	35.19	16.86	
	Stdev/Mean	12%	23%	29%	14%	
VaR Comp	Min	288.33	44.62	69.37	133.07	26%
	Max	472.23	89.77	314.57	341.28	
	Median	376.51	76.10	184.65	200.05	
	Mean	380.70	69.37	175.40	207.18	
	Stdev	49.87	16.73	68.13	60.24	
	Stdev/Mean	13%	24%	39%	29%	
SVaR	Min	414.89	48.25	168.17	256.48	32%
	Max	1,560.72	212.68	513.30	613.42	
	Median	976.31	159.57	328.70	400.45	
	Mean	998.28	148.74	305.59	405.39	
	Stdev	325.07	54.47	104.02	103.98	
	Stdev/Mean	33%	37%	34%	26%	

Table 6: Dispersion results - Portfolios 13 to 16.

Variability for the homogenised VaR (i.e. VaR Alt) is clearly lower than that observed for the regulatory VaR metric for all portfolios. Overall variability decreases by 37% (i.e. from 30% to 19%) for the VaR Alt. Variability also decreases generally for banks using HS, though for portfolio 11 it slightly

increases. A more detailed analysis of the differences observed in these three risk metrics by individual portfolio is provided in section 3.10.1.

Portfolio 13 show the lowest level of dispersion for the three VaR metrics, whilst portfolio 15 ('knock-out option') show the greatest variability in the three VaR metric considered. This result would support the evidence of greater variability for complex portfolios, however this is not the case for portfolio 16 ('double no touch option'), which shows a very low dispersion, especially for the Alt VaR metric.

The Currency Swap included in portfolio 14 was initially considered as a plain vanilla instrument; however, as it can be observed in the P&L analysis produced in section 3.10.1, there is evidence that it might have been interpreted differently by some of the participating banks, showing initially some outlier values and a very high dispersion.

The following charts (8 and 9) show scatter plots of the VaR and VaR Alt results for the FX portfolios.
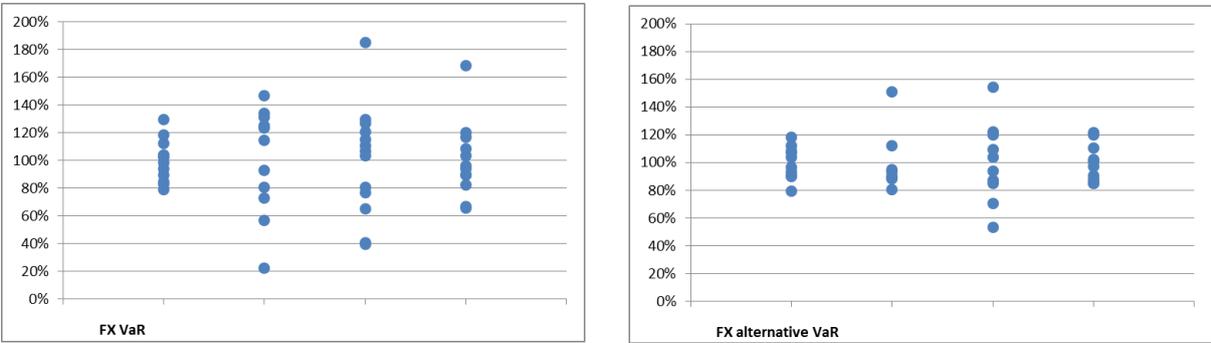
Charts 8 & 9: VaR and VaR Alt normalised dispersion – Portfolios 13 to 16

As regards Stressed VaR, (see scatter plots in chart 10 below) the level of dispersion is actually slightly lower than for VaR for three of the 4 portfolios. However, due to the much higher variability observed in portfolio 13, the average SVaR dispersion for these FX portfolios is higher than for VaR.
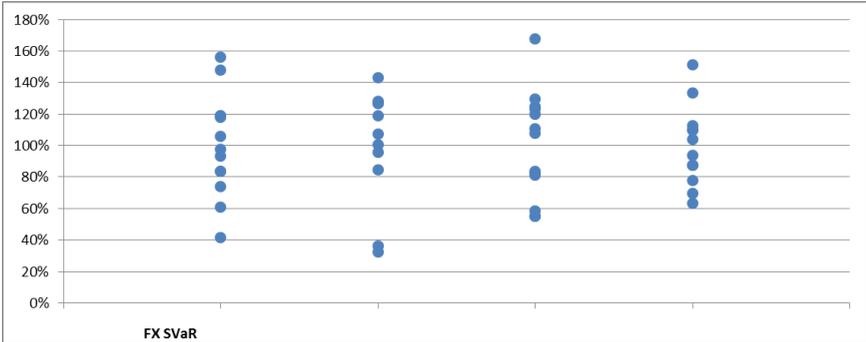
Chart 10: SVaR normalised dispersion – Portfolios 13 to 16

F/X Portfolios: Number 13 – Short EUR/USD and short put EUR call USD option.

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
13 F/X	**Covered F/X Call** - **Short EUR/USD and short put EUR call USD option** - Short 3-month EUR/USD forward contracts (i.e. long USD short EUR) with US$20MM notional purchased at the EUR/USD ECB reference rate as of end of day May 10th 2013 - Short 3-month put EUR call USD option notional US$ 40MM (i.e. short USD against EUR) with strike price corresponding to the three-month forward exchange rate as of end of day May 10th 2013 - effective date May 10th 2013 - expiry date August 12th 2013	EUR	×	×	

50-day P&L vector

| P13	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		92	99	98	96	96	93	54	56
Bank 2	92		92	92	90	90	91	62	64
Bank 3	99	92		99	97	96	93	54	56
Bank 4	98	92	99		97	95	92	55	57
Bank 5	96	90	97	97		94	91	50	53
Bank 6	96	90	96	95	94		90	55	57
Bank 7	93	91	93	92	91	90		61	63
Bank 8	54	62	54	55	50	55	61		98
Bank 9	56	64	56	57	53	57	63	98	
P&L Stdev	48.21	44.93	46.00	42.49	46.04	43.28	41.96	41.53	59.58
Mean	46.00								
Stdev	5.23								
Stdev / Mean	11.38%								

Correlations across one-year daily P&L observations

		FX Portfolios			
		P13	P14	P15	P16
VaR	Min	288.33	13.82	67.73	133.07
	Max	472.23	89.77	314.57	341.28
	Median	372.26	69.88	181.20	192.28
	Mean	364.87	61.20	170.29	202.79
	Stdev	52.88	23.50	67.50	55.75
	Stdev/Mean	14%	38%	40%	27%
VaR Alt	Min	350.18	39.04	65.43	104.57
	Max	522.73	73.33	189.23	149.61
	Median	441.96	44.52	121.21	121.83
	Mean	440.97	48.53	122.49	123.09
	Stdev	52.67	10.93	35.19	16.86
	Stdev/Mean	12%	23%	29%	14%
VaR Comp	Min	288.33	44.62	69.37	133.07
	Max	472.23	89.77	314.57	341.28
	Median	376.51	76.10	184.65	200.05
	Mean	380.70	69.37	175.40	207.18
	Stdev	49.87	16.73	68.13	60.24
	Stdev/Mean	13%	24%	39%	29%

Main Risk Factors

Material risk factors are FX-rate returns, implied volatility returns for pairs against USD, USD- and EUR-swap curve and cross-currency-basis (against USD) time series.

Comments

- Apart from FX risk, this portfolio also incorporates Interest Rate Risk.
- The correlation in the P&L vectors is relatively high (though Banks 8 &9 show clearly a lower correlation compared with the rest and, interestingly, a very high correlation between them).
- The level of volatility in the P&L is very similar across banks (again, bank 9 shows a higher volatility).
- As a result of both factors this portfolio shows the 'VaR Alt' lowest level of dispersion for all FX portfolios.
- The dispersion observed for 'VaR' and 'VaR Comp' increases, but not significantly.
- For the three metrics assessed, this portfolio shows the lowest dispersion.

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
14 F/X	**Mark-to-market Cross-Currency Basis Swap** 2 Year USD 3M LIBOR vs. EUR 3M EURIBOR Swap	EUR	✕	✕	
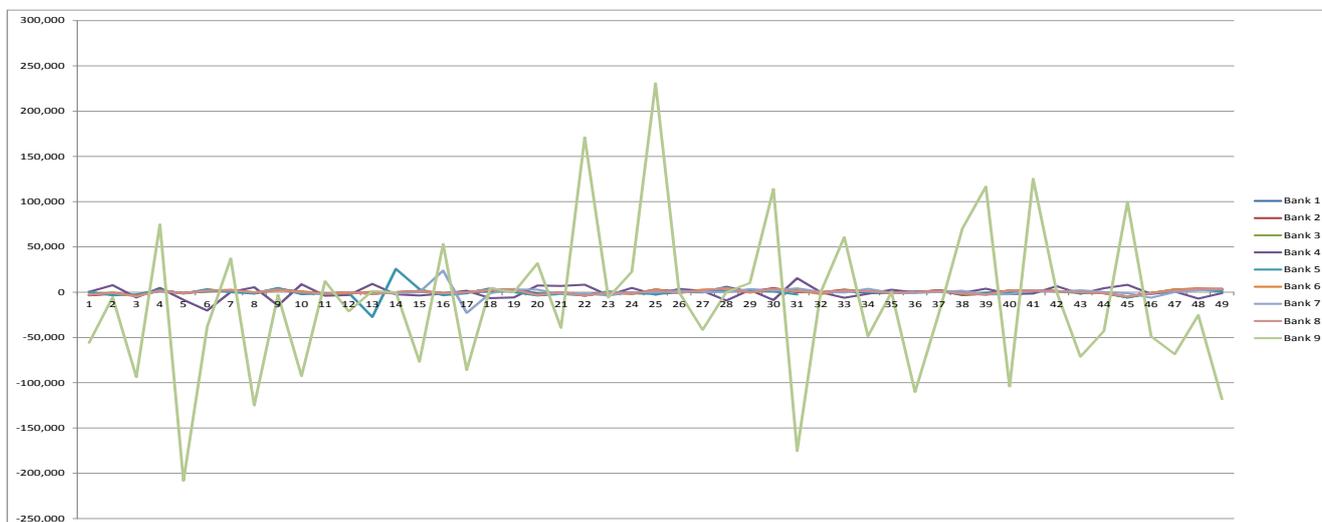
50-day P&L vector

P14	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		95	96	-25	57	91	6	95	-27
Bank 2	95		97	-28	56	93	4	95	-36
Bank 3	96	97		-31	57	93	5	97	-37
Bank 4	-25	-28	-31		-16	-25	-2	-32	34
Bank 5	57	56	57	-16		52	5	57	-16
Bank 6	91	93	93	-25	52		6	90	-35
Bank 7	6	4	5	-2	5	6		5	-8
Bank 8	95	95	97	-32	57	90	5		-37
Bank 9	-27	-36	-37	34	-16	-35	-8	-37	
P&L Stdev	3.92	4.39	4.11	7.77	7.42	4.18	4.69	4.15	100.89
Mean	5.08								
Stdev	1.47								
Stdev / Mean	28.91%								

Correlations across one-year daily P&L observations

		FX Portfolios			
		P13	P14	P15	P16
VaR	Min	288.33	13.82	67.73	133.07
	Max	472.23	89.77	314.57	341.28
	Median	372.26	69.88	181.20	192.28
	Mean	364.87	61.20	170.29	202.79
	Stdev	52.88	23.50	67.50	55.75
	Stdev/Mean	14%	38%	40%	27%
VaR Alt	Min	350.18	39.04	65.43	104.57
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	Median	441.96	44.52	121.21	121.83
	Mean	440.97	48.53	122.49	123.09
	Stdev	52.67	10.93	35.19	16.86
	Stdev/Mean	12%	23%	29%	14%
VaR Comp	Min	288.33	44.62	69.37	133.07
	Max	472.23	89.77	314.57	341.28
	Median	376.51	76.10	184.65	200.05
	Mean	380.70	69.37	175.40	207.18
	Stdev	49.87	16.73	68.13	60.24
	Stdev/Mean	13%	24%	39%	29%

Main Risk Factors

Material risk factors are cross-currency-basis (against USD) time series, FX-rate returns, USD & EUR swap curve.

Comments

- Apart from FX risk, this portfolio also incorporates Interest Rate Risk, both for EUR and USD.
- 9 banks provided data for this portfolio; however bank 9 was identified as an outlier based on its VaR results and excluded from the data analysis.
- The outlier condition of Bank 9 can also be observed in the P&L chart, correlation matrix and, especially, P&L volatility level (this is possibly due to the fact that they interpreted the existence of an outright FX position for the whole notional of the CSW)
- There seems to be a group of banks (1, 2, 3, 6 & 8) that have modelled this portfolio in a consistent manner (showing a very high correlation in the P&L vectors and a very similar level of volatility in the P&L).
- Banks 4, 7 & 9 show low correlation.
- As a result, this portfolio shows a relatively high level of dispersion for 'VaR Alt', as well as for 'VaR' and 'VaR Comp'.

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F/X Portfolios: Number 15 – Knock-out option.

Portfolio # *Risk Factor*	Strategy	Base Currency	VaR	Stressed VaR	IRC
15 F/X	**Knock-out option:** Vanilla option that ceases to exist if the underlying spot breaches a predetermined barrier before maturity	EUR	×	×	
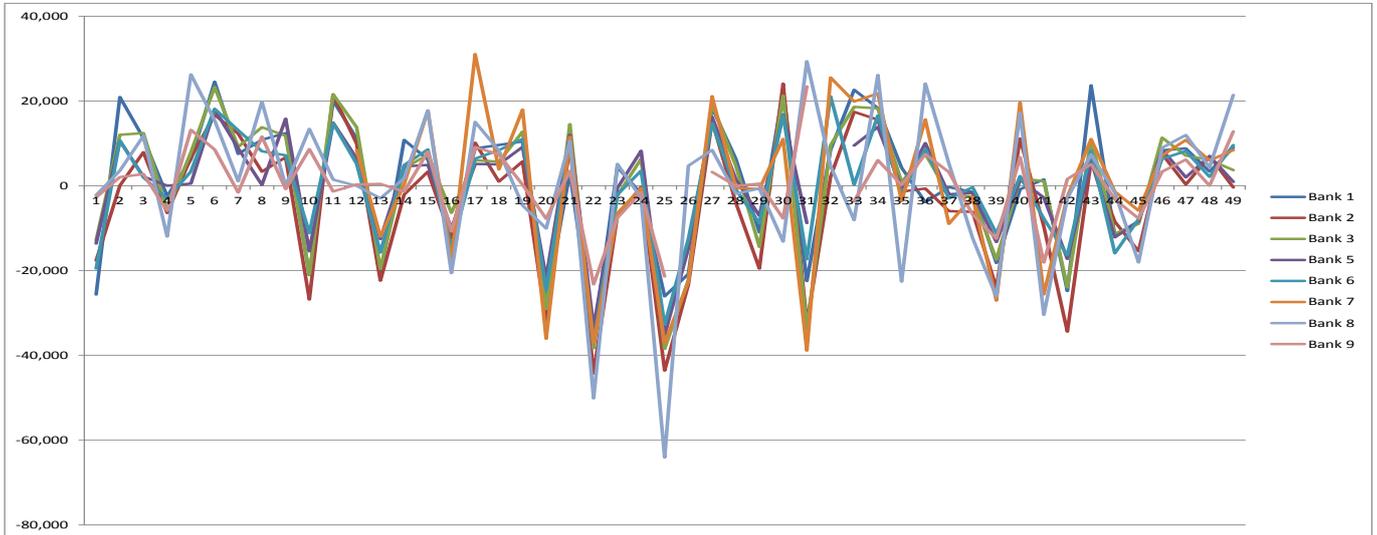
50-day P&L vector

P15	Bank 1	Bank 2	Bank 3	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		91	94	87	90	89	62	58
Bank 2	91		96	93	93	92	72	68
Bank 3	94	96		94	94	93	69	65
Bank 5	87	93	94		95	87	70	67
Bank 6	90	93	94	95		87	71	69
Bank 7	89	92	93	87	87		70	67
Bank 8	62	72	69	70	71	70		96
Bank 9	58	68	65	67	69	67	96	
P&L Stdev	16.50	18.23	17.77	13.25	13.91	23.60	19.82	10.40
Mean	16.68							
Stdev	3.88							
Stdev / Mean	23.24%							

Correlations across one-year daily P&L observations

		FX Portfolios			
		P13	P14	P15	P16
VaR	Min	288.33	13.82	67.73	133.07
	Max	472.23	89.77	314.57	341.28
	Median	372.26	69.88	181.20	192.28
	Mean	364.87	61.20	170.29	202.79
	Stdev	52.88	23.50	67.50	55.75
	Stdev/Mean	14%	38%	40%	27%
VaR Alt	Min	350.18	39.04	65.43	104.57
	Max	522.73	73.33	189.23	149.61
	Median	441.96	44.52	121.21	121.83
	Mean	440.97	48.53	122.49	123.09
	Stdev	52.67	10.93	35.19	16.86
	Stdev/Mean	12%	23%	29%	14%
VaR Comp	Min	288.33	44.62	69.37	133.07
	Max	472.23	89.77	314.57	341.28
	Median	376.51	76.10	184.65	200.05
	Mean	380.70	69.37	175.40	207.18
	Stdev	49.87	16.73	68.13	60.24
	Stdev/Mean	13%	24%	39%	29%

Main Risk Factors

Material risk factors are FX-rate returns, USD-, EUR-swap curve, implied volatility returns for pairs against USD and cross-currency-basis (against USD) time series.

Comments

- Apart from FX risk, this portfolio also incorporates Interest Rate Risk.
- There is high correlation in the P&L vectors, specially between banks 1 to 7. Banks 8 & 9 are less correlated with the others and highly correlated between each other.
- However, the level of volatility in the P&L is very different across banks.
- As a result, despite the high level of correlation in the P&L, this portfolio shows the highest level of dispersion for 'VaR Alt', as well as for the 'VaR' and 'VaR Comp' of all FX portfolios considered.

F/X Portfolios: Number 16 – Double no touch option.

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
16 F/X	**Double no touch option** Digital option that pays a predetermined amount if the spot does not touch any of the barriers during the life of the option	EUR	×	×	
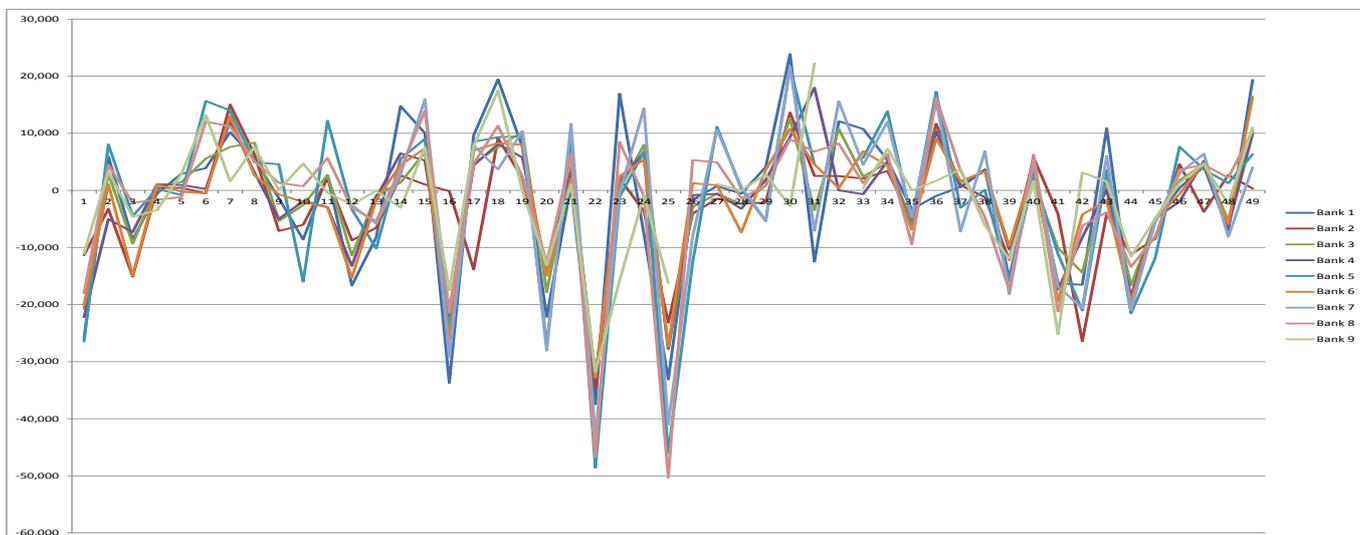
50-day P&L vector

P16	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		80	89	83	86	85	86	85	75
Bank 2	80		84	82	83	78	84	80	61
Bank 3	89	84		92	89	93	92	87	75
Bank 4	83	82	92		84	95	89	82	72
Bank 5	86	83	89	84		79	93	91	78
Bank 6	85	78	93	95	79		84	81	72
Bank 7	86	84	92	89	93	84		91	76
Bank 8	85	80	87	82	91	81	91		86
Bank 9	75	61	75	72	78	72	76	86	
P&L Stdev	13.27	11.09	10.89	11.77	15.73	10.98	15.86	14.38	11.42
Mean	12.82								
Stdev	1.93		Correlations across one-year daily P&L observations						
Stdev / Mean	15.05%								

|		FX Portfolios			
		P13	P14	P15	P16
VaR	Min	288.33	13.82	67.73	133.07
	Max	472.23	89.77	314.57	341.28
	Median	372.26	69.88	181.20	192.28
	Mean	364.87	61.20	170.29	202.79
	Stdev	52.88	23.50	67.50	55.75
	Stdev/Mean	14%	38%	40%	27%
VaR Alt	Min	350.18	39.04	65.43	104.57
	Max	522.73	73.33	189.23	149.61
	Median	441.96	44.52	121.21	121.83
	Mean	440.97	48.53	122.49	123.09
	Stdev	52.67	10.93	35.19	16.86
	Stdev/Mean	12%	23%	29%	14%
VaR Comp	Min	288.33	44.62	69.37	133.07
	Max	472.23	89.77	314.57	341.28
	Median	376.51	76.10	184.65	200.05
	Mean	380.70	69.37	175.40	207.18
	Stdev	49.87	16.73	68.13	60.24
	Stdev/Mean	13%	24%	39%	29%

Main Risk Factors

Material risk factors are FX-rate returns, USD-, EUR-swap curve, implied volatility returns for pairs against USD and cross-currency-basis (against USD) time series.

Comments

- Apart from FX risk, this portfolio also incorporates Interest Rate Risk.
- The correlation in the P&L vectors is quite high for all banks.
- The level of volatility in the P&L is quite similar across banks.
- Both measures are quite similar to those obtained for portfolio 13 (with slightly more dispersion)
- As a result of both factors this portfolio shows the second lowest level of dispersion for 'VaR Alt' (right after portfolio 13).
- The dispersion observed for 'VaR' and 'VaR Comp' increases, in this case significantly.

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3.11 Commodity portfolios

The following 2 commodity portfolios[8] have been assessed:

Portfolio number	Description
17	Curve play from contango to backwardation: long short-term and short long-term gold contracts
18	Short oil put options

The sample size for each of the 2 portfolios is as follows (see section 3.2.3 for further details):

	P17	P18
VaR	10	10
SVaR	9	9

The following table (7) presents the minimum, maximum, median, mean, and standard deviation, as well as the variability (standard deviation / mean) for the 3 alternative VaR metrics assessed in this report, and for the Stressed VaR.

		Commodities Portfolios		Dispersion
		P17	P18	2013
VaR	Min	66.03	133.75	26%
	Max	146.42	302.52	
	Median	90.57	178.58	
	Mean	95.73	189.86	
	Stdev	23.69	52.82	
	Stdev/Mean	25%	28%	
VaR Alt	Min	48.57	85.27	22%
	Max	103.79	146.62	
	Median	72.94	116.33	
	Mean	74.00	117.77	
	Stdev	16.09	26.10	
	Stdev/Mean	22%	22%	
VaR Comp	Min	66.03	133.75	28%
	Max	146.42	302.52	
	Median	103.17	178.58	
	Mean	97.51	193.74	
	Stdev	27.04	56.31	
	Stdev/Mean	28%	29%	
SVaR	Min	102.25	159.22	35%
	Max	235.75	715.56	
	Median	198.00	350.95	
	Mean	186.84	390.26	
	Stdev	39.03	189.81	
	Stdev/Mean	21%	49%	

Table 7: Dispersion results - Portfolios 17 & 18

Variability for the homogenised VaR (i.e. VaR Alt) is lower than that observed for the regulatory VaR metric for all portfolios. Overall variability decreases by more than 15% (i.e. from 26% to 22%) for the VaR Alt. However, variability increases for banks using HS, the slight increase being due to a lowering

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[8] From a regulatory perspective Gold positions should be treated as part of the FX risk, though from a risk management perspective they are treated as a commodity.

in the mean capital charge when non-HS banks are excluded (the range in the max-min values is the same as that observed in VaR).

The following charts (11 and 12) show scatter plots of the VaR and VaR Alt results for the commodity portfolios.
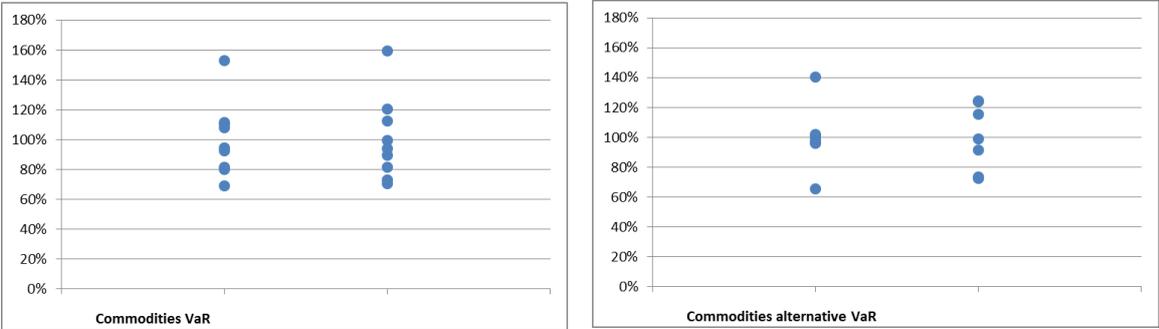
Charts 11 & 12: VaR and VaR Alt normalised dispersion – Portfolios 17 & 18

A more detailed analysis of the differences observed in these three risk metrics by individual portfolio is provided in section 3.11.1.

As regards Stressed VaR, the level of dispersion is actually lower than for VaR for portfolio 17 (see scatter plots in chart 13 below). Due to the much higher variability observed in portfolio 18, the average SVaR dispersion for the Commodity portfolios is higher than for VaR.
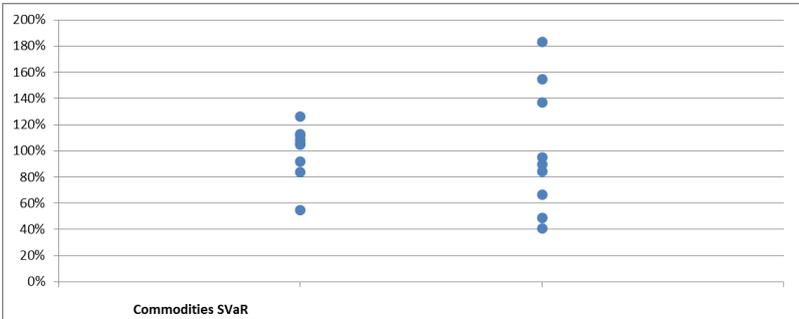
Chart 13: SVaR normalised dispersion – Portfolios 17 & 18

Commodity Portfolios: Number 17 – Curve Play from Contango to Backwardation.

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
17 Commodity	**Curve Play from Contango to Backwardation** Long short-term and Short long-term contracts - Long 3,500,000 3-month ATM OTC London Gold Forwards contracts (1 contract = 0.001 troy ounces, notional: 3,500 troy ounces) - Short 4,300,000 1-year ATM OTC London Gold Forwards contracts (Notional: 4,300 troy ounces**)**	USD	×	×	

50-day P&L vector

| P17	Bank 1	Bank 2	Bank 3	Bank 6	Bank 7	Bank 8
Bank 1		99	42	99	95	88
Bank 2	99		42	99	95	87
Bank 3	42	42		43	44	45
Bank 6	99	99	43		96	88
Bank 7	95	95	44	96		91
Bank 8	88	87	45	88	91	
P&L Stdev	12.80	12.59	13.46	12.67	11.90	11.07
Mean	12.42					
Stdev	0.75		Correlations across one-year daily P&L observations			
Stdev / Mean	6.06%					

		Commodities Portfolios	
		P17	P18
VaR	Min	66.03	133.75
	Max	146.42	302.52
	Median	90.57	178.58
	Mean	95.73	189.86
	Stdev	23.69	52.82
	Stdev/Mean	25%	28%
VaR Alt	Min	48.57	85.27
	Max	103.79	146.62
	Median	72.94	116.33
	Mean	74.00	117.77
	Stdev	16.09	26.10
	Stdev/Mean	22%	22%
VaR Comp	Min	66.03	133.75
	Max	146.42	302.52
	Median	103.17	178.58
	Mean	97.51	193.74
	Stdev	27.04	56.31
	Stdev/Mean	28%	29%

Main Risk Factors

Material risk factors are gold prices, gold lease rate curve.

Comments

- From a regulatory perspective Gold positions should be treated as part of the FX risk, though from a risk management perspective they are treated as a commodity.
- Only 6 out of the 9 banks provided data for this portfolio.
- The correlation in the P&L vector is quite high (except for bank 3) and the level of volatility in the P&L is very similar across banks.
- As a result of both factors, this portfolio shows a level of dispersion for 'VaR Alt' which is relatively low compared with other portfolios.
- The dispersion observed for 'VaR' and 'VaR Comp' increases, but not significantly.

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Commodity Portfolios: Number 18 – Short oil put options.

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
18 Commodity	**Short oil put options** -Short 30 contracts of 3-month OTC WTI Crude Oil puts with strike = 6-month end-of-day forward price on May 10th 2013 (1 contract = 1000 barrels, total notional 30,000 barrels)	USD	×	×	

50-day P&L vector

P18	Bank 1	Bank 2	Bank 3	Bank 5	Bank 6	Bank 8
Bank 1		98	97	82	79	70
Bank 2	98		97	81	78	70
Bank 3	97	97		81	76	68
Bank 5	82	81	81		79	76
Bank 6	79	78	76	79		89
Bank 8	70	70	68	76	89	
P&L Stdev	14.36	13.21	14.12	10.71	15.46	9.74
Mean	12.93					
Stdev	2.04					
Stdev / Mean	15.80%					

Correlations across one-year daily P&L observations

		Commodities Portfolios	
		P17	P18
VaR	Min	66.03	133.75
	Max	146.42	302.52
	Median	90.57	178.58
	Mean	95.73	189.86
	Stdev	23.69	52.82
	Stdev/Mean	25%	28%
VaR Alt	Min	48.57	85.27
	Max	103.79	146.62
	Median	72.94	116.33
	Mean	74.00	117.77
	Stdev	16.09	26.10
	Stdev/Mean	22%	22%
VaR Comp	Min	66.03	133.75
	Max	146.42	302.52
	Median	103.17	178.58
	Mean	97.51	193.74
	Stdev	27.04	56.31
	Stdev/Mean	28%	29%

Main Risk Factors

Material risk factors are oil prices, implied volatilities.

Comments

- Only 6 out of the 9 banks provided data for this portfolio.
- The correlation in the P&L vector is quite high for all banks.
- The level of volatility in the P&L is quite similar across banks.
- As a result of both factors, this portfolio shows a level of dispersion for 'VaR Alt' which is relatively low compared with other portfolios.
- As in the previous portfolio, the dispersion observed for 'VaR' and 'VaR Comp' increases, but not very significantly.

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3.12 Credit portfolios

The following 10 portfolios have been assessed:

Portfolio number	Description
19	Sovereign CDS portfolio: Short protection via CDS on 5 countries
20	Sovereign bond/CDS portfolio: Long protection via CDS on 5 countries
21	Sector concentration portfolio: Short protection via CDS on 10 financials
22	Diversified index portfolio: Short protection via CDS index
23	Diversified index portfolio (higher concentration): Short protection via CDS index
24	Diversified corporate portfolio: Short protection via CDS on 10 A- to AA- corporates
25	Index basis trade on iTraxx 5-year Europe index series 19 version 1
26	CDS bond basis on 5 financials
27	Short index put on iTraxx Europe Crossover series 19
28	Quanto CDS on Spain with delta hedge

The sample size for each of the 10 portfolios can be seen below (see section 3.2.3 for further details). For portfolios 25 and 27, lack of data is particularly acute:

	P19	P20	P21	P22	P23	P24	P25	P26	P27	P28
VaR	12	13	13	13	11	11	8	12	7	10
SVaR	12	13	13	13	11	11	8	12	7	10
IRC	11	11	12	11	11	11	6	12	6	10

The following table (8) presents the minimum, maximum, median, mean, and standard deviation, as well as the variability (standard deviation / mean) for the 3 alternative VaR metrics assessed in this report, andfor the Stressed VaR. The same information for the IRC metric is also provided for the 10 portfolios.

		Credit Spread Portfolios										Dispersion
		P19	P20	P21	P22	P23	P24	P25	P26	P27	P28	2013
VaR	Min	62.94	106.48	70.51	72.92	83.16	54.67	6.35	114.52	55.34	39.42	40%
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	229.41	
	Median	119.81	188.38	116.27	125.83	147.21	85.11	33.18	265.67	210.46	136.12	
	Mean	121.92	218.56	147.22	122.40	163.17	113.16	31.84	273.37	216.90	139.29	
	Stdev	41.49	73.76	59.93	29.60	57.79	61.87	14.11	120.47	105.69	56.77	
	Stdev/Mea	34%	34%	41%	24%	35%	55%	44%	44%	49%	41%	
VaR Alt	Min	66.45	107.81	79.09	72.04	81.26	32.16	3.99	140.26	45.17	37.94	32%
	Max	125.94	274.28	140.75	121.09	165.72	83.13	47.62	373.21	281.32	200.02	
	Median	88.97	199.10	104.78	99.74	151.98	70.37	36.31	229.08	195.57	97.87	
	Mean	96.59	195.44	109.42	100.35	136.88	66.51	33.60	238.49	170.84	109.71	
	Stdev	22.11	64.20	22.53	12.14	29.39	16.39	16.03	90.64	88.92	49.16	
	Stdev/Mea	23%	33%	21%	12%	21%	25%	48%	38%	52%	45%	
VaR Comp	Min	70.18	136.57	97.33	85.43	91.56	58.13	6.35	157.43	55.34	39.42	39%
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	212.52	
	Median	122.88	221.19	148.67	129.15	162.29	87.52	37.04	313.37	210.46	136.12	
	Mean	131.02	229.76	161.25	127.22	173.84	123.54	33.90	291.58	220.79	131.40	
	Stdev	41.43	72.58	60.76	29.24	56.69	63.90	15.91	117.79	115.09	53.00	
	Stdev/Mea	32%	32%	38%	23%	33%	52%	47%	40%	52%	40%	
SVaR	Min	76.24	117.03	222.85	119.62	179.30	184.98	14.06	97.86	94.20	26.60	48%
	Max	333.49	492.13	769.86	423.16	435.18	813.74	74.27	890.39	408.98	429.31	
	Median	173.40	292.39	415.82	222.72	278.44	318.01	56.60	468.58	239.26	48.35	
	Mean	180.87	301.21	470.91	225.38	289.10	388.17	50.52	467.42	250.77	112.07	
	Stdev	83.91	105.86	186.66	75.48	77.25	212.58	18.42	232.17	101.55	126.75	
	Stdev/Me	46%	35%	40%	33%	27%	55%	36%	50%	40%	113%	
IRC	Min	142.95	5.50	626.76	259.12	614.05	951.40	0.06	136.94	61.50	0.07	77%
	Max	1,035.57	247.59	1,718.05	1,336.14	1,840.68	2,069.64	75.73	1,382.61	880.22	126.12	
	Median	564.55	59.77	827.62	570.55	830.67	1,453.23	3.63	406.55	229.39	32.70	
	Mean	622.48	87.54	954.41	616.31	927.38	1,511.55	16.30	607.24	341.46	43.67	
	Stdev	332.84	109.76	326.59	312.31	402.21	377.85	32.97	408.35	298.97	37.16	
	Stdev/Me	53%	125%	34%	51%	43%	25%	202%	67%	88%	85%	

Table 8: Dispersion results - Portfolios 19 to 28

Variability for the homogenised VaR (i.e. VaR Alt) is generally lower than that observed for the regulatory VaR metric. Overall variability decreases by 20% (i.e. from 40% to 32%) for the VaR Alt; however this reduction is not consistently observed, and for portfolios 25, 27 and 28 (all comprising bespoke instruments) variability increases.

In general, variability also decreases for banks using HS (i.e. VaR Comp), though only slightly in all cases (i.e. the overall variability is only reduced from 40% to 39%); again, for portfolios 25 and 27 (but not 28) it slightly increases. A more detailed analysis of the differences observed in these three risk metrics by individual portfolio is provided in section 3.12.1.

According to the data obtained there seems to be greater variability in VaR for sovereign exposures than for corporate ones[9]. In particular, sovereign exposures (via CDS) included in portfolios 19 and 20 (together with portfolio 8 which comprises liquid sovereign bonds) show more dispersion than portfolios 21, 22, 23 on the Alternative VaR metric (on average 28% vs 20%). This is not entirely verified for portfolio 24, where variability is slightly greater than that observed for the VaR Alt in portfolio 19.

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[9] However, the conclusion would not be the same if we analyse variability based on the VaR regulatory metric.

The following charts (14 and 15) show scatter plots of the VaR and VaR Alt results for the credit portfolios.
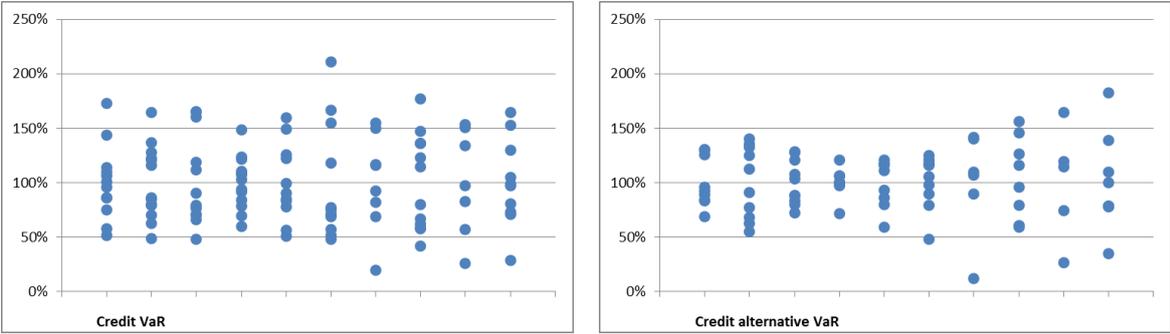
Charts 14 & 15: VaR and VaR Alt normalised dispersion – Portfolios 19 to 28

Regarding IRC, there is even clearer evidence than in VaR of a greater dispersion in the outcome obtained for sovereign exposures. Variability observed in IRC charges for portfolios 8, 19 & 20 (sovereign) is clearly higher than that obtained for the similar corporate portfolios 21, 22, 23 & 24 (on average 90% vs 38%). This evidence suggests that there is currently no market consensus for the treatment of default and migration risks (and even for VaR spread moves) for sovereign positions in the TB.

In general terms, variability in IRC is higher than that observed in VaR (and even SVaR). As can be seen in Table 8 above, the average variability is 77%, however if we consider just the 'plain vanilla' portfolios (19-24) it decreases to 55%, and if we take only the corporate risk portfolios (21-24) it decreases further to 38%, which would be quite comparable to the dispersion observed in regulatory VaR (33% for individual portfolios) and smaller than the average variation for SVaR (44%).

The following chart (16) show scatter plots of the IRC results for the Credit portfolios.
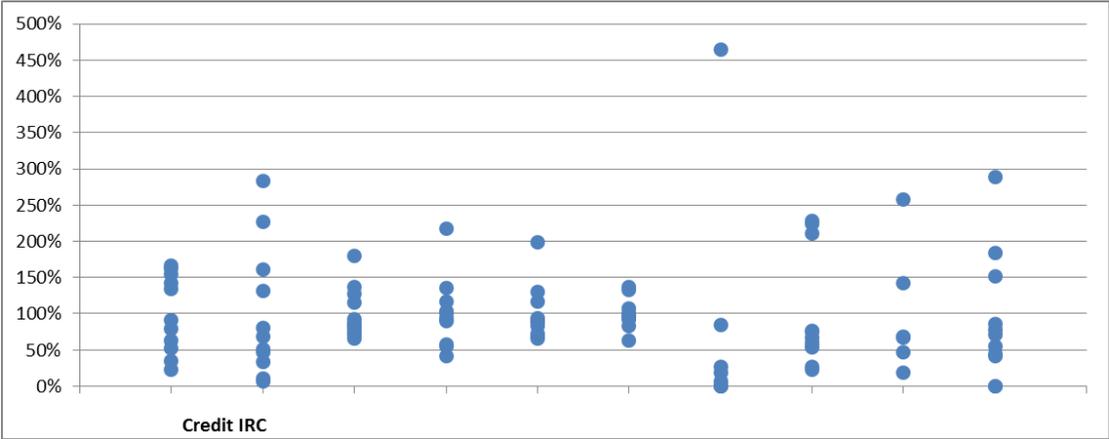
Chart 16: IRC normalised dispersion – Portfolios 19 to 28

Regarding concentration Risk there seems to be evidence that portfolio concentration is appropriately captured by most banks, both in VaR and IRC modelling. This conclusion may be obtained from the comparison of the results obtained for portfolios 22 & 23. Portfolio 22 comprises a 10 M. € short

position in a corporate CDS index whilst portfolio 23 also comprises a set of similar corporate positions with the same portfolio notional; the main difference is that portfolio 23 has concentrated positions in five of the CDS index components. All but one bank's VaR and IRC models deliver consistently a higher capital charge for portfolio 23 than for 22.

As regards basis risk, both between CDS index – individual components (portfolio 25) and Bond – CDS (portfolio 26) there seems to be evidence that they are not consistently captured by banks. Variability is very large in all VaR metrics and IRC, especially for portfolio 25 (index-components basis), which show the highest IRC dispersion (202%), but this extremely high IRC value is largely due to the very low (residual) default & migration risk in the portfolio (i.e. the median IRC value for this portfolio is less than 0.7% of the average IRC median). In this case, little differences in the capital obtained in absolute terms produce huge variations when converted into relative changes.

Finally, apart from what has been described above for portfolios 25 & 26, there is further evidence that more bespoke credit portfolios, such as 27 (short index put option) and 28 (quanto CDS on Spain with delta hedge), show greater variability in the VaR Alt metric than plain vanilla ones. This is also the case for the IRC results.

As regards Stressed VaR, (see scatter plots in chart 17 below) the level of dispersion is higher than for VaR for seven of the 10 portfolios. The average SVaR dispersion for these credit portfolios is higher than for VaR (48% vs 40%).
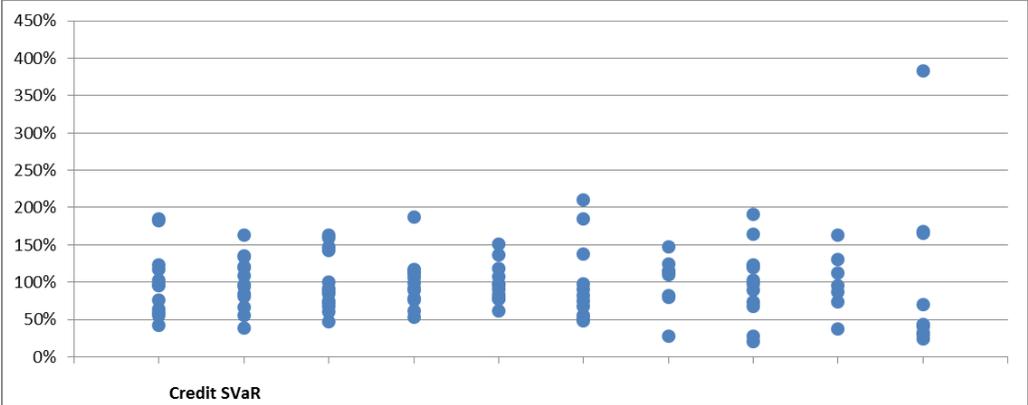

Chart 17: SVaR normalised dispersion – Portfolios 19 to 28

Credit Spread Portfolios: Number 19 – Sovereign CDS Portfolio.

Portfolio # *Risk Factor*	Strategy	Base Currency	VaR	Stressed VaR	IRC
19 Credit Spread	**Sovereign CDS Portfolio** Short Protection via CDS on 5 countries - Short €2MM per single-name 5year CDS (total 10MM notional) on the following countries: Italy, UK, Germany, France & USA - effective date: May 10th 2013 - restructuring clause: FULL	EUR	×	×	x
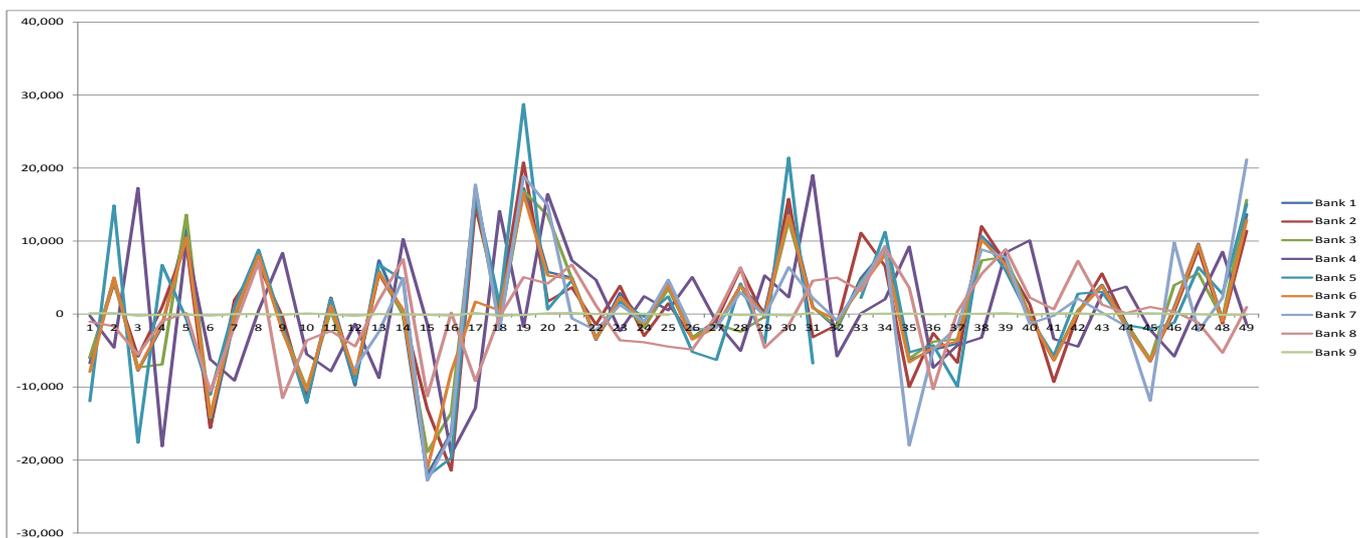
50-day P&L vector

P19	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		97	94	28	93	98	95	63	-36
Bank 2	97		92	27	91	95	91	60	-35
Bank 3	94	92		32	95	93	91	69	-33
Bank 4	28	27	32		25	28	22	28	-8
Bank 5	93	91	95	25		91	91	68	-32
Bank 6	98	95	93	28	91		93	63	-38
Bank 7	95	91	91	22	91	93		61	-34
Bank 8	63	60	69	28	68	63	61		-15
Bank 9	-36	-35	-33	-8	-32	-38	-34	-15	
P&L Stdev	11.63	11.92	15.29	15.45	16.09	11.43	10.91	8.26	0.11
Mean	12.62								
Stdev	2.55								
Stdev / Mean	20.20%								

Correlations across one-year daily P&L observations

		Credit Spread Portfolios									
		P19	P20	P21	P22	P23	P24	P25	P26	P27	P28
VaR	Min	62.94	106.48	70.51	72.92	83.16	54.67	6.35	114.52	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	229.41
	Median	119.81	188.38	116.27	125.83	147.21	85.11	33.18	265.67	210.46	136.12
	Mean	121.92	218.56	147.22	122.40	163.17	113.16	31.84	273.37	216.90	139.29
	Stdev	41.49	73.76	59.93	29.60	57.79	61.87	14.11	120.47	105.69	56.77
	Stdev/Mean	34%	34%	41%	24%	35%	55%	44%	44%	49%	41%
VaR Alt	Min	66.45	107.81	79.09	72.04	81.26	32.16	3.99	140.26	45.17	37.94
	Max	125.94	274.28	140.75	121.09	165.72	83.13	47.62	373.21	281.32	200.02
	Median	88.97	199.10	104.78	99.74	151.98	70.37	36.31	229.08	195.57	97.87
	Mean	96.59	195.44	109.42	100.35	136.88	66.51	33.60	238.49	170.84	109.71
	Stdev	22.11	64.20	22.53	12.14	29.39	16.39	16.03	90.64	88.92	49.16
	Stdev/Mean	23%	33%	21%	12%	21%	25%	48%	38%	52%	45%
VaR Comp	Min	70.18	136.57	97.33	85.43	91.56	58.13	6.35	157.43	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	212.52
	Median	122.88	221.19	148.67	129.15	162.29	87.52	37.04	313.37	210.46	136.12
	Mean	131.02	229.76	161.25	127.22	173.84	123.54	33.90	291.58	220.79	131.40
	Stdev	41.43	72.58	60.76	29.24	56.69	63.90	15.91	117.79	115.09	53.00
	Stdev/Mean	32%	32%	38%	23%	33%	52%	47%	40%	52%	40%

Main Risk Factors

Material risk factors are swap curves and name-specific CDS credit spread curves.

Comments

- 9 banks provided data for this portfolio; however bank 9 was identified as an outlier based on its VaR results and excluded from the data analysis.
- The outlier condition of Bank 9 can also be observed in the P&L chart, correlation matrix and P&L volatility level.
- There seems to be a group of banks (1, 2, 3, 5, 6 & 7) that have modelled this portfolio in a consistent manner (showing very high correlation in the P&L vectors and a similar level of volatility in the P&L).
- Bank 8 shows a relatively high correlation but a low level of volatility, whilst bank 4 shows low correlation and high volatility.
- As a result this portfolio presents a mid-level of dispersion for 'VaR Alt' compared with the other credit portfolios.
- Variability increases significantly for both 'VaR' and 'VaR Comp'.

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Credit Spread Portfolios: Number 20 – Sovereign Bond/CDS Portfolio.

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
20 Credit Spread	**Sovereign Bond/CDS Portfolio - Long Protection via CDS on 5 countries** Long €2MM per single-name 5 year CDS (total 10MM notional) on the following countries: Italy, UK, Germany, France, US as in portfolio #19.- Long €2MM per single-name 5 year bonds (total 10MM notional) on the following countries: Italy, UK, Germany, France, US	EUR	✕	✕	x

50-day P&L vector

P20	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		80	98	36	96	95	66	66	80
Bank 2	80		78	67	77	79	86	80	69
Bank 3	98	78		33	96	95	65	62	77
Bank 4	36	67	33		35	42	65	78	30
Bank 5	96	77	96	35		93	64	64	77
Bank 6	95	79	95	42	93		67	64	78
Bank 7	66	86	65	65	64	67		69	63
Bank 8	66	80	62	78	64	64	69		61
Bank 9	80	69	77	30	77	78	63	61	
P&L Stdev	33.20	18.71	31.09	13.97	33.98	28.78	15.11	14.67	31.90
Mean	24.60								
Stdev	8.24		Correlations across one-year daily P&L observations						
Stdev / Mean	33.49%								

		Credit Spread Portfolios								
		P19	P20	P21	P22	P23	P24	P25	P26	P27	P28
VaR	Min	62.94	106.48	70.51	72.92	83.16	54.67	6.35	114.52	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	229.41
	Median	119.81	188.38	116.27	125.83	147.21	85.11	33.18	265.67	210.46	136.12
	Mean	121.92	218.56	147.22	122.40	163.17	113.16	31.84	273.37	216.90	139.29
	Stdev	41.49	73.76	59.93	29.60	57.79	61.87	14.11	120.47	105.69	56.77
	Stdev/Mean	34%	34%	41%	24%	35%	55%	44%	44%	49%	41%
VaR Alt	Min	66.45	107.81	79.09	72.04	81.26	32.16	3.99	140.26	45.17	37.94
	Max	125.94	274.28	140.75	121.09	165.72	83.13	47.62	373.21	281.32	200.02
	Median	88.97	199.10	104.78	99.74	151.98	70.37	36.31	229.08	195.57	97.87
	Mean	96.59	195.44	109.42	100.35	136.88	66.51	33.60	238.49	170.84	109.71
	Stdev	22.11	64.20	22.53	12.14	29.39	16.39	16.03	90.64	88.92	49.16
	Stdev/Mean	23%	33%	21%	12%	21%	25%	48%	38%	52%	45%
VaR Comp	Min	70.18	136.57	97.33	85.43	91.56	58.13	6.35	157.43	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	212.52
	Median	122.88	221.19	148.67	129.15	162.29	87.52	37.04	313.37	210.46	136.12
	Mean	131.02	229.76	161.25	127.22	173.84	123.54	33.90	291.58	220.79	131.40
	Stdev	41.43	72.58	60.76	29.24	56.69	63.90	15.91	117.79	115.09	53.00
	Stdev/Mean	32%	32%	38%	23%	33%	52%	47%	40%	52%	40%

Main Risk Factors

Material risk factors are EUR & USA swap curves, name-specific CDS credit spread curves and government bond curves.

Comments

- Apart from Credit, the portfolio incorporates Interest Rate Risk, (i.e. the bonds are paying fixed coupon).
- The level of correlation in the P&L vectors is relatively high (except, possibly, for bank 4).
- However the level of volatility in the P&L is very different, with 5 institutions (banks 1, 3, 5, 6 & 9) showing significantly more volatility than the other 4.
- As a result this portfolio presents a high level of dispersion for 'VaR Alt' compared with the other credit portfolios.
- Considering the volatility on portfolio 9 (plain vanilla IRS) was low, it seems the Basis between CDS and bonds (both for sovereign and corporate risks, see also portfolio 26) is an important variability driver.
- Variability does not change materially when we look at 'VaR' and 'VaR Comp' measures.

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Credit Spread Portfolios: Number 21 – Sector Concentration Portfolio.

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
21 Credit Spread	**Sector Concentration Portfolio - Short Protection via CDS on 10 financials** - Equivalent of Short 1MM notional per single-name 5 year CDS (total €10MM notional) on 10 financial companies - effective date May 10th 2013S	EUR	×	×	x
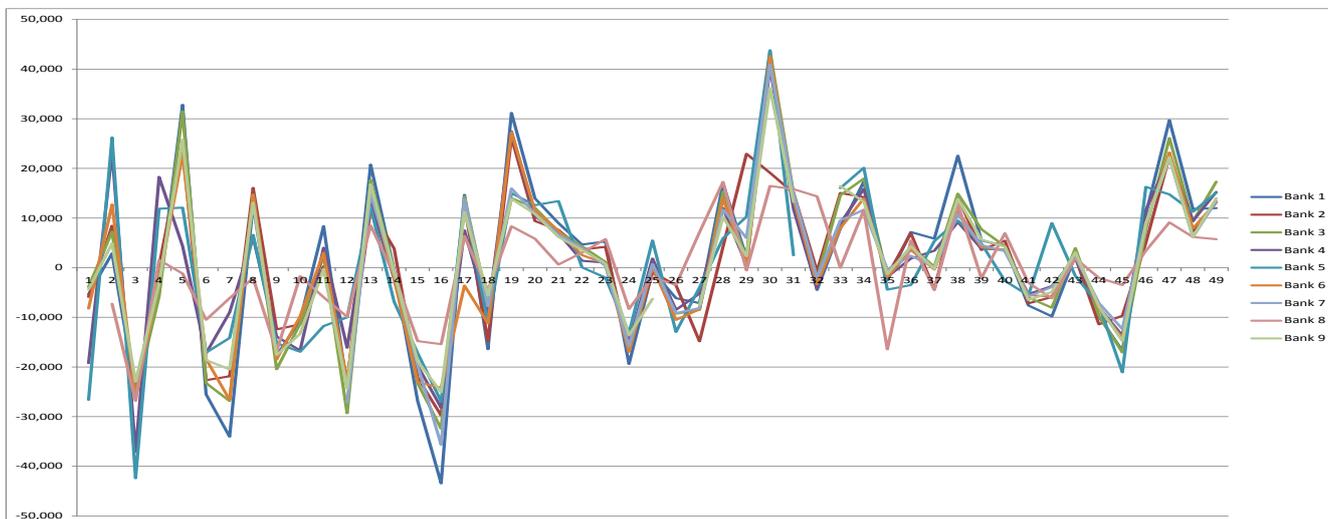
50-day P&L vector

P21	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		92	97	95	87	94	95	69	96
Bank 2	92		92	92	86	92	94	67	93
Bank 3	97	92		96	89	95	97	71	98
Bank 4	95	92	96		91	93	96	70	95
Bank 5	87	86	89	91		85	89	67	90
Bank 6	94	92	95	93	85		96	69	94
Bank 7	95	94	97	96	89	96		70	96
Bank 8	69	67	71	70	67	69	70		70
Bank 9	96	93	98	95	90	94	96	70	
P&L Stdev	17.87	13.28	18.31	15.47	17.26	13.54	12.10	10.81	15.62
Mean	14.92								
Stdev	2.49								
Stdev / Mean	16.71%								

Correlations across one-year daily P&L observations

Main Risk Factors

Material risk factors are name-specific CDS credit spread curves.

Comments

- The level of correlation in the P&L vectors is very high, (with bank 8 showing less correlation with the other banks).
- The level of volatility in the P&L is quite different.
- As a result this portfolio presents a mid-low level of dispersion for 'VaR Alt' compared with the other credit portfolios.
- Variability increases significantly both for 'VaR' and 'VaR Comp' measures

		Credit Spread Portfolios									
		P19	P20	P21	P22	P23	P24	P25	P26	P27	P28
VaR	Min	62.94	106.48	70.51	72.92	83.16	54.67	6.35	114.52	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	229.41
	Median	119.81	188.38	116.27	125.83	147.21	85.11	33.18	265.67	210.46	136.12
	Mean	121.92	218.56	147.22	122.40	163.17	113.16	31.84	273.37	216.90	139.29
	Stdev	41.49	73.76	59.93	29.60	57.79	61.87	14.11	120.47	105.69	56.77
	Stdev/Mean	34%	34%	41%	24%	35%	55%	44%	44%	49%	41%
VaR Alt	Min	66.45	107.81	79.09	72.04	81.26	32.16	3.99	140.26	45.17	37.94
	Max	125.94	274.28	140.75	121.09	165.72	83.13	47.62	373.21	281.32	200.02
	Median	88.97	199.10	104.78	99.74	151.98	70.37	36.31	229.08	195.57	97.87
	Mean	96.59	195.44	109.42	100.35	136.88	66.51	33.60	238.49	170.84	109.71
	Stdev	22.11	64.20	22.53	12.14	29.39	16.39	16.03	90.64	88.92	49.16
	Stdev/Mean	23%	33%	21%	12%	21%	25%	48%	38%	52%	45%
VaR Comp	Min	70.18	136.57	97.33	85.43	91.56	58.13	6.35	157.43	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	212.52
	Median	122.88	221.19	148.67	129.15	162.29	87.52	37.04	313.37	210.46	136.12
	Mean	131.02	229.76	161.25	127.22	173.84	123.54	33.90	291.58	220.79	131.40
	Stdev	41.43	72.58	60.76	29.24	56.69	63.90	15.91	117.79	115.09	53.00
	Stdev/Mean	32%	32%	38%	23%	33%	52%	47%	40%	52%	40%

Credit Spread Portfolios: Number 22 – Diversified Index Portfolio.

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
22 Credit Spread	**Diversified Index Portfolio - Short protection via CDS index** - Short €10MM notional iTraxx 5-year Europe index Series 19, Version 1 – Maturity June 20th 2018 (RED Pair Code: 2I666VAZ8) - effective date May 10th 2013	EUR	✗	✗	x
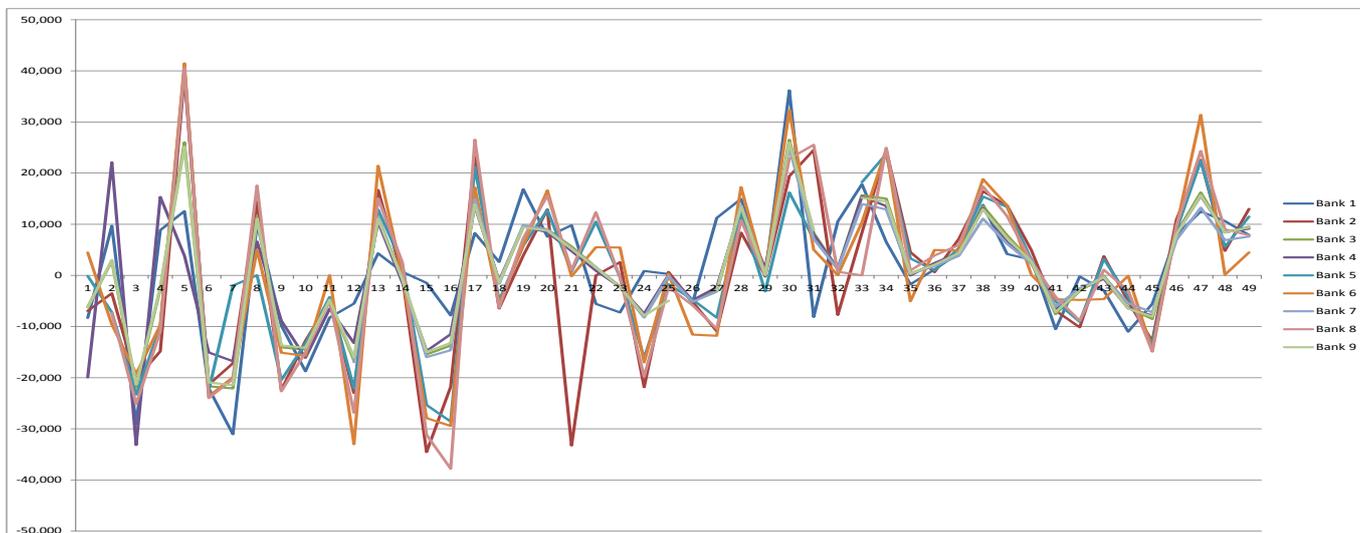
50-day P&L vector

P22	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		54	85	86	57	57	85	56	86
Bank 2	54		83	79	81	88	82	92	83
Bank 3	85	83		97	79	84	97	85	100
Bank 4	86	79	97		76	79	97	81	97
Bank 5	57	81	79	76		80	79	81	79
Bank 6	57	88	84	79	80		85	91	83
Bank 7	85	82	97	97	79	85		86	97
Bank 8	56	92	85	81	81	91	86		85
Bank 9	86	83	100	97	79	83	97	85	
P&L Stdev	12.27	14.19	12.77	11.99	17.49	14.20	9.35	14.76	12.64
Mean	13.30								
Stdev	2.12								
Stdev / Mean	15.95%								

Correlations across one-year daily P&L observations

Main Risk Factors

Material risk factors are name-specific CDS credit spread curves or, in case no individual CDS spread is available for all index constituents, CDS index credit spreads and idiosyncratic spreads.

Comments

- As in the previous portfolio, the level of correlation in the P&L vectors is also very high, (with bank 1 showing less correlation).
- The level of volatility in the P&L is quite similar. The dispersion of the volatility across banks is the lowest amongst the credit portfolios.
- As a result this portfolio presents the lowest level of dispersion for 'VaR Alt' compared with the other credit portfolios.
- Variability increases significantly both for 'VaR' and 'VaR Comp' measures.
- Variability for this portfolio is also the lowest for both 'VaR' and 'VaR Comp' measures.
- The use of a CDS liquid index seems to explain the lower dispersion observed in this portfolio.

		Credit Spread Portfolios									
		P19	P20	P21	P22	P23	P24	P25	P26	P27	P28
VaR	Min	62.94	106.48	70.51	72.92	83.16	54.67	6.35	114.52	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	229.41
	Median	119.81	188.38	116.27	125.83	147.21	85.11	33.18	265.67	210.46	136.12
	Mean	121.92	218.56	147.22	122.40	163.17	113.16	31.84	273.37	216.90	139.29
	Stdev	41.49	73.76	59.93	29.60	57.79	61.87	14.11	120.47	105.69	56.77
	Stdev/Mean	34%	34%	41%	24%	35%	55%	44%	44%	49%	41%
VaR Alt	Min	66.45	107.81	79.09	72.04	81.26	32.16	3.99	140.26	45.17	37.94
	Max	125.94	274.28	140.75	121.09	165.72	83.13	47.62	373.21	281.32	200.02
	Median	88.97	199.10	104.78	99.74	151.98	70.37	36.31	229.08	195.57	97.87
	Mean	96.59	195.44	109.42	100.35	136.88	66.51	33.60	238.49	170.84	109.71
	Stdev	22.11	64.20	22.53	12.14	29.39	16.39	16.03	90.64	88.92	49.16
	Stdev/Mean	23%	33%	21%	12%	21%	25%	48%	38%	52%	45%
VaR Comp	Min	70.18	136.57	97.33	85.43	91.56	58.13	6.35	157.43	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	212.52
	Median	122.88	221.19	148.67	129.15	162.29	87.52	37.04	313.37	210.46	136.12
	Mean	131.02	229.76	161.25	127.22	173.84	123.54	33.90	291.58	220.79	131.40
	Stdev	41.43	72.58	60.76	29.24	56.69	63.90	15.91	117.79	115.09	53.00
	Stdev/Mean	32%	32%	38%	23%	33%	52%	47%	40%	52%	40%

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Credit Spread Portfolios: Number 23 – Diversified Index Portfolio (higher concentration).

Portfolio # *Risk Factor*	Strategy	Base Currency	VaR	Stressed VaR	IRC
23 Credit Spread	**<u>Diversified Index Portfolio (higher concentration)</u> - Short protection via CDS index** - Short €5MM notional iTraxx 5-year Europe index Series 19, Version 1 – Maturity June 20th 2018 (RED Pair Code: 2I666VAZ8) - Short €5MM notional (equally weighted) on the following 5 Financials belonging to the iTraxx 5-year Europe index Series 19, Version 1 – Maturity June 20th 2018 (RED Pair Code: 2I666VAZ8): ING, CMZB, AXA, AEGON & SANTAN.	EUR	×	×	x
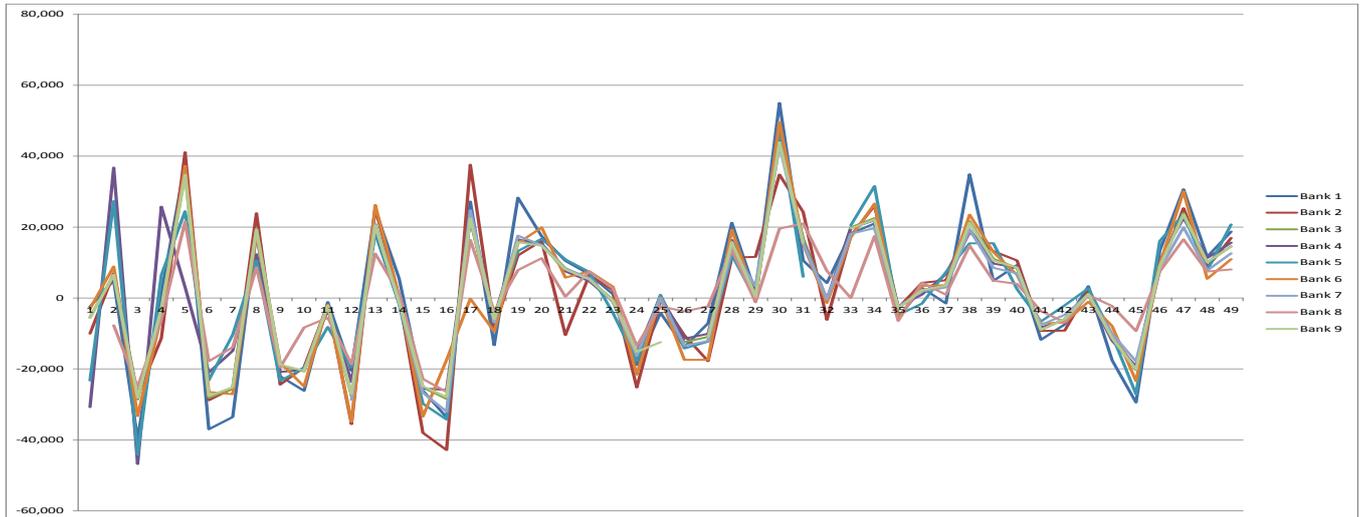
50-day P&L vector

| P23	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		92	96	94	90	92	95	85	95
Bank 2	92		95	92	90	96	97	91	95
Bank 3	96	95		97	94	95	98	89	100
Bank 4	94	92	97		94	92	97	86	97
Bank 5	90	90	94	94		90	93	87	94
Bank 6	92	96	95	92	90		97	90	94
Bank 7	95	97	98	97	93	97		90	97
Bank 8	85	91	89	86	87	90	90		89
Bank 9	95	95	100	97	94	94	97	89	
P&L Stdev	21.88	17.76	20.32	20.22	22.01	17.79	15.03	11.27	20.54
Mean	18.54								
Stdev	3.33		Correlations across one-year daily P&L observations						
Stdev / Mean	17.94%								

Main Risk Factors

Material risk factors are name-specific CDS credit spread curves or, in case no individual CDS spread is available for all index constituents, CDS index credit spreads and idiosyncratic spreads.

Comments

- As in the 2 previous portfolios, the level of correlation in the P&L vectors is very high for all banks.
- However, the dispersion in the P&L volatility is higher than in the 2 previous portfolios.
- As a result this portfolio presents a mid-low level of dispersion for 'VaR Alt' compared with the other credit portfolios.
- Variability increases significantly both for 'VaR' and 'VaR Comp' measures.
- The use of a CDS liquid index, together with some of its most liquid components, seems to explain the very high correlation observed in this portfolio.

		Credit Spread Portfolios									
		P19	P20	P21	P22	P23	P24	P25	P26	P27	P28
VaR	Min	62.94	106.48	70.51	72.92	83.16	54.67	6.35	114.52	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	229.41
	Median	119.81	188.38	116.27	125.83	147.21	85.11	33.18	265.67	210.46	136.12
	Mean	121.92	218.56	147.22	122.40	163.17	113.16	31.84	273.37	216.90	139.29
	Stdev	41.49	73.76	59.93	29.60	57.79	61.87	14.11	120.47	105.69	56.77
	Stdev/Mean	34%	34%	41%	24%	35%	55%	44%	44%	49%	41%
VaR Alt	Min	66.45	107.81	79.09	72.04	81.26	32.16	3.99	140.26	45.17	37.94
	Max	125.94	274.28	140.75	121.09	165.72	83.13	47.62	373.21	281.32	200.02
	Median	88.97	199.10	104.78	99.74	151.98	70.37	36.31	229.08	195.57	97.87
	Mean	96.59	195.44	109.42	100.35	136.88	66.51	33.60	238.49	170.84	109.71
	Stdev	22.11	64.20	22.53	12.14	29.39	16.39	16.03	90.64	88.92	49.16
	Stdev/Mean	23%	33%	21%	12%	21%	25%	48%	38%	52%	45%
VaR Comp	Min	70.18	136.57	97.33	85.43	91.56	58.13	6.35	157.43	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	212.52
	Median	122.88	221.19	148.67	129.15	162.29	87.52	37.04	313.37	210.46	136.12
	Mean	131.02	229.76	161.25	127.22	173.84	123.54	33.90	291.58	220.79	131.40
	Stdev	41.43	72.58	60.76	29.24	56.69	63.90	15.91	117.79	115.09	53.00
	Stdev/Mean	32%	32%	38%	23%	33%	52%	47%	40%	52%	40%

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Credit Spread Portfolios: Number 24 – Diversified Corporate Portfolio

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
24 Credit Spread	**Diversified Corporate Portfolio** - Short Protection via CDS on 10 A- to AA- corporate - Short equivalent of €2MM notional per single-name 5 year CDS (total €20MM notional) on the following 10 companies (for USD CDS use the exchange rate at May 10th 2013): P&G, Home Depot, Royal Dutch Shell, IBM, Met Life, Southern Co, Vodafone, BHP, Roche.	EUR	✕	✕	x
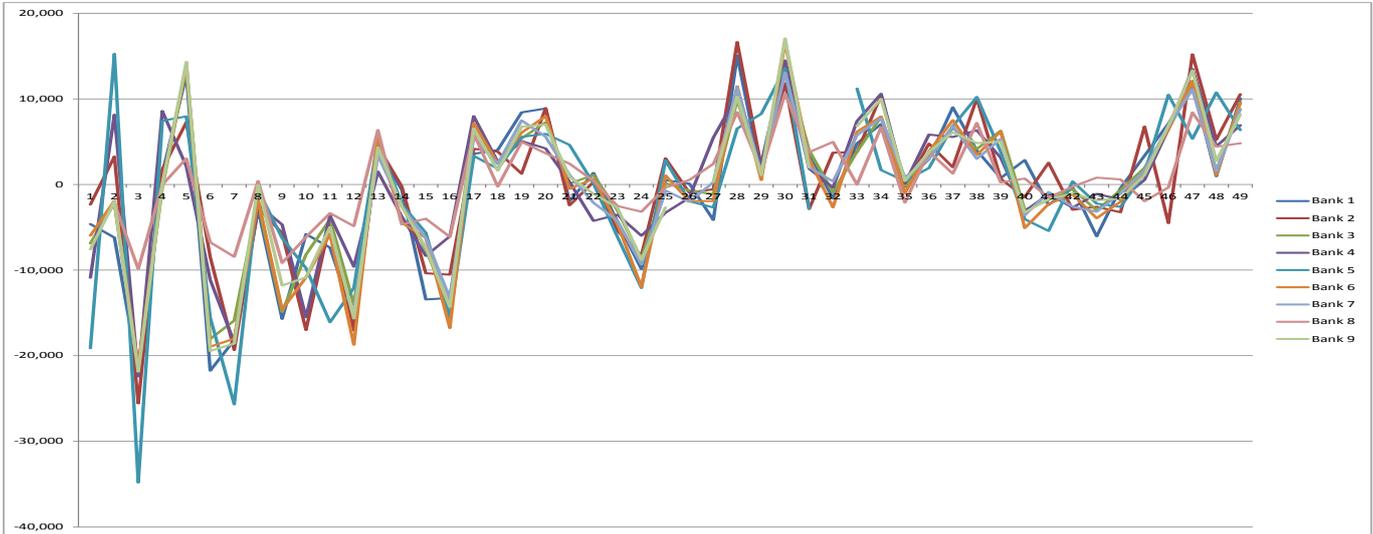
50-day P&L vector

P24	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		75	96	89	87	85	94	74	90
Bank 2	75		77	74	70	68	74	61	75
Bank 3	96	77		94	89	88	95	77	94
Bank 4	89	74	94		86	82	92	78	93
Bank 5	87	70	89	86		80	86	70	85
Bank 6	85	68	88	82	80		86	71	83
Bank 7	94	74	95	92	86	86		77	91
Bank 8	74	61	77	78	70	71	77		77
Bank 9	90	75	94	93	85	83	91	77	
P&L Stdev	8.49	10.11	9.00	9.75	10.56	7.23	6.33	4.85	10.71

| Mean	8.56
Stdev	1.92
Stdev / Mean	22.43%

Correlations across one-year daily P&L observations

Main Risk Factors

Material risk factors are name-specific CDS credit spread curves or, in case no individual CDS spread is available for all names in the portfolio, CDS index credit spreads and idiosyncratic spreads.

Comments

- As in the previous corporate risk portfolios (i.e. 21-23), the level of correlation in the P&L vectors is quite high for nearly all banks.
- However, the variability in the P&L level of volatility is the highest amongst the directional credit spread corporate portfolios (21-24).
- Consequently this portfolio presents the highest level of dispersion for 'VaR Alt' compared with the other 3 directional corporate credit portfolios.
- However, variability hugely increases both for 'VaR' and 'VaR Comp' measures.
- As a result, this is the credit spread portfolio (i.e. 19-28) which shows the highest variability in both measures.
- It may be concluded that a significant part of the variability observed is due to model options contemplated in the rule.

		Credit Spread Portfolios									
		P19	P20	P21	P22	P23	P24	P25	P26	P27	P28
VaR	Min	62.94	106.48	70.51	72.92	83.16	54.67	6.35	114.52	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	229.41
	Median	119.81	188.38	116.27	125.83	147.23	85.11	33.18	265.67	210.46	136.12
	Mean	121.92	218.56	147.22	122.40	163.17	113.16	31.84	273.37	216.90	139.29
	Stdev	41.49	73.76	59.93	29.60	57.79	61.87	14.11	120.47	105.69	56.77
	Stdev/Mean	34%	34%	41%	24%	35%	55%	44%	44%	49%	41%
VaR Alt	Min	66.45	107.81	79.09	72.04	81.26	32.16	3.99	140.26	45.17	37.94
	Max	125.94	274.28	140.75	121.09	165.73	83.13	47.62	373.21	281.32	200.02
	Median	88.97	199.10	104.78	99.74	151.98	70.37	36.31	229.08	195.57	97.87
	Mean	96.59	195.44	109.42	100.35	136.88	66.51	33.60	238.49	170.84	109.71
	Stdev	22.11	64.20	22.53	12.14	29.39	16.39	16.03	90.64	88.92	49.16
	Stdev/Mean	23%	33%	21%	12%	21%	25%	48%	38%	52%	45%
VaR Comp	Min	70.18	136.57	97.33	85.43	91.56	58.13	6.35	157.43	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	212.52
	Median	122.88	221.19	148.67	129.15	162.29	87.52	37.04	313.37	210.46	136.12
	Mean	131.02	229.76	161.25	127.22	173.84	123.54	33.90	291.58	220.79	131.40
	Stdev	41.43	72.58	60.76	29.24	56.69	63.90	15.91	117.79	115.09	53.00
	Stdev/Mean	32%	32%	38%	23%	33%	52%	47%	40%	52%	40%

Portfolio # *Risk Factor*	Strategy	Base Currency	VaR	Stressed VaR	IRC
25 Credit Spread	**Index basis** - Short € 5MM notional iTraxx 5-year Europe index Series 19, Version 1 – Maturity June 20th 2018 (RED Pair Code: 2I666VAZ8) - Effective date: May 10th 2013 - Long €5MM notional on all Constituents of iTraxx Series 19, Version 1 – Maturity June 20th 2018 (RED Pair Code: 2I666VAZ8) (i.e.the aggregate notional is €5MM and all names are equally weighted) - Effective date: May 10th 2013	EUR	×	×	x
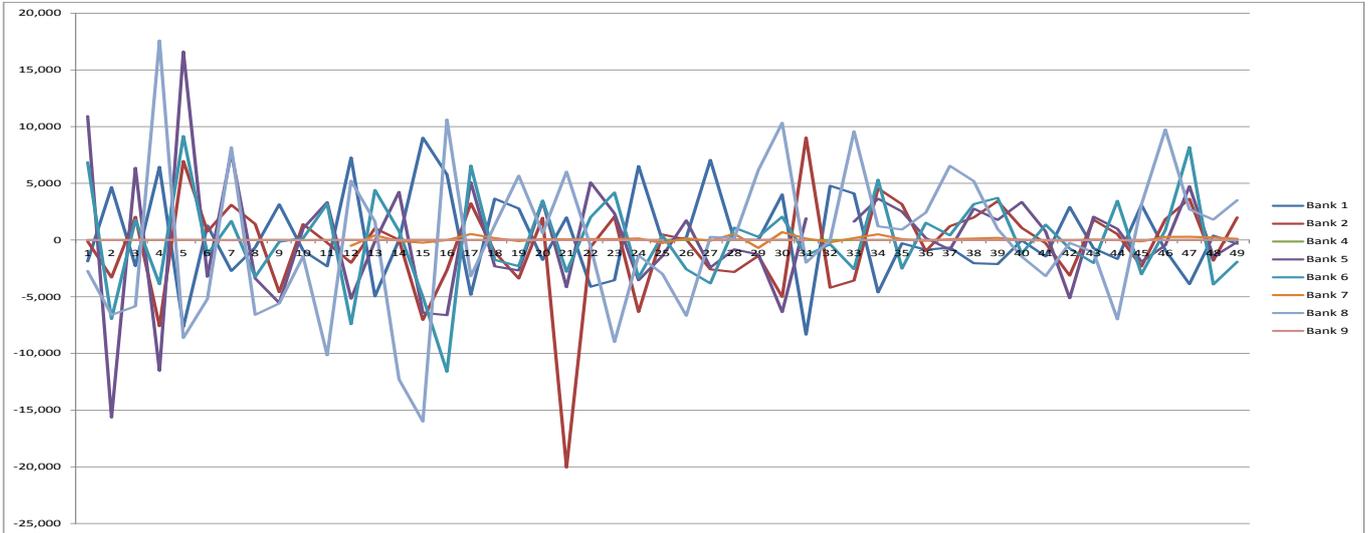
50-day P&L vector

P25	Bank 1	Bank 2	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		-71	-17	-47	-68	1	27	-24
Bank 2	-71		9	53	48	2	-34	19
Bank 4	-17	9		4	20	49	29	73
Bank 5	-47	53	4		45	9	-15	9
Bank 6	-68	48	20	45		11	-12	24
Bank 7	1	2	49	9	11		26	40
Bank 8	27	-34	29	-15	-12	26		13
Bank 9	-24	19	73	9	24	40	13	
P&L Stdev	3.47	4.17	0.00	5.84	3.97	0.91	5.88	0.01
Mean	4.04							
Stdev	1.67							
Stdev / Mean	41.33%							

Correlations across one-year daily P&L observations

|		**Credit Spread Portfolios**									
		P19	P20	P21	P22	P23	P24	P25	P26	P27	P28
VaR	Min	62.94	106.48	70.51	72.92	83.16	54.6?	6.35	114.52	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.6?	49.19	484.27	332.19	229.41
	Median	119.81	188.38	116.27	125.83	147.21	85.1?	33.18	265.67	210.46	136.12
	Mean	121.92	218.56	147.22	122.40	163.17	113.1?	31.84	273.37	216.90	139.29
	Stdev	41.49	73.76	59.93	29.60	57.79	61.8?	14.11	120.47	105.69	56.77
	Stdev/Mean	34%	34%	41%	24%	35%	55%	44%	44%	49%	41%
VaR Alt	Min	66.45	107.81	79.09	72.04	81.26	32.1?	3.99	140.26	45.17	37.94
	Max	125.94	274.28	140.75	121.09	165.72	83.1?	47.62	373.21	281.32	200.02
	Median	88.97	199.10	104.78	99.74	151.98	70.3?	36.31	229.08	195.57	97.87
	Mean	96.59	195.44	109.42	100.35	136.88	66.5?	33.60	238.49	170.84	109.71
	Stdev	22.11	64.20	22.53	12.14	29.39	16.3?	16.03	90.64	88.92	49.16
	Stdev/Mean	23%	33%	21%	12%	21%	25%	48%	38%	52%	45%
VaR Comp	Min	70.18	136.57	97.33	85.43	91.56	58.1?	6.35	157.43	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.6?	49.19	484.27	332.19	212.52
	Median	122.88	221.19	148.67	129.15	162.29	87.5?	37.04	313.37	210.46	136.12
	Mean	131.02	229.76	161.25	127.22	173.84	123.5?	33.90	291.58	220.79	131.40
	Stdev	41.43	72.58	60.76	29.24	56.69	63.9?	15.91	117.79	115.09	53.00
	Stdev/Mean	32%	32%	38%	23%	33%	52%	47%	40%	52%	40%

Main Risk Factors

Material risk factors are index CDS spreads and name-specific CDS credit spread curves or, in case no individual CDS spread is available for all names in the portfolio, CDS index credit spreads and idiosyncratic spreads.

Comments

- 8 out of the 9 banks provided data for this portfolio, and 2 of these 8 banks (4 and 9) were identified as outliers and excluded from the data analysis.
- Both banks excluded show a very low level of dispersion in the reported P&L (nearly zero). They (interestingly) show the highest correlation in the P&L (73%) across all banks.
- The level of correlation in the P&L vectors is very low (even negative) for nearly all banks (except the outliers).
- Also, the variability in the P&L volatility is extremely high.
- As a result this portfolio presents a very high level of dispersion for 'VaR Alt'
- Variability does not change significantly for 'VaR' and 'VaR Comp' measures.
- VaR results are nevertheless low, as one would expect for a non-directional portfolio, which exaggerates the variability observed.
- Basis risk between a credit index and its components is a very idiosyncratic risk factor, bound to produce high variability.

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Credit Spread Portfolios: Number 26 – CDS bond Basis

Portfolio # *Risk Factor*	Strategy	Base Currency	VaR	Stressed VaR	IRC
26 Credit Spread	**CDS bond Basis** - Long Bonds €2MM per single-name 5 year bonds on 5 Financials (3 EU, 2 North America): Met Life, Allianz, Prudential, AXA, ING. - Long Protection via CDS on the same names (€2MM per single-name 5 year).	EUR	✗	✗	X
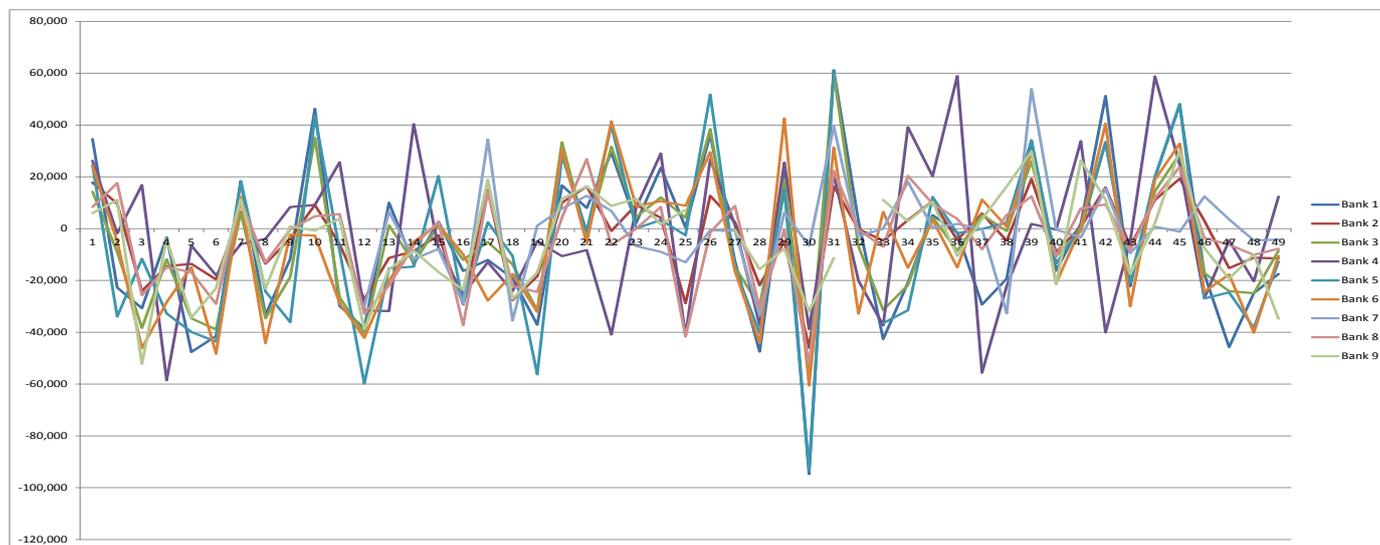
50-day P&L vector

P26	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8	Bank 9
Bank 1		82	97	50	96	92	34	69	76
Bank 2	82		81	52	84	80	57	91	83
Bank 3	97	81		48	96	93	37	67	75
Bank 4	50	52	48		51	52	26	50	45
Bank 5	96	84	96	51		92	34	72	76
Bank 6	92	80	93	52	92		37	70	75
Bank 7	34	57	37	26	34	37		60	34
Bank 8	69	91	67	50	72	70	60		70
Bank 9	76	83	75	45	76	75	34	70	
P&L Stdev	42.05	16.16	33.17	30.00	41.22	38.15	15.32	16.64	22.67
Mean	28.38								
Stdev	10.34								
Stdev / Mean	36.45%								

Correlations across one-year daily P&L observations

|		**Credit Spread Portfolios**									
		P19	P20	P21	P22	P23	P24	P25	P26	P27	P28
VaR	Min	62.94	106.48	70.51	72.92	83.16	54.67	6.35	114.52	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	229.41
	Median	119.81	188.38	116.27	125.83	147.21	85.11	33.18	265.67	210.46	136.12
	Mean	121.92	218.56	147.22	122.40	163.17	113.16	31.84	273.37	216.90	139.29
	Stdev	41.49	73.76	59.93	29.60	57.79	61.87	14.11	120.47	105.69	56.77
	Stdev/Mean	34%	34%	41%	24%	35%	55%	44%	44%	49%	41%
VaR Alt	Min	66.45	107.81	79.09	72.04	81.26	32.16	3.99	140.26	45.17	37.94
	Max	125.94	274.28	140.75	121.09	165.72	83.13	47.62	373.21	281.32	200.02
	Median	88.97	199.10	104.78	99.74	151.98	70.37	36.31	229.08	195.57	97.87
	Mean	96.59	195.44	109.42	100.35	136.88	66.51	33.60	238.49	170.84	109.71
	Stdev	22.11	64.20	22.53	12.14	29.39	16.39	16.03	90.64	88.92	49.16
	Stdev/Mean	23%	33%	21%	12%	21%	25%	48%	38%	52%	45%
VaR Comp	Min	70.18	136.57	97.33	85.43	91.56	58.13	6.35	157.43	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	212.52
	Median	122.88	221.19	148.67	129.15	162.29	87.52	37.04	313.37	210.46	136.12
	Mean	131.02	229.76	161.25	127.22	173.84	123.54	33.90	291.58	220.79	131.40
	Stdev	41.43	72.58	60.76	29.24	56.69	63.90	15.91	117.79	115.09	53.00
	Stdev/Mean	32%	32%	38%	23%	33%	52%	47%	40%	52%	40%

Main Risk Factors

Material risk factors are bond prices (which incorporate Interest Rate and credit risks) and name-specific CDS credit spread curves (or, in case no individual CDS spread is available, CDS index credit spreads and idiosyncratic spreads)

Comments

- Considering that the CDS-Bond basis is considered as a risk factor which is difficult to model, the level of correlation in the P&L vectors is, remarkably, quite high for most banks (4 & 7 show lower correlation).
- However, bonds included in the portfolio incorporate interest rate risk, which is arguably driving most of the P&L variation.
- This explains why this non-directional portfolio shows a higher VaR than portfolio 24 (10 M long position via sold CDS)
- If we consider that portfolio 9 (an IRS, i.e. pure interest rate risk) shows one of the lowest dispersions (i.e. very high correlation and very similar degree of variability in the P&L vector) then it seems that the basis risk is acting as an important variability driver.
- Dispersion in P&L volatility is very high.
- As a result this portfolio presents a high level of variability for 'VaR Alt'
- Dispersion increases, though does not change significantly for 'VaR' and 'VaR Comp' measures.

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Credit Spread Portfolios: Number 27 – Short Index put on ITraxx Europe Crossover series 19

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
27 Credit Spread	**Short Index put on ITraxx Europe Crossover series 19** - European put option, 10 M Eur notional, 500 b.p. strike, ITRAXX-Xover 20-June-2018 underlying, maturity 18 December 2013	EUR	✕	✕	x
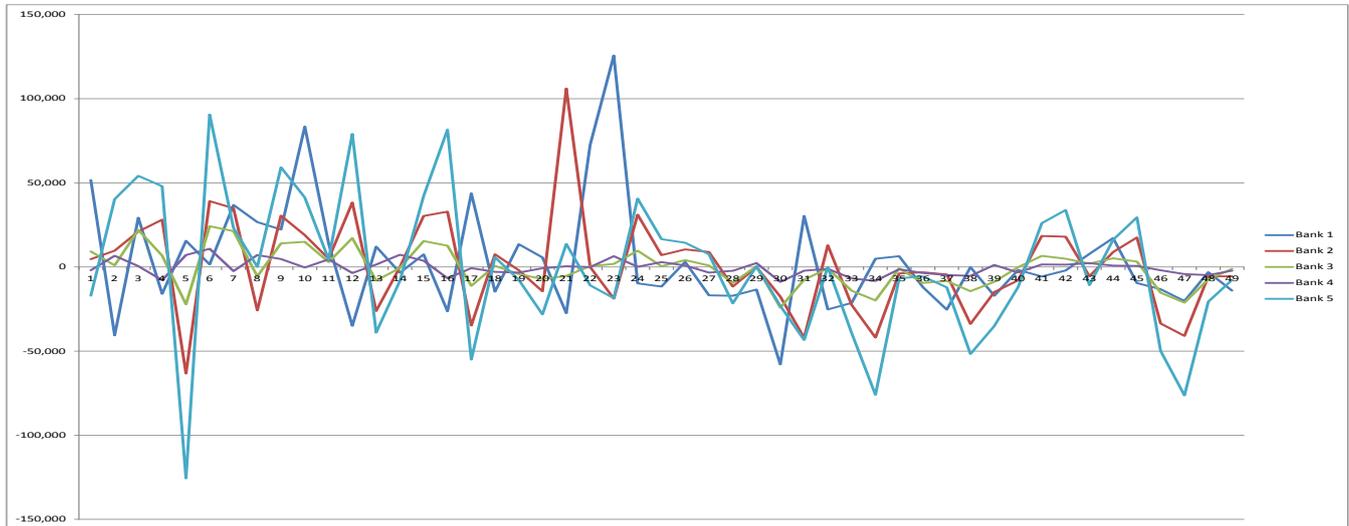
50-day P&L vector

P27	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5
Bank 1		16	55	48	23
Bank 2	16		73	53	78
Bank 3	55	73		76	79
Bank 4	48	53	76		59
Bank 5	23	78	79	59	
P&L Stdev	22.69	22.51	13.05	4.35	48.00
Mean	22.12				
Stdev	14.62				
Stdev / Mean	66.08%				

Correlations across one-year daily P&L observations

Main Risk Factors

Material risk factors are implied volatilities on ITRAXX level of spread.

Comments

- Only 5 banks provided data for this bespoke portfolio.
- Correlation in the P&L is generally low, in particular banks 1 & 2 show very low correlation with the others, whilst 3, 4 & 5 are more correlated.
- Variability in the P&L volatility is extremely high.
- As a result this portfolio presents the highest level of dispersion for 'VaR Alt' across the 28 portfolios, though also has less participating banks (so the results should be considered with an additional layer of caution).
- Variability doesn't change significantly for 'VaR' and 'VaR Comp' measures.

		Credit Spread Portfolios									
		P19	P20	P21	P22	P23	P24	P25	P26	P27	P28
VaR	Min	62.94	106.48	70.51	72.92	83.16	54.67	6.35	114.52	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	229.41
	Median	119.81	188.38	116.27	125.83	147.21	85.11	33.18	265.67	210.46	136.12
	Mean	121.92	218.56	147.22	122.40	163.17	113.16	31.84	273.37	216.90	139.29
	Stdev	41.49	73.76	59.93	29.60	57.79	61.87	14.11	120.47	105.69	56.77
	Stdev/Mean	34%	34%	41%	24%	35%	55%	44%	44%	49%	41%
VaR Alt	Min	66.45	107.81	79.09	72.04	81.26	32.16	3.99	140.26	45.17	37.94
	Max	125.94	274.28	140.75	121.09	165.72	83.13	47.62	373.21	281.32	200.02
	Median	88.97	199.10	104.78	99.74	151.98	70.37	36.31	229.08	195.57	97.87
	Mean	96.59	195.44	109.42	100.35	136.88	66.51	33.60	238.49	170.84	109.71
	Stdev	22.11	64.20	22.53	12.14	29.39	16.39	16.03	90.64	88.92	49.16
	Stdev/Mean	23%	33%	21%	12%	21%	25%	48%	38%	52%	45%
VaR Comp	Min	70.18	136.57	97.33	85.43	91.56	58.13	6.35	157.43	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	212.52
	Median	122.88	221.19	148.67	129.15	162.29	87.52	37.04	313.37	210.46	136.12
	Mean	131.02	229.76	161.25	127.22	173.84	123.54	33.90	291.58	220.79	131.40
	Stdev	41.43	72.58	60.76	29.24	56.69	63.90	15.91	117.79	115.09	53.00
	Stdev/Mean	32%	32%	38%	23%	33%	52%	47%	40%	52%	40%

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Credit Spread Portfolios: Number 28 – Quanto CDS on Spain with delta hedge

Portfolio # *Risk Factor*	Strategy	Base Currency	VaR	Stressed VaR	IRC
28 Credit Spread	**Quanto CDS on Spain with delta hedge**	EUR	×	×	x
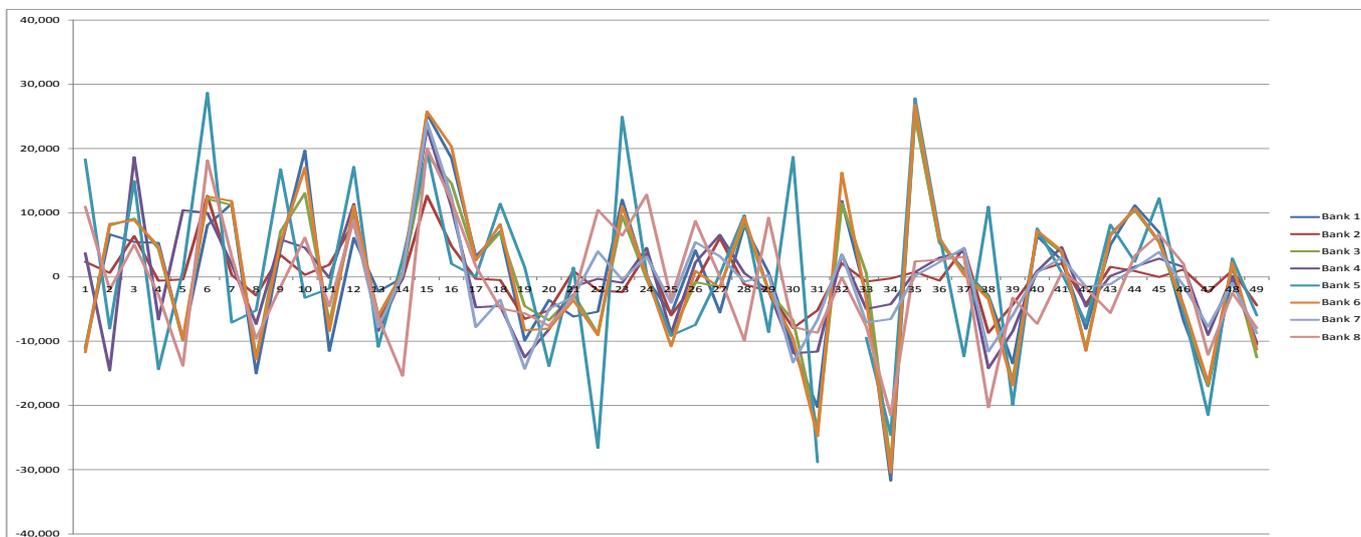
50-day P&L vector

P28	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8
Bank 1		61	94	65	74	97	69	52
Bank 2	61		61	80	49	65	79	55
Bank 3	94	61		63	81	95	59	52
Bank 4	65	80	63		53	59	92	82
Bank 5	74	49	81	53		76	44	39
Bank 6	97	65	95	59	76		60	43
Bank 7	69	79	59	92	44	60		78
Bank 8	52	55	52	82	39	43	78	
P&L Stdev	11.22	4.19	12.72	13.34	15.49	10.92	8.37	19.57

Mean	11.98
Stdev	4.30
Stdev / Mean	35.87%

Correlations across one-year daily P&L observations

Main Risk Factors

Material risk factors are USD- and EUR-swap curves, quanto basis and name-specific CDS credit spread curve for Spain.

Comments

- Only 8 banks provided data for this bespoke portfolio.
- Correlation in the P&L is mid-low, and banks 5 & 8 in particular show a low correlation with the others.
- Again, variability in the P&L volatility is very high.
- As a result this portfolio presents a high level of dispersion for 'VaR Alt'.
- Variability actually decreases (though does not change significantly) for 'VaR' and 'VaR Comp' measures.

		Credit Spread Portfolios									
		P19	P20	P21	P22	P23	P24	P25	P26	P27	P28
VaR	Min	62.94	106.48	70.51	72.92	83.16	54.67	6.35	114.52	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	229.41
	Median	119.81	188.38	116.27	125.83	147.21	85.11	33.18	265.67	210.46	136.12
	Mean	121.92	218.56	147.22	122.40	163.17	113.16	31.84	273.37	216.90	139.29
	Stdev	41.49	73.76	59.93	29.60	57.79	61.87	14.11	120.47	105.69	56.77
	Stdev/Mean	34%	34%	41%	24%	35%	55%	44%	44%	49%	41%
VaR Alt	Min	66.45	107.81	79.09	72.04	81.26	32.16	3.99	140.26	45.17	37.94
	Max	125.94	274.28	140.75	121.09	165.72	83.13	47.62	373.21	281.32	200.02
	Median	88.97	199.10	104.78	99.74	151.98	70.37	36.31	229.08	195.57	97.87
	Mean	96.59	195.44	109.42	100.35	136.88	66.51	33.60	238.49	170.84	109.71
	Stdev	22.11	64.20	22.53	12.14	29.39	16.39	16.03	90.64	88.92	49.16
	Stdev/Mean	23%	33%	21%	12%	21%	25%	48%	38%	52%	45%
VaR Comp	Min	70.18	136.57	97.33	85.43	91.56	58.13	6.35	157.43	55.34	39.42
	Max	210.79	359.87	243.58	182.10	260.27	238.62	49.19	484.27	332.19	212.52
	Median	122.88	221.19	148.67	129.15	162.29	87.52	37.04	313.37	210.46	136.12
	Mean	131.02	229.76	161.25	127.22	173.84	123.54	33.90	291.58	220.79	131.40
	Stdev	41.43	72.58	60.76	29.24	56.69	63.90	15.91	117.79	115.09	53.00
	Stdev/Mean	32%	32%	38%	23%	33%	52%	47%	40%	52%	40%

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3.13 Aggregated portfolios

The following 7 aggregated portfolios have been assessed:

Portfolio number	Description
29	All non-APR portfolios excluding exotic portfolios
30	All non-APR portfolios
31	All Equity portfolios
32	All Interest Rate portfolios
33	All FX portfolios
34	All Commodity portfolios
35	All Credit Spread portfolios

The sample size for each of the 7 aggregated portfolios can be seen below (see section 3.2.3 for further details). As explained in section 3.2.2 of this report, several data points were eliminated from the analysis, mainly because the aggregated portfolio was lacking too many of the individual portfolios that form part of it (especially for two of the participating banks) making any capital charges stemming from these portfolios non-comparable with those provided by the rest of banks.

As can be observed below lack of data is particularly acute for portfolio 34 (comprising portfolios 17 & 18 – commodities):

	P29	P30	P31	P32	P33	P34	P35
VaR	10	10	10	13	10	8	12
SVaR	10	10	10	13	10	8	12
IRC	11	11					11

The following tables (9 & 10) present the minimum, maximum, median, mean, and standard deviation, as well as the variability (standard deviation / mean) for the 3 alternative VaR metrics assessed in this report, and for the Stressed VaR.

The same information for the IRC metric is also provided for the 3 aggregated portfolios that comprise individual portfolios subject to an IRC charge. No IRC data is provided for the aggregated portfolio 32 (interest rate) since it only includes one individual portfolio (8) with specific risk, so the results would be the same as those provided in section 3.9 of this report.

In addition, the tables also provide the theoretical capital charge that would result for each of the aggregated portfolios. Two calculations have been performed, one considering the real multipliers that banks apply to their VaR & SVaR (i.e. including regulatory add-ons) and a second one, setting all multipliers at 3.

Information on the Diversification Benefit (DB) observed for all the risk metrics (VaR, VaR Alt, VaR Comp, SVaR, IRC) and capital measures assessed is also provided.

| | | Aggregated Portfolios | | | | | | | | |
| | | All in (Non-Exotic) | | | All in | | | Equity | | |
		Sum	P29	D.B.	Sum	P30	D.B.	Sum	P31	D.B.
VaR	Min	2,397.01	624.20	55%	4,042.09	767.74	72%	814.13	168.46	74%
	Max	3,898.31	1,636.31	76%	5,820.63	1,506.42	84%	1,651.36	390.60	84%
	Median	2,855.57	849.65	72%	4,544.02	844.49	81%	1,193.90	237.61	77%
	Mean	2,994.15	931.53	69%	4,680.82	945.77	80%	1,241.48	278.00	78%
	Stdev	466.52	284.41	0.07	585.75	234.87	0.04	297.85	88.66	0.03
	Stdev/Mean	16%	31%	10%	13%	25%	5%	24%	32%	4%
VaR Alt	Min	2,239.11	684.80	61%	3,159.40	682.18	75%	855.54	202.98	55%
	Max	2,880.23	1,027.10	69%	4,286.43	973.54	82%	1,083.99	487.51	76%
	Median	2,480.14	904.86	66%	3,679.20	796.31	79%	939.68	289.49	72%
	Mean	2,546.76	877.26	66%	3,727.22	799.94	78%	964.35	296.10	70%
	Stdev	232.88	129.87	0.03	354.69	99.73	0.03	88.02	92.03	0.08
	Stdev/Mean	9%	15%	5%	10%	12%	3%	9%	31%	11%
VaR Comp	Min	2,688.06	743.04	55%	4,042.09	767.74	72%	1,054.24	168.46	74%
	Max	3,898.31	1,636.31	75%	5,820.63	1,506.42	84%	1,812.43	390.60	84%
	Median	2,978.84	896.43	73%	4,655.75	844.49	81%	1,383.90	306.31	79%
	Mean	3,140.32	975.76	69%	4,772.43	982.89	79%	1,363.74	297.05	79%
	Stdev	423.18	295.11	0.08	600.25	280.25	0.05	284.17	89.60	0.03
	Stdev/Mean	13%	30%	11%	13%	29%	6%	21%	30%	4%
SVaR	Min	3,804.08	1,178.24	55%	5,700.45	1,323.76	62%	1,442.17	216.77	71%
	Max	7,981.22	3,124.47	82%	12,188.81	3,819.00	83%	4,127.21	727.91	91%
	Median	5,649.04	1,631.87	68%	8,387.38	1,796.43	78%	2,314.61	350.12	84%
	Mean	5,751.86	1,784.37	69%	8,438.91	2,022.83	76%	2,373.15	388.32	83%
	Stdev	1,231.01	546.01	0.08	1,880.59	714.43	0.07	784.37	136.34	0.06
	Stdev/Mean	21%	31%	11%	22%	35%	9%	33%	35%	8%
IRC	Min	3,906.67	1,755.15	25%	3,924.85	1,694.68	31%			
	Max	8,438.46	6,172.56	68%	8,726.65	6,026.82	74%			
	Median	5,049.65	2,921.76	42%	5,185.41	2,876.82	41%			
	Mean	5,334.74	3,161.15	42%	5,562.99	3,068.81	45%			
	Stdev	1,405.18	1,364.03	0.13	1,447.19	1,214.88	0.13			
	Stdev/Mean	26%	43%	32%	26%	40%	30%			
Capital	Min	25,351.54	8,426.27	50%	34,298.21	8,764.52	62%	7,565.67	1,155.68	75%
	Max	46,492.26	18,455.03	75%	68,193.91	19,730.01	80%	19,578.78	3,807.02	89%
	Median	34,276.50	11,398.17	66%	45,314.37	12,911.98	75%	10,691.11	2,119.87	82%
	Mean	34,276.78	12,167.05	64%	48,412.79	12,772.80	73%	11,863.24	2,167.03	81%
	Stdev	6,743.11	3,391.39	0.09	10,444.56	3,280.52	0.06	3,383.26	687.17	0.04
	Stdev/Mean	20%	28%	14%	22%	26%	9%	29%	32%	5%
Capital setting multipliers at 3	Min	25,351.54	8,036.23	50%	34,298.21	8,764.52	62%	7,565.67	1,155.68	75%
	Max	40,552.49	18,455.03	75%	59,189.19	19,730.01	79%	16,781.81	3,263.16	89%
	Median	30,361.85	11,398.17	66%	43,654.43	11,036.50	74%	10,108.29	1,935.62	82%
	Mean	31,465.41	11,371.90	64%	44,514.57	11,976.77	73%	10,843.91	1,998.96	81%
	Stdev	4,757.27	3,374.24	0.09	6,961.14	3,353.96	0.06	2,625.54	588.39	0.04
	Stdev/Mean	15%	30%	14%	16%	28%	9%	24%	29%	5%

Table 9: Dispersion results - Portfolios 29 to 31

		Aggregated Portfolios											
		Interest Rates			FX			Commodity			Credit Spread		
		Sum	P32	D.B.	Sum	P33	D.B.	Sum	P34	D.B.	Sum	P35	D.B.
VaR	Min	181.47	154.47	15%	743.89	358.00	31%	227.14	114.56	38%	1,101.66	390.38	52%
	Max	1,188.21	751.51	74%	1,114.69	770.20	54%	448.94	219.71	53%	2,154.10	1,020.88	76%
	Median	835.63	249.83	67%	809.28	445.61	46%	299.74	150.31	49%	1,377.91	528.89	61%
	Mean	800.45	294.30	61%	836.18	459.14	46%	303.20	155.45	48%	1,483.16	550.47	62%
	Stdev	257.89	161.33	0.18	112.99	124.88	0.07	79.37	35.21	0.05	365.71	175.34	0.08
	Stdev/Mean	32%	55%	30%	14%	27%	16%	26%	23%	11%	25%	32%	13%
VaR Alt	Min	462.87	155.37	66%	669.30	264.44	42%	160.75	119.63	21%	769.78	371.13	44%
	Max	825.00	236.16	77%	776.08	435.21	64%	249.44	136.02	45%	1,660.05	558.30	71%
	Median	683.99	203.88	72%	741.25	376.30	48%	214.48	129.15	42%	1,075.83	429.39	61%
	Mean	681.42	193.11	72%	734.15	362.26	51%	209.78	128.49	37%	1,154.77	439.63	60%
	Stdev	109.35	28.41	0.03	35.20	62.58	0.09	36.72	6.90	0.11	305.65	56.71	0.08
	Stdev/Mean	16%	15%	4%	5%	17%	18%	18%	5%	30%	26%	13%	14%
VaR Comp	Min	663.68	192.22	63%	767.49	371.12	31%	236.92	138.21	38%	1,101.66	397.72	52%
	Max	1,052.37	333.95	74%	1,114.69	770.20	54%	448.94	219.71	53%	2,154.10	1,020.88	76%
	Median	840.16	265.73	68%	830.23	447.48	46%	300.87	153.00	50%	1,421.44	536.29	60%
	Mean	829.97	262.14	68%	861.88	483.54	45%	321.90	165.98	48%	1,509.07	572.95	61%
	Stdev	133.40	53.16	0.04	116.41	132.60	0.08	90.03	36.89	0.07	403.73	187.71	0.09
	Stdev/Mean	16%	20%	5%	14%	27%	18%	28%	22%	14%	27%	33%	14%
SVaR	Min	362.02	312.02	14%	1,297.43	814.84	9%	369.75	257.78	30%	1,567.07	759.79	40%
	Max	1,882.67	725.86	67%	2,608.15	2,020.15	53%	913.56	575.27	55%	3,538.85	2,105.68	70%
	Median	1,098.22	516.06	57%	1,969.25	1,237.59	33%	583.16	269.08	43%	2,541.23	989.90	56%
	Mean	1,183.77	519.73	52%	1,915.75	1,284.38	33%	623.61	354.51	43%	2,560.19	1,151.47	55%
	Stdev	443.78	133.50	0.15	378.85	364.12	0.14	202.73	143.32	0.10	605.00	424.14	0.10
	Stdev/Mean	37%	26%	29%	20%	28%	42%	33%	40%	22%	24%	37%	18%
IRC	Min										3,895.90	1,691.17	28%
	Max										8,334.99	6,011.00	73%
	Median										5,185.41	2,890.05	41%
	Mean										5,433.34	3,055.99	44%
	Stdev										1,503.10	1,216.44	0.13
	Stdev/Mean										28%	40%	30%
Capital	Min	4,680.05	2,029.89	44%	5,364.73	3,612.91	19%	1,820.00	1,212.65	33%	12,415.41	6,605.13	43%
	Max	10,457.52	5,902.36	67%	11,540.81	8,650.06	52%	4,394.48	2,512.02	54%	23,724.17	13,124.09	68%
	Median	6,840.87	2,753.67	60%	8,465.68	5,994.70	37%	3,228.56	1,571.73	45%	18,354.78	7,514.16	48%
	Mean	7,589.24	3,187.64	58%	8,962.52	5,698.61	36%	3,154.09	1,720.68	45%	18,664.81	8,653.43	53%
	Stdev	2,386.97	1,310.07	0.08	2,226.94	1,492.09	0.11	915.25	528.55	0.08	3,874.43	2,123.12	0.09
	Stdev/Mean	31%	41%	14%	25%	26%	31%	29%	31%	17%	21%	25%	17%
Capital setting multipliers at 3	Min	4,680.05	2,029.89	43%	5,364.73	3,612.91	19%	1,820.00	1,117.03	33%	12,415.41	5,809.70	43%
	Max	8,859.18	4,467.78	67%	11,168.52	8,371.03	52%	3,766.70	2,204.67	54%	23,162.21	13,124.09	69%
	Median	6,840.87	2,753.67	60%	8,412.42	5,049.60	37%	2,648.72	1,245.91	45%	18,345.90	7,398.69	48%
	Mean	6,766.94	2,819.81	58%	8,131.07	5,230.56	36%	2,780.41	1,529.89	45%	17,389.39	8,161.81	53%
	Stdev	1,388.38	773.92	0.08	1,566.83	1,427.91	0.11	790.51	505.22	0.08	3,488.47	2,267.46	0.09
	Stdev/Mean	21%	27%	14%	19%	27%	31%	28%	33%	17%	20%	28%	17%

Table 10: Dispersion results - Portfolios 32 to 35

As was the case for the individual portfolios, it can be observed that variability for the homogenised VaR (i.e. VaR Alt) is significantly lower than that observed for the regulatory VaR metric. Overall variability decreases by 50% (i.e. from 32% to 16%) for the VaR Alt. This reduction is consistently observed, though for portfolio 31 the reduction is very limited.

Variability also decreases in general for banks using HS (i.e. VaR Comp) though, certainly, not to the same extent (i.e. the overall variability is only reduced from 32% to 27%). For portfolios 30 and 25 it slightly increases.

The following charts (18 and 19) show scatter plots of the VaR and VaR Alt results for the aggregated portfolios.
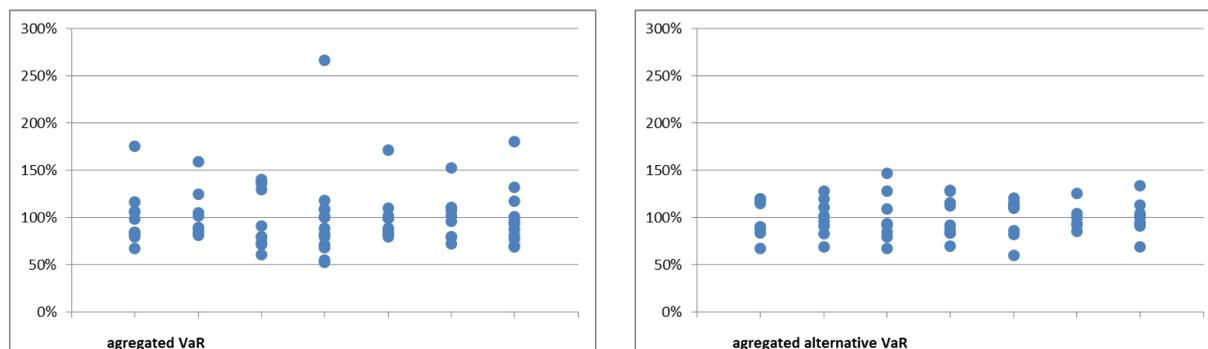
Charts 18 & 19: VaR and VaR Alt normalised dispersion – Portfolios 29 to 35

Dispersion in Diversification Benefits (DB)

Regarding the Diversification Benefit (DB), which is one the main drivers behind VaR-portfolio charges, it can be observed that, in general, larger aggregated portfolios exhibit greater DB than smaller ones. This does not follow a strict order in all cases and, in addition, we should not forget that DB may really be reflecting offsetting between the different portfolios, rather than actual diversification. This type of bias could be especially important in this kind of exercise, where even aggregated portfolios comprise a very limited number of positions.

In any case, the larger median DB is observed for those portfolios which comprise a large number of individual portfolios, such as 30 (all in, 28 portfolios included) and 29 (all in non-exotic, 20), whilst the lower level of DB is for 33 (FX, 4) and 34 (Commodities, 2). On average, there is less dispersion in the DB for Alt VaR (12% vs 13%), and this is particularly the case for the two more-inclusive portfolios (29 and 30).

As noted in section 3.7.1 of this report, dispersion for the Alt VaR metric is, for the average of the 28 individual portfolios, 29% lower than that observed for the regulatory VaR metric, however the dispersion decreases even more (around 50%) when we analyse the aggregated portfolios. This may be partially due to the lower dispersion observed in the DB for the Alt VaR metric in some of the portfolios, in particular 29, 30 and, especially, 32.

However in other cases (such as portfolio 33) variability in the DB is actually higher than that observed for VaR (11% vs 4%). In this case, the significantly lower dispersion observed in the individual portfolios (9% vs 24% for the 'Sum' column) is almost entirely neutralised when the VaR is calculated for the aggregated portfolio (31% vs 32%).

As regards Stressed VaR, the level of dispersion is generally higher than for VaR, though for portfolios 29 and 32 is the same or lower. There is also more dispersion in the DB observed, though this is not the case for portfolios 31 and 32.

Differences in SVaR capital are not large in any case (see scatter plots in chart 20 below). Variability is quite comparable to that observed in VaR, in fact the average SVaR dispersion for the aggregated portfolios is only slightly higher than for VaR (33% vs 32%).
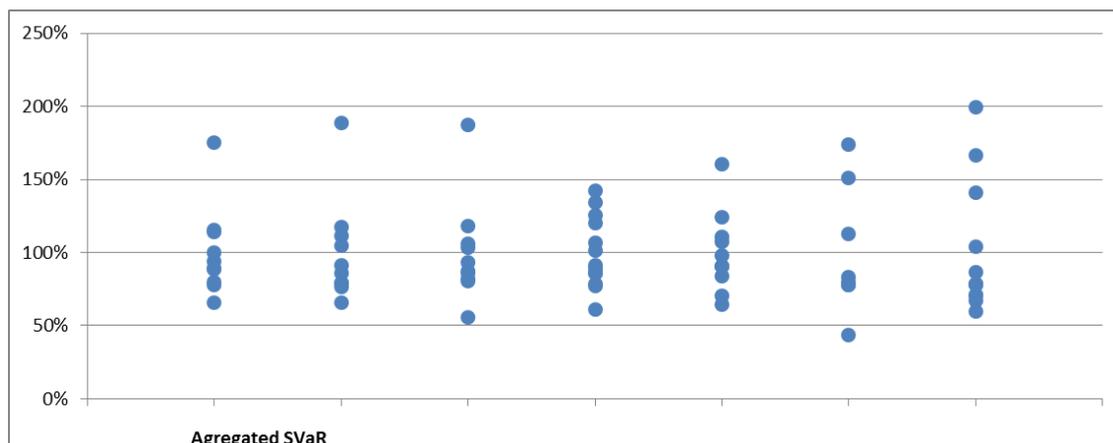
Chart 20: SVaR normalised dispersion – Portfolios 29 to 35

Regarding IRC, the median level of DB (41-42%) is significantly lower than for VaR / SVaR (where it is around 70-80% for the 'all in' portfolios), but the level of dispersion in the DB is significantly higher than for regulatory VaR (30% vs 5% for the 'all in' portfolio).

The resulting variability observed for IRC (see scatter plots in chart 21 below) in the aggregated portfolios (41%) is higher than that obtained for VaR and SVaR, but is clearly less than that observed for correlation trading models described in section 3.14 of this report.
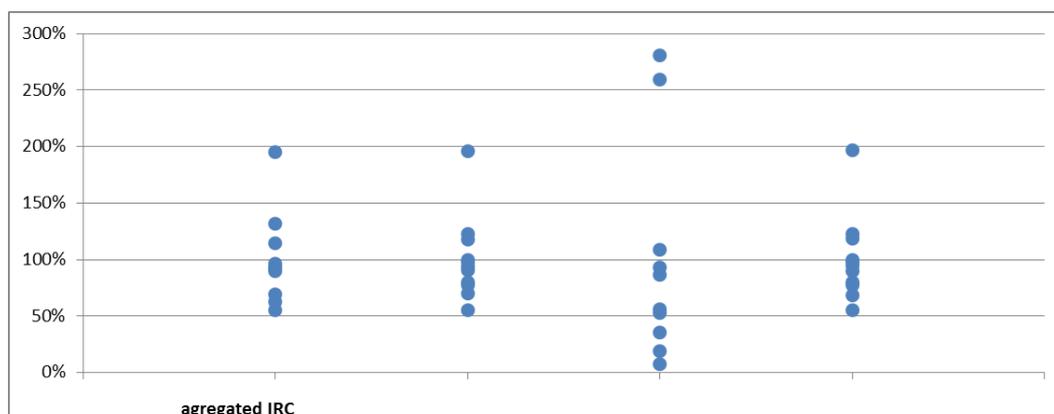
Chart 21: IRC normalised dispersion – Portfolios 29 to 35

Dispersion in Capital outcome:

As may be observed in the Table 9 above, variability in the capital outcome (i.e. aggregating VaR, SVaR and IRC charges) for the most 'inclusive' portfolios (i.e. 29 and 30) is in the range of 28-26% which, as seen in the table (11) below, is clearly lower than the average dispersion observed for VaR, SVaR and IRC, both on an individual and aggregated basis[10].

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[10] In addition it is worth noting that there is one firm which has reported a substantially higher aggregated capital than the rest (see Charts 22 & 23), if this firm is excluded from the analysis, variability would decrease to 23% and 19% for portfolios 29 and 30, respectively.

		VaR	SVaR	IRC
INDIV. PORT.	Equity	32%	54%	
	Interest Rate	36%	34%	91%
	FX	30%	32%	
	Commodities	26%	35%	
	Credit Spread	40%	48%	77%
	TOTAL	33%	41%	84%
AGGREGATED PORT.		32%	33%	41%

Table 11: Average dispersion results

On an aggregated basis, variability does not seem to be driven by complexity, since it is lower for portfolio 30 than for portfolio 29 (which excludes bespoke positions). In fact, the lowest variability is observed for portfolio 35 (credit - 25%) which encompasses most of the portfolios with higher VaR/SVaR dispersion.

Accordingly, it may be deducted that the idiosyncratic factors which drive variability on an individual portfolio do not compound when they are aggregated; on the contrary, they tend to compensate when market risk metrics are summed.

Finally, variability was not influenced in this particular exercise by regulatory add-ons. The max-min range of capital values dispersion for portfolios 29 and 30 remains exactly the same when 3 multipliers are applied instead of the regulatory ones, but the variation coefficient actually increases due to the lower capital average obtained (see charts 22 & 23).
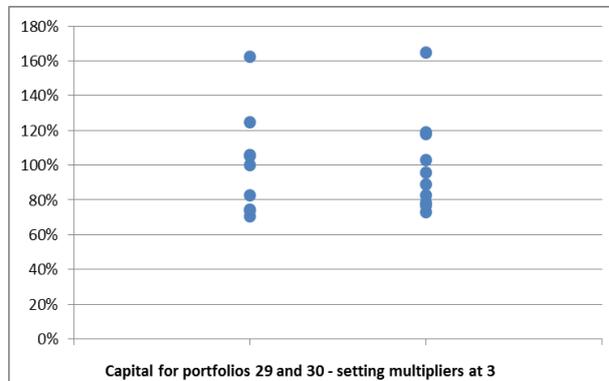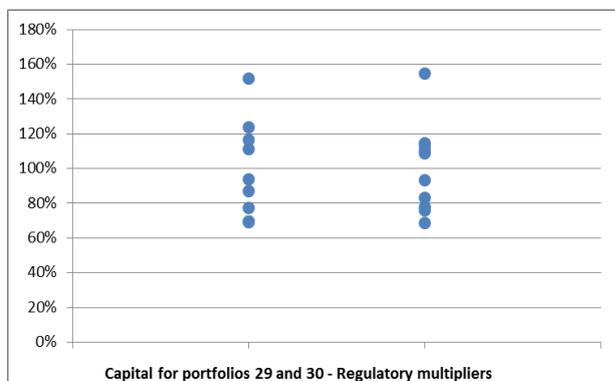
Charts 22 & 23: Capital normalised dispersion – Portfolios 29 & 30

3.14 Correlation Trading Models

The following 7 correlation trading portfolios have been assessed:

Portfolio number	Description
1	Long position in spread hedged equity tranche of CDX.NA.IG index series 9 v4 (attachment point: 0%, detachment point: 3%)
2	Long position in spread hedged mezzanine tranche of CDX.NA.IG index series 9 v4 (attachment point: 7%, detachment point: 10%)
3	Short position in spread hedged super senior tranche of CDX.NA.IG index series 9 v4 (attachment point: 30%, detachment point: 100%)
4	Spread hedged First to Default CDS on basket of 5 obligors with a US tech sector focus.
5	Spread hedged Bespoke synthetic CDO tranche referencing iTraxx Europe index series 9 with non-standard maturity
6	Spread hedged Bespoke synthetic CDO tranche referencing iTraxx Europe index series 9 with non-standard attachment and detachment points
7	Spread hedged Bespoke synthetic CDO tranche referencing 100 obligors with US and Europe mix.

These individual portfolios were selected by the SIGTB from a much larger sample after feedback received from various institutions regarding materiality of the products under investigation. An all-in portfolio encompassing portfolios 1 to 7 was discarded as nearly all institutions indicated such a portfolio would not be an appropriate representation of a real correlation trading portfolio.

It is important to highlight that most institutions indicated that the correlation trading portfolio business was in 'wind-down' mode and, therefore, care was taken to limit investigation in this phase of the exercise to the most simple and liquid products.

The sample size for each of the 7 portfolios can be seen below. Only 6 of the participating banks were able to model correlation trading activities:

	P1	P2	P3	P4	P5	P6	P7
VaR	6	6	6	6	6	6	6
SVaR	6	6	6	6	6	6	6
APR	6	6	6	6	6	6	6
APR Floor	6	6	6	6	6	6	6

As can be seen all banks were able to provide the information and no data was excluded from this (very limited) sample. In any case, data is so scarce for this activity that no additional P&L analysis for VaR has been performed (VaR is not a relevant metric for this kind of activity). For the same reason (i.e. lack of enough data), no further analysis was produced for the All Price Risk (APR) metric. Only aggregated results are presented.

The following table (12) presents the minimum, maximum, median, mean, and standard deviation as well as the variability (standard deviation / mean) for the APR metric. In addition, as with the other 35 portfolios, the same information is provided for the 3 alternative VaR metrics assessed in this report, as well as for the Stressed VaR. Finally, the variability observed for the APR standardised charge (used to calculate the 8% floor for the internal model) is also included.

		APR Portfolios							Dispersion
		P1	P2	P3	P4	P5	P6	P7	2013
VaR	Min	32,051.33	7,291.80	468.22	14,997.98	3,784.55	12,818.50	13,326.95	68%
	Max	386,629.80	60,286.00	12,335.40	135,025.60	62,617.54	200,037.00	293,978.45	
	Median	203,905.61	40,137.40	9,070.77	32,972.04	40,538.75	73,525.02	194,655.18	
	Mean	199,241.80	39,603.63	7,921.94	47,905.07	33,667.46	79,715.56	172,261.68	
	Stdev	132,060.22	19,230.57	4,402.19	44,393.74	22,092.58	69,795.47	103,049.88	
	Stdev/Mean	66%	49%	56%	93%	66%	88%	60%	
VaR Alt	Min	95,354.35	27,607.68	5,376.62	15,852.27	4,254.71	9,143.09	70,528.53	54%
	Max	291,176.61	52,096.82	10,378.68	75,590.97	68,633.48	89,259.30	244,738.38	
	Median	191,858.73	42,856.80	8,909.13	22,784.32	35,676.69	73,823.35	155,643.34	
	Mean	192,562.10	41,354.52	8,393.39	34,252.97	36,060.39	61,512.27	156,638.40	
	Stdev	106,298.83	11,937.81	2,326.59	27,876.46	26,373.82	36,858.34	78,234.31	
	Stdev/Mean	55%	29%	28%	81%	73%	60%	50%	
VaR Comp	Min	97,505.47	31,582.41	5,296.51	14,997.98	9,660.88	11,310.44	80,794.68	54%
	Max	341,143.94	56,783.57	10,884.18	119,140.24	62,617.54	102,462.48	293,978.45	
	Median	203,905.61	38,733.52	9,070.77	29,564.29	41,789.34	73,525.02	194,655.18	
	Mean	211,615.16	41,458.26	8,580.56	48,316.70	38,964.28	65,205.74	191,020.87	
	Stdev	113,198.87	11,737.72	2,419.06	48,150.33	21,912.81	41,523.08	87,437.27	
	Stdev/Mean	53%	28%	28%	100%	56%	64%	46%	
SVaR	Min	65,633.44	16,109.86	1,066.05	27,094.20	5,474.26	14,457.00	23,015.48	93%
	Max	1,096,142.90	494,100.00	87,700.00	497,083.00	94,605.00	460,441.84	1,538,794.42	
	Median	650,723.84	78,442.68	16,486.81	137,429.73	56,748.71	123,262.05	516,278.89	
	Mean	578,210.36	170,449.38	24,994.67	220,328.12	51,602.23	178,093.65	589,178.24	
	Stdev	359,139.28	186,011.61	31,651.16	221,569.69	33,764.90	175,332.57	509,577.02	
	Stdev/Mean	62%	109%	127%	101%	65%	98%	86%	
APR	Min	531,307.50	48,368.74	11,921.26	224,062.17	1,444.04	110,297.89	2,429,341.64	81%
	Max	3,077,579.00	5,201,080.02	102,190.08	6,121,455.00	2,903,689.50	3,426,988.50	24,488,000.00	
	Median	1,895,384.72	2,375,660.00	42,161.25	1,226,086.60	911,436.42	1,911,795.72	9,670,051.43	
	Mean	1,777,326.55	2,245,254.00	45,768.51	2,385,621.21	1,133,556.88	1,831,869.87	11,338,316.52	
	Stdev	986,612.85	1,989,976.21	33,415.31	2,527,955.08	1,153,403.34	1,197,461.14	9,045,154.24	
	Stdev/Mean	56%	89%	73%	106%	102%	65%	80%	
APR St	Min	551,210.56	20,968.01	687.50	28,566.00	4,636.50	35,376.50	75,283.50	133%
	Max	9,397,059.22	1,357,340.00	64,573.90	1,133,193.10	623,474.00	5,309,302.68	15,689,500.00	
	Median	2,373,480.44	433,665.90	4,385.00	156,602.50	31,488.16	1,071,337.50	1,505,104.44	
	Mean	3,811,915.11	545,645.80	16,848.66	304,353.18	174,971.97	1,707,109.03	4,004,549.23	
	Stdev	3,939,159.10	593,257.10	27,118.50	416,457.24	256,427.99	2,106,735.25	5,990,201.23	
	Stdev/Mean	103%	109%	161%	137%	147%	123%	150%	

Table 12: Dispersion results - APR portfolios 1 to 7

Average variability for the APR charge (81%) is significantly higher than for any of the other metrics considered in this report (with the remarkable exception of the standardised APR calculation, which shows an average level of dispersion of 133%). Variability is more pronounced for portfolios 4 and 5. In any case, dispersion for APR is lower than that obtained for SVaR (93%) and quite comparable to that observed in regulatory VaR (68%).

As was the case for the non-APR portfolios the homogenised VaR metric (i.e. VaR Alt) is generally lower than that observed for the regulatory VaR. Overall variability decreases by more than 20% (i.e. from 68% to 54%) for the VaR Alt. Again, this reduction is not consistently observed, as in portfolio 5 variability increases.

In general, variability also decreases for banks using HS (i.e. VaR Comp), and the decrease is the same as that observed for VaR Alt; however, dispersion increases for portfolio 4. It is worth noting that VaR is not the most relevant metric for this kind of trading activity.

As mentioned above the variability for the standardised charge calculated to compute the regulatory floor established for the APR charge is the highest observed in this exercise. This result would go

against the notion that the standardised charges should be used in all cases to dampen variability, as this is not the case at least for correlation trading activities.

On average, variability is 133% (ranging from 103% to 161%). This may seem surprising, but it is worth remembering that the standardised approach for correlation trading activities is based on the Supervisory Formula Approach (SFA) that use bank's estimates for PDs and LGDs as inputs.

In this regard, the dispersion observed is quite in-line with the SIGBB finding on variability of PDs and LGDs used in the supervisory formula approach for specific risk of securitisation positions (see www.bis.org/publ/bcbs256.pdf for further details). This suggests that standardised approaches that rely to some extent on banks' internal estimation of parameters may be subject to similar levels of variability as internal model approaches.

Annex CRM (APR) and non-CRM portfolio specification

CRM portfolio specification

Common Instructions

Overview   To ensure accurate and consistent execution of the CRM exercise across all participating institutions, banks are asked to familiarize themselves with the following instructions and assumptions.

Acronyms   The following acronyms are used throughout this document:

Acronym	Definition
CRM	Comprehensive Risk Measure as defined per BCBS 193 and clarified in BCBS 208.
CS01	Credit spread sensitivity. Please refer to sections on additional assumptions and instructions for CDS and CDO products for details.
CTP	Correlation Trading Portfolio as defined per BCBS 193.

Submission   − *Where*

− Please submit exercise results to your respective national supervisors

− *How*

− Please submit exercise results using submission template provided with this document.

− *What*

− Please refer to the sections with heading "Required Results" and "Reporting Currency".

− *When*

Please provide all request results by Friday, June 28 2013.

Pre-exercise validation

Please submit the following to your local supervisor by May 17, 2013 using the template provided:

Valuation of each portfolio as of close of business May 10, 2013 (for portfolios 1-4 the valuation should be at 5.00pm New York time, for portfolios 5-7 the valuation should be at 5.00pm London time), together with additional details:
- o Source of the valuation (e.g. front office system, back office system)
- o Basis of valuation (market price or model (and if so what model))
- o Exact timing of the valuation
- o Any material assumptions used when booking each portfolio that were not included in the portfolio specification
- o The valuation should exclude the MtM of the CS01 hedges.
- o The valuation should also exclude all other valuation adjustments. These should be reported separately in the assumptions for each trade.

Par up-front fee for portfolios 4 to 7. Reported valuation should exclude this up-front fee.

Hedge notional and sign for the hedge notional for all portfolios and hedging instruments used (if different from requirements specified in the portfolio specification).

A summary document showing differences (if any) between your approved CRM model and the Basel Accord definition of the model.

This data will be reviewed in the week commencing 20 May to ensure all participating institutions have correctly understood instructions in this document.

Duration of exercise and key dates

Unless otherwise stated:

The duration and data requirements for the exercise are as follows:
- Calculate and report MtM as of: Friday, June 07 2013
- Calculate and report daily 10-day VaR figures (do not apply the multiplier) for the period 3-14 June
- Calculate and report weekly modeled CRM and standardised charges from Friday, June 07 2013 (**Start Date**) to Friday, June 14 2013 (**End Date**)

Book trades as of May 10 2013 (as required for the pre-exercise validation) and allow the trades to age throughout the CRM exercise without rebooking the trades.

Regulatory Approval of Models

Please refer to the following table regarding usage of models, depending on approval for regulatory capital calculations (a separate tab in the accompanying results template is provided to indicate whether an approved or internal model is used for each portfolio):

If the exercise requires use of model that is…	Then Bank must provide results using…
approved by your national regulator	the approved model.
not approved by your national regulator	the model currently being used for internal management purposes.

Required Results

Please document the following results, as applicable for each portfolio, in the results submission template accompanying this document.

- Market Value (MTM) as at 7 June. This follows the same inclusions/exclusions per the instructions in the Pre-exercise validation section of this document.
- VaR (general market and specific risk)
- Stressed VaR (general market and specific risk)
- CRM Modeled Charge
- CRM Standardised Charge
- Hedge notional for all portfolios.

The modeled CRM charge for the purposes of this exercise is defined as the sum of:
  a price risk component covering
    credit spread and index-single name basis,
    implied correlations and index-bespoke tranche basis
    and recovery rate volatility
  and a rating migration and default component

If attribution for the CRM modeled charge is available, then please provide additional breakdown of the following results for each portfolio:
  Price Risk CRM   Default and Migration CRM

Up-front fees, valuation adjustments, and CS01 hedges should be included for all portfolios when calculation VaR, Stressed VaR, and CRM.

Reporting Currency

For each portfolio, banks are asked to provide the results for each portfolio in two currencies:
  The Bank's home currency and
  The base currency of each exercise as specified in the Portfolio Definition section.

Two separate tabs in the accompanying results submission template are provided to facilitate the submission of both home and base currency results.

Collateral

Unless otherwise stated, assume that there is neither any margining agreements nor collateralization of positions associated with the trades entered in the exercise.

Active Management

Assume all hedge positions are static. No rebalancing is allowed on subsequent CRM reporting dates after initial valuation date (i.e. May 10th 2013) in order to minimize subsequent influences to the result that are external to the model.

CDS contract specific assumptions and instructions	Unless otherwise stated, the following assumptions are applicable for all CDS and index CDS positions:

- Assume any up-front fee is paid/received to enter the position as per the market conventions.
- The maturity date follows conventional quarterly termination dates, often referred to as "IMM dates".
- CS01 is defined as the change in CDS price due to a 1bp widening across all tenors of the single name or index spread.

Additional specifications required in order to compute pricing calculations should be done in a way that is consistent with market standards. Refer to section titled "Additional Required Assumptions" for further instructions.

CDO Tranche assumptions and instructions	Unless otherwise stated, the following assumptions are applicable for all CDO tranche positions:

- For standard index tranches, assume any up-front fee is paid/received to enter the position as per the market conventions
- Notional specified in each portfolio represents the original tranche notional, unadjusted for any defaults.
- CS01 is defined as the change in tranche price due to a 1bp widening across all tenors of the single name or index spread.
- Spread Delta is defined as the ratio of CS01 for the tranche over CS01 of the underlying credit (CDS, index CDS, or bond). In the case of non-index tranches, for the same tranche there will be one spread delta per underlying credit.

Additional specifications required in order to compute pricing calculations should be done in a way that is consistent with market standards. Refer to section titled "Additional Required Assumptions" for further instructions.

Additional Required Assumptions	If additional assumptions beyond those specified above are relevant to the interpretation of exercise results submitted, for example:

- coupon rolls,
- mapping against indices,
- weighting of contributions from different indices to a bespoke correlation surface, etc

then please submit a separate document containing these assumptions in addition to the results template spreadsheet.

Portfolio Definition

Portfolio # and Name	Strategy	Base Currency
1 - 3 **Standard Index CDO Tranches**	These portfolios contain positions in index tranches referencing the CDX.NA.IG index series 9 V4 (RED:2I65BYCG8). The portfolios facilitate quantitative comparison of techniques used in CDO pricing and CRM computation for a standardised product. Only the equity (0-3), mezzanine (7-10) and super senior (30-100) tranches are examined as these tranches provide sufficient coverage of the range of credit spread convexity, leverage, and correlation sensitivity typically encountered in correlation trading. Notional is 10M USD for each tranche. The contractual maturity is 7 years, Effective Sept. 21 2007, for each tranche with the actual maturity date of Dec. 20, 2014. Valuation as of 5pm NY time on each date of valuation. Assume running spread of 500bps for the tranches in portfolio 1,2, and running spread of 100 bps for portfolio 3. The following portfolios are constructed by hedging each index tranche with the CDX.NA.IG index series 9 V4 7Y CDS to achieve zero CS01 as of initial valuation date. No further rehedging is required. Please report the hedge notional as of the initial valuation date.	USD

Portfolio #	Tranche Position	Attachment Point (%)	Detachment Point (%)
1. Spread hedged EQ tranche	Long	0	3
2. Spread hedged Mez tranche	Long	7	10
3. Spread hedged SS tranche	Short	30	100

Portfolio # and Name	Strategy	Base Currency
4 **First-to-Default CDS**	This portfolio contains a First-to-default (FTD) CDS, used to compare risk model differences in a popular non-tranched credit instrument commonly seen in the correlation trading portfolio. The FTD CDS references the following basket of 5 obligors, with a US tech sector focus, which are all constituents of the CDX.NA.HY S19 (RED: 2I65BRJT8) Index:	USD

Obligor	CLIP
ADVANCED MICRO DEVICES, INC.	007G93AD4
RadioShack Corporation	7C547BAF9
Seagate Technology HDD Holdings	8J298RAA0
SunGard Data Systems Inc.	8EDAAMAE6
Unisys Corporation	999B35AF1

2M USD notional is invested in each underlying, Long Protection
The FTD CDS is effective as of May 10, 2013, and has a maturity of 5 years. This means the FTD CDS will mature on May 10, 2018.
The FTD CDS is spread delta hedged with 5 single name CDS corresponding to each obligor to achieve zero CS01, now a vector of 5 elements, as of initial valuation date. No further rehedging is required. Please report the hedge notional as of the initial valuation date. In addition, for each single name hedge, please use the 5 Y maturity CDS effective as of March 20 2013, as the hedge if available, and if not, please indicate which hedging instruments you used.
Please calculate the par FTD CDS premium as of the initial valuation date. This premium is paid quarterly, using Act360 day count. Please report this premium along with the initial MtM. The final premium for the exercise will be determined by averaging all the premia contributed by the Banks, after dropping the highest and lowest figures.
Valuation as of 5pm NY time on each date of valuation.
Assume running spread of 1000bps.

Portfolio # and Name	Strategy	Base Currency
5 **Bespoke Synthetic CDO Tranche (non-standard maturity)**	This is a non-standard index tranche referencing the iTraxx Europe index series 9 (RED:2I666VAI6) with a non-standard maturity, used to study the effect of interpolation used for the base correlation surface. Notional is 10M EUR, long the tranche	EUR

	Attachment point is 6% Detachment point is 9% The tranche has a contractual maturity of 6 years, effective as of March 20, 2008 (in other words, it will mature on June 20, 2014) Please calculate and report the par coupon as of the initial valuation date. Hedge the spread delta using the iTraxx Europe index series 9 7Y index CDS to achieve zero CS01 as of the initial valuation date. No further rehedging is required. Please report the index CDS notional used in the hedge. Valuation as of 5pm London time on each date of valuation. Assume running spread of 300 bps.	
6 **Bespoke Synthetic CDO Tranche (non-standard AP/DP)**	This is a non-standard index tranche referencing the iTraxx Europe index series 9 (RED:2I666VAI6) with a non-standard attachment and detachment point, used to study the effect of the interpolation methodology used for the base correlation surface. Notional is 10M EUR, long the tranche Attachment point is 5% Detachment point is 7% The tranche has a contractual maturity of 7 years, effective as of March 20, 2008 (in other words, it will mature on June 20, 2015) Please calculate and report the par coupon as of the initial valuation date. Hedge the spread delta using the iTraxx Europe index series 9 7Y index CDS to achieve zero CS01 as of the initial valuation date. No further rehedging is required. Please report the index CDS notional used in the hedge. Valuation as of 5pm London time on each date of valuation. Assume running spread of 500 bps.	EUR
7 **Bespoke Synthetic CDO Tranche (Base correlation mapping + regional mix)**	This portfolio is a synthetic CDO tranche referencing a pool of obligors pulled from popular credit indices just prior to the credit crisis. It is used to assess the risk in legacy bespoke positions where valuation and risk management is complicated by the cross-regional and cross sector composition of the reference pool and the need to integrate correlation information from multiple underlying indices. The CDO tranche is backed by the following obligations : First 25 (non-defaulted, non-matured, CLIP available) unique obligors in the CDX.NA.IG S9 V4 index First 25 (non-defaulted, non-matured, CLIP available) unique obligors in the CDX.HY.IG S9 V22 index First 25 (non-defaulted, non-matured, CLIP available) unique obligors in the iTraxx Europe S9 V1 index First 17 (non-defaulted, non-matured, CLIP available) unique obligors in the iTraxx Europe S9 V1 Cross-over V8 index First 8 (non-defaulted, non-matured, CLIP available) unique obligors in the iTraxx Europe S9 V1 HiVol index The full list of obligors is provided below. In case of discrepancies between the reference obligor and the CLIP, please use the obligor and look up the correct CLIP directly from Markit: http://www.markit.com/assets/en/docs/products/data/indices/credit-index-annexes/itraxx_europe_series_9(Xover%20v8).pdf http://www.markit.com/assets/en/docs/products/data/indices/credit-index-annexes/IG%209%20v4.pdf http://www.markit.com/assets/en/docs/products/data/indices/credit-index-annexes/CDX.NA.HY.9%20V22.pdf	EUR

	Obligor	CLIP	Source
1	ACE LIMITED	0A4848AC9	CDX.NA.IG S9 V4
2	Aetna Inc.	0A8985AC5	CDX.NA.IG S9 V4
3	The Allstate Corporation	0C2002AC1	CDX.NA.IG S9 V4
4	Altria Group, Inc.	0C4291AC8	CDX.NA.IG S9 V4
5	AMERICAN ELECTRIC POWER COMPANY, INC.	027A8AAC0	CDX.NA.IG S9 V4
6	American International Group, Inc.	028EFBAC1	CDX.NA.IG S9 V4
7	Amgen Inc.	0D4278AC3	CDX.NA.IG S9 V4

	8	Anadarko Petroleum Corporation	0A3576AD5	CDX.NA.IG S9 V4	
	9	Arrow Electronics, Inc.	0E69A8AA4	CDX.NA.IG S9 V4	
	10	AutoZone, Inc.	0F8665AA6	CDX.NA.IG S9 V4	
	11	Baxter International Inc.	0H8994AA6	CDX.NA.IG S9 V4	
	12	Boeing Capital Corporation	09G715AD8	CDX.NA.IG S9 V4	
	13	Burlington Northern Santa Fe Corporation	1D39H2AB2	CDX.NA.IG S9 V4	
	14	Campbell Soup Company	1E786BAC8	CDX.NA.IG S9 V4	
	15	Capital One Bank	1F444NAC3	CDX.NA.IG S9 V4	
	16	Cardinal Health, Inc.	1F55D7AB6	CDX.NA.IG S9 V4	
	17	CARNIVAL CORPORATION	1F79BDAD1	CDX.NA.IG S9 V4	
	18	Caterpillar Inc.	15DA35AC1	CDX.NA.IG S9 V4	
	19	CBS Corporation	136CDCAB6	CDX.NA.IG S9 V4	
	20	Centex Corporation	1G7543AD7	CDX.NA.IG S9 V4	
	21	Comcast Cable Communications, LLC	2C02BLAC3	CDX.NA.IG S9 V4	
	22	Computer Sciences Corporation	2C5899AC5	CDX.NA.IG S9 V4	
	23	ConAgra Foods, Inc.	225DGFAB6	CDX.NA.IG S9 V4	
	24	Countrywide Home Loans, Inc.	2E45A1AE9	CDX.NA.IG S9 V4	
	25	Cox Communications, Inc.	2E6448AC6	CDX.NA.IG S9 V4	
	26	The AES Corporation	0A143HAB4	CDX.NA.HY S9 V22	
	27	Allied Waste North America, Inc.	01AED5AC5	CDX.NA.HY S9 V22	
	28	American Axle & Manufacturing, Inc.	UU2679AA7	CDX.NA.HY S9 V22	
	29	ArvinMeritor, Inc.	0E7688AB0	CDX.NA.HY S9 V22	
	30	Beazer Homes USA, Inc.	07CABWAA5	CDX.NA.HY S9 V22	
	31	Chesapeake Energy Corporation	17B67DAD5	CDX.NA.HY S9 V22	
	32	CMS Energy Corporation	137DHFAC0	CDX.NA.HY S9 V22	
	33	Cooper Tire & Rubber Company	237EB4AC8	CDX.NA.HY S9 V22	
	34	CSC Holdings, Inc.	1D8934AC6	CDX.NA.HY S9 V22	
	35	Dillard's, Inc.	2H946DAB5	CDX.NA.HY S9 V22	
	36	DOMTAR INC.	27CCB7AC0	CDX.NA.HY S9 V22	
	37	EchoStar DBS Corporation	29FFDMAE7	CDX.NA.HY S9 V22	
	38	First Data Corporation	34AIF9AB9	CDX.NA.HY S9 V22	
	39	Ford Motor Company	3H98A7AB3	CDX.NA.HY S9 V22	
	40	FOREST OIL CORPORATION	37A69AAB2	CDX.NA.HY S9 V22	
	41	GEORGIA-PACIFIC LLC*	3AA64GAA9	CDX.NA.HY S9 V22	
	42	The Goodyear Tire & Rubber Company	3BA7A5AD6	CDX.NA.HY S9 V22	
	43	Harrah's Operating Company, Inc.	4F498HAF1	CDX.NA.HY S9 V22	
	44	The Hertz Corporation	46A844AC6	CDX.NA.HY S9 V22	

	45	Host Hotels & Resorts, L.P.	4I517NAA0	CDX.NA.HY S9 V22	
	46	IKON Office Solutions, Inc.	4J6884AD7	CDX.NA.HY S9 V22	
	47	K. Hovnanian Enterprises, Inc.	4I66CGAA7	CDX.NA.HY S9 V22	
	48	L-3 Communications Corporation	UZ523AAB1	CDX.NA.HY S9 V22	
	49	Massey Energy Company	5CD823AD1	CDX.NA.HY S9 V22	
	50	MGM MIRAGE	5A7BE8AE9	CDX.NA.HY S9 V22	
	51	Daimler AG	DE7C9QAA4	iTraxx.EU S9	
	52	VOLKSWAGEN AKTIENGESELLSCHAFT	9BAEC8AD7	iTraxx.EU S9	
	53	CADBURY SCHWEPPES PUBLIC LIMITED COMPANY	1D9929AC5	iTraxx.EU S9	
	54	CARREFOUR	FG4CAMAC3	iTraxx.EU S9	
	55	DIAGEO PLC	2H767TAC4	iTraxx.EU S9	
	56	EXPERIAN FINANCE PLC	GJ57CTAC9	iTraxx.EU S9	
	57	SAFEWAY LIMITED	GNEDEUAB4	iTraxx.EU S9	
	58	Svenska Cellulosa Aktiebolaget SCA	8EFEDFAB4	iTraxx.EU S9	
	59	E.ON AG	28EFF8AB5	iTraxx.EU S9	
	60	ELECTRICITE DE FRANCE	FHBD4HAC9	iTraxx.EU S9	
	61	UNITED UTILITIES PLC	9A442RAC9	iTraxx.EU S9	
	62	Vattenfall Aktiebolag	W5GGHNAD5	iTraxx.EU S9	
	63	Aegon N.V.	007GB6AD4	iTraxx.EU S9	
	64	ASSICURAZIONI GENERALI - SOCIETA PER AZIONI	0E996BAD3	iTraxx.EU S9	
	65	AVIVA PLC	GG6EBTAD8	iTraxx.EU S9	
	66	Banco Espirito Santo, S.A.	xx37B2AE7	iTraxx.EU S9	
	67	BARCLAYS BANK PLC	06DABKAE4	iTraxx.EU S9	
	68	BNP PARIBAS	05ABBFAF5	iTraxx.EU S9	
	69	Swiss Reinsurance Company	HPC44AAC3	iTraxx.EU S9	
	70	THE ROYAL BANK OF SCOTLAND PUBLIC LIMITED COMPANY	GNDEGIAC6	iTraxx.EU S9	
	71	UNICREDITO ITALIANO SOCIETA PER AZIONI	T2E64UAE6	iTraxx.EU S9	
	72	Zurich Insurance Company	9HHHARAD0	iTraxx.EU S9	
	73	Koninklijke DSM N.V.	NS517VAB7	iTraxx.EU S9	
	74	European Aeronautic Defence and Space Company EADS N.V.	FG8825AB6	iTraxx.EU S9	
	75	FINMECCANICA S.P.A.	3E9829AB5	iTraxx.EU S9	
	76	ALCATEL LUCENT	FF1AAKAB8	iTraxx.EU S9 Xover V8	
	77	BRITISH AIRWAYS plc	1C145AAA4	iTraxx.EU S9 Xover V8	
	78	BRITISH ENERGY HOLDINGS PLC	GH684NAA6	iTraxx.EU S9 Xover V8	
	79	CODERE FINANCE (LUXEMBOURG) S.A.	LM9E7LAA4	iTraxx.EU S9 Xover V8	
	80	Cognis GmbH	DE69AIAA8	iTraxx.EU S9 Xover V8	
	81	Evonik Degussa GmbH	DD79BOAA5	iTraxx.EU S9 Xover V8	
	82	Grohe Holding GmbH	DFAE7AAA0	iTraxx.EU S9 Xover V8	
	83	INEOS GROUP HOLDINGS PLC	GKBDF0AA0	iTraxx.EU S9 Xover V8	
	84	INTERNATIONAL POWER PLC	4A619UAA8	iTraxx.EU S9 Xover V8	
	85	ITV PLC	GKDHCEAC8	iTraxx.EU S9 Xover V8	
	86	Kabel Deutschland GmbH	DJA66EAB0	iTraxx.EU S9 Xover V8	
	87	NORDIC TELEPHONE COMPANY HOLDING ApS	KN48C9AA2	iTraxx.EU S9 Xover V8	
	88	NXP B.V.	NTBEFLAC1	iTraxx.EU S9 Xover V8	

89	ONO FINANCE II PUBLIC LIMITED COMPANY	GMDC6QAA9	iTraxx.EU S9 Xover V8
90	RHODIA	7D85CGAD9	iTraxx.EU S9 Xover V8
91	SMURFIT KAPPA FUNDING PUBLIC LIMITED COMPANY	GOA86FAC7	iTraxx.EU S9 Xover V8
92	Stena Aktiebolag	W4FCDXAA6	iTraxx.EU S9 Xover V8
93	NEXT PLC	GMB517AA3	iTraxx.EU S9 HVol
94	KELDA GROUP PLC	GJ5578AA9	iTraxx.EU S9 HVol
95	COMPAGNIE DE SAINT-GOBAIN	FG872CAB3	iTraxx.EU S9 HVol
96	LAFARGE	555DE7AB6	iTraxx.EU S9 HVol
97	RENTOKIL INITIAL PLC	GNC59OAA5	iTraxx.EU S9 HVol
98	ThyssenKrupp AG	DLBCG0AB0	iTraxx.EU S9 HVol
99	TELECOM ITALIA SPA	T2B9EFAE5	iTraxx.EU S9 HVol
100	WPP 2005 LIMITED	GPGFFQAC8	iTraxx.EU S9 HVol

The investment is 10M EUR in each of the reference obligation, which means the total reference pool size of the CDO is 1Bn EUR. The bank will be long these tranches.

Attachment point is 11%

Detachment point is 15%

The tranche has a contractual maturity of 7 years, effective as of March 20, 2008 (in other words, it will mature on June 20, 2015)

Please calculate and report the par coupon as of the initial valuation date.

Hedge the spread delta using all 100 single name CDSs to achieve zero CS01 as of the initial valuation date. No further rehedging is required. In this case CS01 is a vector of 100 elements, corresponding to each single name CDS. Please report the CDSs notional used in the hedge. In addition, for each single name hedge, please use the 7 Y maturity CDS, effective as of March 20 2008, as the hedge if available, and if not, please indicate which hedging instruments you used.

Please do not do any form of correlation hedging

Valuation as of 5pm London time on each date of valuation.

Assume running spread of 500 bps.

Non-APR portfolio specification

Common Instructions

In order to ensure the accurate and consistent execution of the exercise across all participating institutions, banks are asked to familiarize themselves with the following instructions and assumptions:

a)   Banks should assume they enter all positions on 10 May 2013, and once positions have been entered, each portfolio ages for the duration of the exercise. Furthermore, assume the Bank does not take any action to manage the portfolio in any way during the entire exercise period. Unless explicitly stated otherwise in the specifications for a particular portfolio, strike prices for options positions should be determined relative to prices for the underlying as observed at market close on 10 May 2013.

b)   For the purpose of pre-exercise validation banks should provide to their local supervisor on 17 May 2013 the valuation of each portfolio and the 10-day VaR based upon end of day prices observed on 10 May using the pre-exercise validation data template provided. Where possible, the exact timing of the valuation should be as per the table below:

Portfolio number	Valuation time
1 and 4	4.30pm London
2, 3 and 6	4.00pm London
5 and 7	4.30pm London
8-12 and 14	5.00pm London
13 and 15	4.30pm New York
16	4.30pm New York
17	1.30pm New York
18	2.30pm New York
19-28	5.00pm London

c)   The following additional details should also be provided in the pre-exercise validation data template:

   i.   Source of the valuation (e.g. front office system, back office system)

   ii.   Basis of valuation (market price or model (and if so what model))

   iii.   If the valuation included in the template incorporates any adjustment to the valuation produced by the bank's systems, the value of those adjustments

   iv.   Exact timing of the valuation

   v.   Any material assumptions used when booking each portfolio that were not included in the portfolio specification

d)   For the purpose of the test portfolio exercise, banks should provide the valuation of each portfolio on 3 June, together with the relevant required risk metrics as described in the accompanying results reporting template and explained below.

e)   Banks should calculate the risks of the positions without taking into account the funding costs associated to the portfolios (i.e. no assumptions are admitted as per the funding means of the portfolios).

f) Banks should exclude to the extent possible counterparty credit risk when valuing the risks of the portfolios.

g) Banks should calculate 10-day 99% VaR on a daily basis. If a participating bank also calculates VaR by risk factor, it may elect to separately provide an additional breakdown of total VaR, GMR (General Market Risk) VaR, DSR (Debt Specific Risk) VaR, and ESR (Equity Specific Risk) VaR for each portfolio as applicable.

h) Stressed VaR and IRC are to be calculated on a weekly basis. We would prefer that calculate Stressed VaR and IRC based on end of day prices for each Friday in the time window for the exercise. However, flexibility will be granted to banks preferring to use results from another day of the week if required.

i) For each portfolio, banks are asked to provide results in two currencies; one in the Bank's home currency and one in the base currency of the portfolio as provided in the table below.

j) In addition to VaR, stressed VaR and IRC risk metrics, banks should also provide the initial market value of each portfolio on day one of the exercise, and indicate the stress period used in the calculation of each portfolio. For the selection of the stress period, the following applies:

– In order to facilitate a quantitative assessment of the impact of different choices for stress periods across banks, stressed VaR for portfolios other than any "all-in" portfolios will be calculated using the top-of-the-house stressed period currently used by each bank for its actual trading portfolio.

– For the 'all-in portfolios', each bank is asked to use its own internal process for stress period selection to identify the appropriate stress period. Banks are not required to identify a separate stress period for each 'all-in' portfolio, instead the stress period for portfolio 29 should be used for all of the 'all-in' portfolios.

k) For transactions that include long positions in CDS, assume an immediate up-front fee is paid to enter the position as per the market conventions as indicated by Markit Partners (25, 50, 100bps for investment grade, 500bps for high yield).

l) Assume that the maturity date for all CDS in the exercise follow conventional quarterly termination dates, often referred to as "IMM dates".

m) Additional specifications required in order to compute pricing calculations required for CDS positions should be done in a way that is consistent with commonly used market standards.

n) Use the maturity date (i.e., some options expire on third Saturday of the month, etc.) that ensures the deal is closest to the term-to-maturity specified. For any material details of the product specification that are not explicitly stated in this document, please provide the assumptions you have used along with the results (i.e., day count convention, etc.).

o) The acronyms ATM, OTM and ITM refer to an option's moneyness: ATM stands for "at the money", OTM stands for "out of the money", and ITM means "in the money".

p) Assume that all options are traded over-the-counter unless explicitly specified in the portfolios

q) Follow the standard timing conventions for OTC options (i.e. expiry dates are the business day following a holiday)

r) Assume that the timing convention for options is as follows: The time to maturity for a n-month option entered on 10 May is in n months. For example, a 3-month OTC option entered on May 10, 2013 expires on August 10, 2013. If options expire on a non-trading day, adjust the expiration date as per business day conventions consistent with common practices. Also provide explicit details on the nature of the adjustment made.

s)   Assume that the exercise style for all OTC options specified is as follows:

       –   **American** for single name equities and commodities, and,

       –   **European** for equity indices, foreign exchange and Swaptions*.*

t)   For all options exclude the premium from the initial market value calculations (i.e. options are to be considered as "naked").

u)   In the case that a bank is required to make additional assumptions beyond those specified above that it believes are relevant to the interpretation of its exercise results (e.g. close of business timing, coupon rolls, mapping against indices, etc.), it should submit a description of those specifications in a separate document accompanying its return template.

Portfolio Definition

Equity Portfolios					
Portfolio # *Risk Factor*	**Strategy**	**Base Currency**	**VaR**	**Stressed VaR**	**IRC**
1 *Equity*	**Equity Index Futures** *Long delta* -Long 30 contracts ATM 3-month front running FTSE 100 index futures ** Futures price is based on the index level at NYSE Liffe London market close on Friday, May 10th, 2013. 1 contract corresponds to 10 equities underlying*	GBP	×	×	
2 *Equity*	**Bullish Leveraged Trade** *Long gamma & long vega* -Long 100 contracts OTC Google (GOOG) OTM 3-month call options (1 contract = 100 shares underlying) ** Strike price is out-of-the-money by 10% relative to the stock price at market close on Friday, May 10th, 2013.*	USD	×	×	
3 *Equity*	**Volatility Trade #1** *Short short-term vega & long long-term vega* -Short straddle 3-month ATM* S&P 500 Index OTC options (30 contracts) -Long straddle 2-year ATM S&P 500 Index OTC options (30 contracts) *1 contract corresponds to 100 equities underlying - effective date May 10th 2013 * Strike price is based on the index level at NYSE market close on May 10th 2013.*	USD	×	×	
4 Equity	**Volatility Trade #2 (Smile effect)** **Long/short puts on FTSE 100** - Long 40 contracts of 3-month put options on FTSE 100 index (*with a strike price that is 10% OTM* based on the end-of-day index value*) - Short 40 contracts of 3-month put options on FTSE 100 index (*with a strike price that is 10% ITM* based on the end-of-day index value*) ** Strike price is based on the index level at NYSE Liffe London market close on May 10th 2013. 1 contract corresponds to 10 equities underlying*	GBP	×	×	
5 Equity	**Equity Variance Swaps on Eurostoxx 50 (SX5E)** - Long ATM variance swap on Eurostoxx 50 with a maturity of 2 years, Vega notional amount of €50 k. The payoff is based on the following realized variance formula: $$\frac{252}{n-2}\sum_{i=1}^{n-1}[\ln(\frac{S_{i+1}}{S_i})]^2 \, ,$$ where n= number of working days until maturity. **Fixing dates are provided in annex 2-0.** The strike of the variance swap should be defined on the trade date (May 10th 2013) to cancel the value of the swap. (Please provide the strike you determined on the pre-exercise validation data template together with the initial market value of the trade.)	EUR	×	×	
6 Equity	**Barrier Option** - Long 40 contracts of 3-month ATM* S&P 500 down-and-in put options with a barrier level that is 10% OTM* and continuous (monitoring frequency. *1 contract corresponds to 100 equities underlying * Strike price is based on the index level at NYSE market close on May 10th 2013.*	USD	×	×	
7 Equity	**Quanto index call** - 3Year USD Quanto Call on Eurostoxx 50 ***See details in annex 2-1***	USD	x	x	
Interest Rate Portfolios					
Portfolio # *Risk Factor*	**Strategy**	**Base Currency**	**VaR**	**Stressed VaR**	**IRC**
8 *Interest*	**Curve Flattener Trade** *Long long-term & short short-term treasuries*	EUR	×	×	×

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
Rate	-Long €5MM 10-year German Treasury bond (ISIN: DE0001102309 Expiry February 2nd 2023) -Short €20MM 2-year German Treasury note (ISIN: DE0001137404 Expiry December 12th 2014)				
9 Interest Rate	**Interest rate swap** *Bloomberg code eusw10v3 curncy* - Receive fixed rate and pay floating rate - Fixed leg:, pay annually - Floating leg: 3-month Euribor rate, pay quarterly - Notional: €5mm, - Roll convention and calendar: standard - Effective date May 10th 2013 (i.e. rates to be used are those at the market as of May 10th 2013) - Maturity date May 10th 2023	EUR	×	×	
10 *Interest Rate*	**2-year swaption on 10-year interest rate swap** ***See details in annex 2-8***	EUR	×	×	
11 *Interest Rate*	**LIBOR Range Accrual** Structured coupon indexed on the number of days in the interest rate period when the Libor fixes in a predetermined range ***See details in annex 2-2***	USD	×	×	
12 *Interest Rate*	**Inflation zero coupon swap** EURHICPX index 10Y maturity par zero coupon swap ***See details in annex 2-3***	EUR	×	×	
Foreign Exchange Portfolios					
Portfolio # *Risk Factor*	Strategy	Base Currency	VaR	Stressed VaR	IRC
13 *F/X*	**Covered F/X Call** ***Short EUR/USD and short put EUR call USD option*** - Short 3-month EUR/USD forward contracts (i.e. long USD short EUR) with US$20MM notional purchased at the EUR/USD ECB reference rate as of end of day May 10th 2013 - Short 3-month put EUR call USD option notional US$ 40MM (i.e. short USD against EUR) with strike price corresponding to the three-month forward exchange rate as of end of day May 10th 2013 - effective date May 10th 2013 - expiry date August 12th 2013	EUR	×	×	
14 *F/X*	***Mark-to-market Cross-Currency Basis Swap*** ***2 Year USD 3M LIBOR vs. EUR 3M EURIBOR Swap*** ***See details in annex 2-9***	EUR	×	×	
15 *F/X*	**Knock-out option:** Vanilla option that ceases to exist if the underlying spot breaches a predetermined barrier before maturity ***See details in annex 2-4***	EUR	×	×	
16 *F/X*	**Double no touch option** Digital option that pays a predetermined amount if the spot does not touch any of the barriers during the life of the option ***See details in annex 2-5***	EUR	×	×	
Commodities Portfolios					
Portfolio # *Risk Factor*	Strategy	Base Currency	VaR	Stressed VaR	IRC
17 *Commodity*	**Curve Play from Contango to Backwardation** ***Long short-term and Short long-term contracts*** - Long 3,500,000 3-month ATM OTC London Gold Forwards contracts (1 contract = 0.001 troy ounces, notional: 3,500 troy ounces) - Short 4,300,000 1-year ATM OTC London Gold Forwards contracts (Notional: 4,300 troy ounces)	USD	×	×	

Portfolio # Risk Factor	Strategy	Base Currency	VaR	Stressed VaR	IRC
18 *Commodity*	**Short oil put options** -Short 30 contracts of 3-month OTC WTI Crude Oil puts with strike = 6-month end-of-day forward price on May 10th 2013 (1 contract = 1000 barrels, total notional 30,000 barrels)	USD	×	×	

Credit Spread Portfolios					
Portfolio # *Risk Factor*	**Strategy**	**Base Currency**	**VaR**	**Stressed VaR**	**IRC**

| 19
Credit Spread | –   **Sovereign CDS Portfolio**
Short Protection via CDS on 5 countries
- Short €2MM per single-name 5year CDS (total 10MM notional) on the following countries:

–   - effective date: May 10th 2013

–   - restructuring clause: FULL

See table below | EUR | × | × | × |

Portfolio 19 table:

Country	RED Code	currency
Italy	4AB951	USD
UK	9A17DE	USD
Germany	3AB549	USD
France	3I68EE	USD
US	9A3AAA	EUR

| 20
Credit Spread | –   **Sovereign Bond/CDS Portfolio**
Long Protection via CDS on 5 countries
- Long €2MM per single-name 5 year CDS (total 10MM notional) on the following countries: *Italy, UK, Germany, France, US* as in portfolio #19.

–   - Long €2MM per single-name 5 year bonds (total 10MM notional) on the following countries: *Italy, UK, Germany, France, US* (as identified in the following table)

–   - effective date May 10th 2013

–   - to convert the notional of the non-Euro bonds use the FX spot as at end of day May 10th 2013 | EUR | × | × | × |

Portfolio 20 table:

– Identifier	– Description
– IT0004907843	– BTP January 2018
– DE0001135341	– BUND January 2018
– GB00B8KP6M44	– GILT July 2018
– FR0011394345	– OAT May 2018
– US912828HZ65	– TBOND May 18

| 21
Credit Spread | **Sector Concentration Portfolio**
Short Protection via CDS on 10 financials

- Equivalent of Short 1MM notional per single-name 5 year CDS (total €10MM notional) on the following 10 companies
–   - effective date May 10th 2013 | EUR | × | × | × |

Portfolio 21 table:

Name	RED Code	Ccy	Doc Clause
Met Life	5EA6BX	USD	MR
Allianz	DD359M	EUR	MM
Prudential	7B878P	USD	MR
AXA	FF667M	EUR	MM
ING BANK	48DGFE	EUR	MM
Aegon	007GB6	EUR	MM
Aviva	GG6EBT	EUR	MM
Swiss Re	HOB65N	EUR	MM
Principal	7B676W	USD	MR

	Financial Group						
	Suncorp Group	8ED955	USD	MR			

22 *Credit Spread*	**Diversified Index Portfolio** *Short protection via CDS index* - Short €10MM notional iTraxx 5-year Europe index Series 19, Version 1 – Maturity June 20th 2018 (RED Pair Code: 2I666VAZ8) − - effective date May 10th 2013	EUR	×	×	×

23 *Credit Spread*	**Diversified Index Portfolio (higher concentration)** **Short protection via CDS index** - Short €5MM notional iTraxx 5-year Europe index Series 19, Version 1 – Maturity June 20th 2018 (RED Pair Code: 2I666VAZ8) - Short €5MM notional (equally weighted) on the following 5 Financials belonging to the iTraxx 5-year Europe index Series 19, Version 1 – Maturity June 20th 2018 (RED Pair Code: 2I666VAZ8): - Effective date: May 10th 2013	EUR	×	×	×

CDS NAME	RED Code	CCY	Doc Clause
ING BK CDS EUR SR 5Y	*48DGFE AH6*	*EUR*	*MM*
CMZB CDS EUR SR 5Y	*2C27EG AG9*	*EUR*	*MM*
AXA SA CDS EUR SR 5Y	*FF667MA D8*	*EUR*	*MM*
AEGON CDS EUR SR 5Y	*007GB6A D4*	*EUR*	*MM*
SANTAN CDS EUR SR 5Y	*EFAGG9 AF6*	*EUR*	*MM*

24 *Credit Spread*	**Diversified Corporate Portfolio** **Short Protection via CDS on 10 A- to AA-corporate** - Short equivalent of €2MM notional per single-name 5 year CDS (total €20MM notional) on the following 10 companies (for USD CDS use the exchange rate at May 10th 2013):	EUR	×	×	×

Name	RED Code	CCY	Doc Clause
P&G	7B6989	USD	MR
Home Depot	47A77D	USD	MR
Siemens	8A87AG	EUR	MM
Royal Dutch Shell	GNDF9A	EUR	MM
IBM	49EB20	USD	MR
Met Life	5EA6BX	USD	MR
Southern Co	8C67DF	USD	MR
Vodafone	9BADC3	EUR	MM
BHP	08GE66	USD	MR
Roche	7E82AF	EUR	MM

25 *Credit Spread*	**Index basis** Short € 5MM notional iTraxx 5-year Europe index Series 19, Version 1 – Maturity June 20th 2018 (RED Pair Code: 2I666VAZ8) Effective date: May 10th 2013 Long €5MM notional on all Constituents of iTraxx Series 19, Version 1 – Maturity June 20th 2018 (RED Pair Code: 2I666VAZ8) (i.e.the aggregate notional is €5MM and all names are equally weighted)	EUR	×	×	×

		Base Currency	VaR	Stressed VaR	IRC
	Effective date: May 10th 2013				

| 26
Credit Spread | **CDS bond Basis**
-Long Bonds €2MM per single-name 5 year bonds on 5 Financials (3 EU, 2 North America). | EUR | × | × | × |

Table within portfolio 26:

ISIN	SECURITY NAME
US59217GAG47	MET 3.65 June 14th 2018
DE000A1HG1J8	ALVGR 1 3/8 March 13th 2018
US74432RAN35	PRU 0 August 10th 2018
FR001132266	AXASA 1 7/8 Sept 20th 2019
XS0368232327	INTNED 5 1/4 June 5th 2018

- Long Protection via CDS on the same names (€2MM per single-name 5 year).

Name	RED Code	CCY	Doc clause
Met Life	5EA6BX	USD	MR
Allianz	DD359M	EUR	MM
Prudential	7B878P	USD	MR
AXA	FF667M	EUR	MM
ING	49BEBA	EUR	MM

Portfolio	Strategy	Base Currency	VaR	Stressed VaR	IRC
27 *Credit Spread*	**Short Index put on ITraxx Europe Crossover series 19** ***See details in annex 2-6***	EUR	×	×	×
28 *Credit Spread*	**Quanto CDS on Spain with delta hedge** ***See details in annex 2-7***	EUR	×	×	×

Diversified Portfolios					
Portfolio #	**Strategy**	**Base Currency**	**VaR**	**Stressed VaR**	**IRC**
29	**All-in Portfolio (1):** All non CRM portfolios excluding portfolios 5, 7, 11, 12, 15, 16, 27, 28.	EUR	×	×	x
30	**All-in Portfolio (2):** All non CRM portfolios	EUR	×	×	×
31	**All-in Portfolio (3):** All Equity portfolios (i.e. comprising portfolios from #1 to #7	EUR	×	×	
32	**All-in Portfolio (4):** All Interest Rate portfolios (i.e. comprising portfolios from #8 to #12	EUR	×	×	×
33	**All-in Portfolio (5):** All F/X portfolios (i.e. comprising portfolios from #13 to #16	EUR	×	×	
34	**All-in Portfolio (6):** All Commodity (i.e. comprising portfolios from #17 to #18	EUR	×	×	
35	**All-in Portfolio (7):** All Credit Spread portfolios (i.e. comprising portfolios from #19 to #28	EUR	×	×	×

Annex 2-0: Fixing schedule dates for variance swap on Eurostoxx 50.

10-mai-13	26-juin-13	12-août-13	26-sept-13	12-nov-13	03-janv-14	19-févr-14	07-avr-14	27-mai-14	11-juil-14	27-août-14	13-oct-14	27-nov-14	20-janv-15	06-mars-15	24-avr-15
13-mai-13	27-juin-13	13-août-13	27-sept-13	13-nov-13	06-janv-14	20-févr-14	08-avr-14	28-mai-14	14-juil-14	28-août-14	14-oct-14	28-nov-14	21-janv-15	09-mars-15	27-avr-15
14-mai-13	28-juin-13	14-août-13	30-sept-13	14-nov-13	07-janv-14	21-févr-14	09-avr-14	29-mai-14	15-juil-14	29-août-14	15-oct-14	01-déc-14	22-janv-15	10-mars-15	28-avr-15
15-mai-13	01-juil-13	15-août-13	01-oct-13	15-nov-13	08-janv-14	24-févr-14	10-avr-14	30-mai-14	16-juil-14	01-sept-14	16-oct-14	02-déc-14	23-janv-15	11-mars-15	29-avr-15
16-mai-13	02-juil-13	16-août-13	02-oct-13	18-nov-13	09-janv-14	25-févr-14	11-avr-14	02-juin-14	17-juil-14	02-sept-14	17-oct-14	03-déc-14	26-janv-15	12-mars-15	30-avr-15
17-mai-13	03-juil-13	19-août-13	03-oct-13	19-nov-13	10-janv-14	26-févr-14	14-avr-14	03-juin-14	18-juil-14	03-sept-14	20-oct-14	04-déc-14	27-janv-15	13-mars-15	04-mai-15
20-mai-13	04-juil-13	20-août-13	04-oct-13	20-nov-13	13-janv-14	27-févr-14	15-avr-14	04-juin-14	21-juil-14	04-sept-14	21-oct-14	05-déc-14	28-janv-15	16-mars-15	05-mai-15
21-mai-13	05-juil-13	21-août-13	07-oct-13	21-nov-13	14-janv-14	28-févr-14	16-avr-14	05-juin-14	22-juil-14	05-sept-14	22-oct-14	08-déc-14	29-janv-15	17-mars-15	06-mai-15
22-mai-13	08-juil-13	22-août-13	08-oct-13	22-nov-13	15-janv-14	03-mars-14	17-avr-14	06-juin-14	23-juil-14	08-sept-14	23-oct-14	09-déc-14	30-janv-15	18-mars-15	07-mai-15
23-mai-13	09-juil-13	23-août-13	09-oct-13	25-nov-13	16-janv-14	04-mars-14	22-avr-14	09-juin-14	24-juil-14	09-sept-14	24-oct-14	10-déc-14	02-févr-15	19-mars-15	08-mai-15
24-mai-13	10-juil-13	26-août-13	10-oct-13	26-nov-13	17-janv-14	05-mars-14	23-avr-14	10-juin-14	25-juil-14	10-sept-14	27-oct-14	11-déc-14	03-févr-15	20-mars-15	11-mai-15
27-mai-13	11-juil-13	27-août-13	11-oct-13	27-nov-13	20-janv-14	06-mars-14	24-avr-14	11-juin-14	28-juil-14	11-sept-14	28-oct-14	12-déc-14	04-févr-15	23-mars-15	
28-mai-13	12-juil-13	28-août-13	14-oct-13	28-nov-13	21-janv-14	07-mars-14	25-avr-14	12-juin-14	29-juil-14	12-sept-14	29-oct-14	15-déc-14	05-févr-15	24-mars-15	
29-mai-13	15-juil-13	29-août-13	15-oct-13	29-nov-13	22-janv-14	10-mars-14	28-avr-14	13-juin-14	30-juil-14	15-sept-14	30-oct-14	16-déc-14	06-févr-15	25-mars-15	
30-mai-13	16-juil-13	30-août-13	16-oct-13	02-déc-13	23-janv-14	11-mars-14	29-avr-14	16-juin-14	31-juil-14	16-sept-14	31-oct-14	17-déc-14	09-févr-15	26-mars-15	
31-mai-13	17-juil-13	02-sept-13	17-oct-13	03-déc-13	24-janv-14	12-mars-14	30-avr-14	17-juin-14	01-août-14	17-sept-14	03-nov-14	18-déc-14	10-févr-15	27-mars-15	
03-juin-13	18-juil-13	03-sept-13	18-oct-13	04-déc-13	27-janv-14	13-mars-14	02-mai-14	18-juin-14	04-août-14	18-sept-14	04-nov-14	19-déc-14	11-févr-15	30-mars-15	
04-juin-13	19-juil-13	04-sept-13	21-oct-13	05-déc-13	28-janv-14	14-mars-14	05-mai-14	19-juin-14	05-août-14	19-sept-14	05-nov-14	22-déc-14	12-févr-15	31-mars-15	
05-juin-13	22-juil-13	05-sept-13	22-oct-13	06-déc-13	29-janv-14	17-mars-14	06-mai-14	20-juin-14	06-août-14	22-sept-14	06-nov-14	23-déc-14	13-févr-15	01-avr-15	
06-juin-13	23-juil-13	06-sept-13	23-oct-13	09-déc-13	30-janv-14	18-mars-14	07-mai-14	23-juin-14	07-août-14	23-sept-14	07-nov-14	29-déc-14	16-févr-15	02-avr-15	
07-juin-13	24-juil-13	09-sept-13	24-oct-13	10-déc-13	31-janv-14	19-mars-14	08-mai-14	24-juin-14	08-août-14	24-sept-14	10-nov-14	30-déc-14	17-févr-15	07-avr-15	
10-juin-13	25-juil-13	10-sept-13	25-oct-13	11-déc-13	03-févr-14	20-mars-14	09-mai-14	25-juin-14	11-août-14	25-sept-14	11-nov-14	02-janv-15	18-févr-15	08-avr-15	
11-juin-13	26-juil-13	11-sept-13	28-oct-13	12-déc-13	04-févr-14	21-mars-14	12-mai-14	26-juin-14	12-août-14	26-sept-14	12-nov-14	05-janv-15	19-févr-15	09-avr-15	
12-juin-13	29-juil-13	12-sept-13	29-oct-13	13-déc-13	05-févr-14	24-mars-14	13-mai-14	27-juin-14	13-août-14	29-sept-14	13-nov-14	06-janv-15	20-févr-15	10-avr-15	
13-juin-13	30-juil-13	13-sept-13	30-oct-13	16-déc-13	06-févr-14	25-mars-14	14-mai-14	30-juin-14	14-août-14	30-sept-14	14-nov-14	07-janv-15	23-févr-15	13-avr-15	
14-juin-13	31-juil-13	16-sept-13	31-oct-13	17-déc-13	07-févr-14	26-mars-14	15-mai-14	01-juil-14	15-août-14	01-oct-14	17-nov-14	08-janv-15	24-févr-15	14-avr-15	
17-juin-13	01-août-13	17-sept-13	01-nov-13	18-déc-13	10-févr-14	27-mars-14	16-mai-14	02-juil-14	18-août-14	02-oct-14	18-nov-14	09-janv-15	25-févr-15	15-avr-15	
18-juin-13	02-août-13	18-sept-13	04-nov-13	19-déc-13	11-févr-14	28-mars-14	19-mai-14	03-juil-14	19-août-14	03-oct-14	19-nov-14	12-janv-15	26-févr-15	16-avr-15	
19-juin-13	05-août-13	19-sept-13	05-nov-13	20-déc-13	12-févr-14	31-mars-14	20-mai-14	04-juil-14	20-août-14	06-oct-14	20-nov-14	13-janv-15	27-févr-15	17-avr-15	
20-juin-13	06-août-13	20-sept-13	06-nov-13	23-déc-13	13-févr-14	01-avr-14	21-mai-14	07-juil-14	21-août-14	07-oct-14	21-nov-14	14-janv-15	02-mars-15	20-avr-15	
21-juin-13	07-août-13	23-sept-13	07-nov-13	27-déc-13	14-févr-14	02-avr-14	22-mai-14	08-juil-14	22-août-14	08-oct-14	24-nov-14	15-janv-15	03-mars-15	21-avr-15	
24-juin-13	08-août-13	24-sept-13	08-nov-13	30-déc-13	17-févr-14	03-avr-14	23-mai-14	09-juil-14	25-août-14	09-oct-14	25-nov-14	16-janv-15	04-mars-15	22-avr-15	
25-juin-13	09-août-13	25-sept-13	11-nov-13	02-janv-14	18-févr-14	04-avr-14	26-mai-14	10-juil-14	26-août-14	10-oct-14	26-nov-14	19-janv-15	05-mars-15	23-avr-15	

Annex 2-1: details for portfolio 7

3 Year USD quanto call on EUROSTOXX 50

Party A: counterparty
Party B: participating Bank
Equity Notional Amount (ENA) : USD 5,000,000

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Trade Date: May 10th, 2013
Strike Date: May 10th, 2013
Effective Date: May 10th, 2013
Valuation Date : May 10th, 2016
Termination Date: May 10th, 2016
Underlying Index: EURO STOXX 50 (Bloomberg: SX5E Index)

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Floating Rate Payer : Counterparty
Notional Amount: USD 5,000,000
Floating Rate: USDLIBOR3M as determined at 11.00am London time two (2) business days prior to the start of the relevant interest period
Spread : + 300 bps
Floating Rate Day Count Fraction: act/360
Floating Amount Payment Dates:
n / Floating Amount Payment Date
1/ August 9th, 2013
2/November 11th, 2013
3/ February 10th, 2014
4/May 9th, 2014
5/August 11th, 2014
6/November 10th, 2014
7/February 10th, 2015
8/May 11th, 2015
9/ August 10th, 2015
10/November 10th, 2015
11/February 10th, 2016
12/ May 10th, 2016

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Equity Amount Payer : participating bank
Equity Amount:
On the **Termination Date**, Party B will pay Party A the following Cash Settlement Amount:

$$ENA \times \max\left(0\%, \frac{Index_{Final} - Index_{Initial}}{Index_{Initial}}\right)$$

Where
$Index_{Initial}$ is the official Closing Level of the Underlying Index on the **Strike Date**.
$Index_{Final}$ is the official Closing Level of the Underlying Index on the **Valuation Date**.

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Settlement Terms :
Settlement Currency: USD Quanto
Business Days: New York

Annex 2-2: details for portfolio 11

3M Libor USD Range Accrual

Party A	**Participating bank**
Party B	Counterparty
Notional Amount	**USD 10,000,000.0**
Trade Date:	**10 May 2013**
Effective Date:	10 May 2013
Termination Date:	10 May 2023

Party A pays:	4% *n/N
n:	Number of days when the Range Accrual Index fixes between the Lower Barrier and the Upper Barrier (inclusive) during the relevant Interest Period
N:	Number of days in the relevant Interest Period
Range Accrual Index:	3 month USD Libor as quoted on Reuters page LIBOR01, 11:00 London Time
USD 3M Libor:	3 month USD Libor as quoted on Reuters page LIBOR01, 11:00 London Time, fixed 2 business days prior to the first day of each interest Period
Lower Barrier:	2.50%
Upper Barrier:	4.00%
Day Count Fraction:	Actual/360
Payment Dates:	Quarterly
Business Day Convention:	Modified Following
Business Days for Fixing:	London and New York
Business Days for Payment:	London and New York

Party B pays:	USD 3M Libor
USD 3M Libor:	3 month USD Libor as quoted on Reuters page LIBOR01, 11:00 London Time, fixed 2 business days prior to the first day of each interest Period
Day Count Fraction:	Actual/360
Payment Dates:	Quarterly
Business Day Convention:	Modified Following
Business Days for Fixing:	London and New York
Business Days for Payment:	London and New York
Interest Period:	From the previous payment date (inclusive) to the next payment date (exclusive)

Annex 2-3: details for portfolio 12

EURHICPX index 10Y maturity zero coupon swap

Contract date   10 May 2013

Payer of Fixed   participating bank
Payer of HICP XT Float   counterparty

Notional amount   EUR 10,000,000.00
Start date   10 May 2013
Maturity date   10 May 2023

Fixed Rate Details
Fixed Rate   2.000 per cent
Payment day convention   Modified Following
Payment Days   Target

Fixed payment dates   10 May 2023

HICP XT Float Rate Details
Float rate   Target
Frequency   At Maturity in arrears
Reference   REUTERS OATEI01
Payment days   10 May 2023

HICP XT Fixed rate calculation method
Notional amount*[((1+Fixed rate)^n)-1]

HICP XT Floating rate calculation method Notional amount*[Index(end)/Index(start)-1]

Index (end) = HICP XT Feb 2023 Index unrevised
Index (start) = HICP XT Feb 2013 Index unrevised

There is no floor

Annex 2-4: details for portfolio 15

KNOCK-OUT CURRENCY OPTION

Trade Date: 10 May 2013
Buyer : Participating Bank (Party B)
Seller : Client [Party A]

Currency Option Style : European
Currency Option Type: EUR Call USD Put
Call Currency and Call Currency Amount: EUR 15, 000,000.00
Put Currency and Put Currency Amount: equivalent amount of EUR 15, 000,000.00 based on EUR/USD exchange rate on 10th May, NY closing time
Strike Price: EUR/USD exchange rate on 10th May, NY closing time

Expiration Date: 12 May 2014
Expiration Time: 10:00 AM (local time in NEWYORK)
Automatic Exercise: Applicable
Settlement: Deliverable
Settlement Date: 12 May 2014

Barrier Event: Applicable
Event Type: Knock-Out
Spot Exchange Rate Direction: Greater than or equal to the Barrier Level
Initial Spot Price: value of USD / EUR on 10th May 2013
Barrier Level: 1.5000 USD / EUR
Event Period Start Date and Time: Trade Date at the time of execution hereof
Event Period End Date and Time: Expiration Date at the Expiration Time

Annex 2-5: details for portfolio 16

Double No Touch Binary CURRENCY OPTION

Trade Date: 10 May 2013
Buyer: participating bank (Party B)
Seller: Client [Party A]

Currency Option Style: Binary
Expiration Date: 12 May 2014
Expiration Time: 10:00 AM (local time in NEWYORK)
Automatic Exercise: Applicable
Settlement: Non-Deliverable
Settlement Amount: EUR 1, 000,000.00
Settlement Date: 10 May 2014

Barrier Event: Applicable
Event Type: Double No-Touch Binary

Initial Spot Price: level of USD/EUR on 10th May 2013
Upper Barrier Level: 1.5000 USD / EUR
Lower Barrier Level: 1.2000 USD / EUR

Event Period Start Date and Time: Trade Date at the time of execution hereof
Event Period End Date and Time: Expiration Date at the Expiration Time
Business Day Convention: Following

Annex 2-6: details for portfolio 27

| **Index put on ITraxx Europe Crossover series 19** |

Buyer: counterparty

Seller: participating bank

Option type: put

Trade date: 10th May 2013

Maturity : 18th December 2013

Ticker: ITRAXX-Xover19

Underlying end: 20- June- 18

Option Style: European

Option Strike: 500.00 Bps

Notional : EUR 10,000,000.00

Annex 2-7: details for portfolio 28

Quanto CDS on Spain with delta hedge

Quanto CDS General Terms:

Trade Date: 10 May 2013
Effective Date: 10 May 2013
Scheduled Termination Date: 20 June 2018
Protection Seller: counterparty
Protection Buyer: Participating bank
Business Day: London
Business Day Convention: Modified Following
Reference Entity: Kingdom of Spain
Notional: EUR 10,000,000.00
Red Code: 8CA965

− **Coupon Payment Dates:**   March 20, June 20, September 20 and December 20 in each year

− **Coupon spread:**   1.00%

− **Fixed Rate Day Count Fraction:**   Actual/365 (Fixed)

Floating Payment:

Floating Rate Payer Calculation Amount: EUR 10,000,000.00

Conditions to Settlement: Credit Event Notice
Notice of Publicly Available Information Applicable

− **Credit Events:**   The following Credit Events shall apply to this Transaction:

Bankruptcy
Debt Restructuring (CR)
Failure to Pay

−

Settlement Currency	EUR

Delta Hedge CDS General Terms:

Trade Date:	10 May 2013
Effective Date:	10 May 2013
Scheduled Termination Date:	20 June 2018
Protection Seller:	Participating bank
Protection Buyer:	Counterparty
Business Day:	London
Business Day Convention:	Modified Following
Reference Entity:	Kingdom of Spain
Notional	USD 10,300,000.00
Red Code:	8CA965

- **Coupon Payment Dates:** March 20, June 20, September 20 and December 20 in each year from and including 20 September 2012.

- **Coupon spread:** 1.00%

- **Fixed Rate Day Count Fraction:** Actual/365 (Fixed)

Floating Payment:

Floating Rate Payer Calculation Amount:	USD 10,300,000.00
Conditions to Settlement:	Credit Event Notice
	Notice of Publicly Available Information Applicable
Settlement Currency	USD

Annex 2-8: details for portfolio 10

2-year Swaption on 10-year IRS

1. SWAPTION TERMS

Swaption Trade Date: May 10th, 2013

Swaption Notional Amount: EUR 5.000.000

Option Style: European

Swaption Seller: Party A, participating bank - the Swaption Seller

Swaption Buyer: Party B, counterparty - the Swaption Buyer

Option Type: Receiver

Underlying Buyer: the Swaption Seller

Underlying Seller: the Swaption Buyer

Quoting Style: Spread

Strike Price: 1.538% per annum

Business Days for Payment: London

Exercise Business Days: London

2. PROCEDURE FOR EXERCISE

Expiration Date: May 11th 2015

Earliest Exercise Time: 9:00 a.m. London time

Expiration Time: 11:00 a.m. London time

Partial Exercise: Not Applicable

3. SETTLEMENT TERMS

Settlement: Cash.

In the event that Swaption Buyer effectively exercises this Swaption Transaction, then: not later than the third Business Day for Payment following the Expiration Date, (i) if the Settlement Payment is a positive number, the Underlying Buyer shall pay the Settlement Payment to the Underlying Seller or (ii) if the Settlement Payment is a negative number, the Underlying Seller shall pay the absolute value of the Settlement Payment to the Underlying Buyer.

Settlement Payment: An amount (which may be positive or negative), in the Settlement Currency of the Underlying Swap Transaction, equal to the Strike Adjustment Amount minus the Accrued Amount.

Strike Adjustment Amount: the present value, as of the Expiration Date, of a stream of payments equal to (a) (i) the Strike Price minus (ii) the Fixed Rate for the Underlying Swap Transaction multiplied by (b) the Swaption Notional Amount calculated in accordance with the following assumptions:

a. such payments are made with the same frequency, on the same basis, on the same dates and for the same term as the Fixed Amounts payable with respect to the Underlying Swap Transaction, except that the initial Fixed Rate Payer Calculation Period shall commence on and include the calendar day immediately following the Expiration Date;

b. calculations are to be made assuming (i) a single "Deal Spread" equal to the Fixed Rate for the Underlying Swap Transaction, , (iii) a "Curve Date" equal to the Expiration Date and a "Settlement Date" equal to the calendar day immediately following the Expiration Date, (iv) a "Benchmark Swap Curve"

Accrued Amount: An amount equal to:

a. if the calendar day immediately following the Expiration Date falls on a day that is a Fixed Rate Payer Payment Date (as defined in the Underlying Swap Transaction), zero; and

b. if the calendar day immediately following the Expiration Date falls on a day that is not such a Fixed Rate Payer Payment Date, (i) the Fixed Rate for the Underlying Swap Transaction multiplied by (ii) the Adjusted Swaption Notional Amount multiplied by (iii) the Partial Exercise Factor multiplied by (iv) the actual number of days in the period from, and including, the later of the Effective Date of the Underlying Swap Transaction and the Fixed Rate Payer Payment Date falling immediately prior to the calendar day immediately following the Expiration Date to, and including, the Expiration Date divided by (v) 360.

4. UNDERLYING SWAP TRANSACTION TERMS

Swap of the Portfolio 9 (i.e. ten years fixed for variable IRS) but with an effective date of 11^h May 2015 and a maturity date of 12^h May 2025.

Annex 2-9: details for portfolio 14

Mark to Market (resettable) Cross-Currency Basis Swap

Trade Date: May 10th, 2013

Maturity Date: May 11th, 2015

Business Day Convention: Modified Following

Reset dates: each quarter starting from May, 10th 2013

Payment dates: quarterly

Notional Amount in EUR (**Constant Currency Amount**): EUR 20.000.000

Notional Amount in USD (**Variable Currency Amount**): an amount corresponding to EUR 20.000.000 according to the EUR/USD spot exchange rate at the beginning of each Interest Period

Mark-to-Market Amount: the difference between the Variable Currency Amount of the current Interest Period and the Variable Currency Amount of the previous Interest Period.

Interest Period: from the previous payment date (inclusive) to the next payment date (exclusive)

Party A (Variable Currency Payer): **counterparty**

Party B (Constant Currency Payer): **participating bank**

Party A pays: USD 3M Libor on the Variable Currency Amount (USD)
USD 3M Libor: 3 month Libor flat as quoted on Reuters page Libor01, 11:00 London Time, fixed 2 business days prior to the first day of each interest period

Party B pays: EUR 3M Euribor minus 20 basis points on the Constant Currency Amount (EUR)
EUR 3M Euribor: 3M Euribor as quoted on Reuters page Euribor01, 11:00 London Time, fixed 2 business days prior to the first day of each interest period
At each reset date Party A will pay to Party B the Mark-to-Market Amount, if negative.
At each reset date Party A will receive from Party B the Mark-to-Market Amount, if positive.

InitialExchange

Initial Exchange Date:Trade Date

EUR Initial Exchange Amount:EUR 20 000 000

USD InitialExchangeAmount: USD 25.876.000 (EUR/USD Initial Exchange Rate: 1.2938)

Final Exchange

Final Exchange Date: Maturity Date

EUR Final Exchange Amount: EUR 20,000,000.00

USD Final Exchange Amount: The Variable Currency Amount determined for the final Calculation Period