EBA Consultation Paper

on the

Draft Guidelines

on

Stressed Value At Risk (Stressed VaR)

(CP 48)

London, 30 November 2011

Contents

I. Responding to this Consultation

The EBA invites comments on all matters in this paper.

Comments are most helpful if they:

- indicate the specific paragraph in the guideline to which the comment relates;

- contain a clear rationale;

- provide evidence to support the views expressed/ rationale proposed; and

- describe any alternative regulatory choices EBA should consider.

Please send your comments to the EBA by email to CP48@eba.europa.eu by 15.01.2012, indicating the reference 'EBA CP 48'. Please note that comments submitted after the deadline, or sent to another e-mail address will not be processed.

Publication of responses

All contributions received will be published following the close of the consultation, unless you request otherwise. Please indicate clearly and prominently in your submission any part you do not wish to be publicly disclosed. A standard confidentiality statement in an e-mail message will not be treated as a request for non-disclosure. A confidential response may be requested from us in accordance with the EBA's rules on access to documents. We may consult you if we receive such a request. Any decision we make not to disclose the response is reviewable by the EBA's Board of Appeal and the European Ombudsman.

Data protection

Information on data protection can be found at www.eba.europa.eu under the heading 'Disclaimer'.

II. Executive Summary

The amendments to the Capital Requirements Directive[1] by Directive 2010/76/EU (CRD III)[2] relate, among others, to Stressed Value-at-Risk (Stressed VaR) in the trading book. According to these amendments, the predecessor of the EBA, the Committee of European Banking Supervisors (CEBS)[3] is tasked with monitoring the range of practices in this area and drawing up guidelines in order to ensure convergence of supervisory practices.

The amendments to the Capital Requirements Directive by Directive 2010/76/EU (CRD III) will enter into force on 31 December 2011.

Providing guidance on Stressed VaR modelling by credit institutions using the Internal Model Approach ("IMA") for the calculation of the required capital for market risk in the trading book, is seen as an important means of addressing weaknesses in the regulatory capital framework and in the risk management of financial institutions that contributed to the turmoil in global financial markets and is expected to reduce reliance on cyclical VaR-based capital estimates as well as to contribute to the development of a more robust financial system.

The first chapter, on "Identification and validation of the stressed period", elaborates on the value-at-risk model inputs calibrated to historical data from a continuous 12-month period of significant financial stress relevant to an institution's portfolio and deals with i) the length of the stressed period, ii) the number of stressed periods to use for calibration, iii) the approach to identify the appropriate historical period and iv) the required documentation to support the approach used to identify the stressed period. The second chapter, on "Review of the stressed period" provides guidance on the frequency and monitoring of a stressed period. The third chapter on "Stressed VaR methodology" deals with i) consistency issues between the VaR and Stressed VaR methodologies and ii) the use and validation of proxies in Stressed VaR modelling. The fourth and final chapter, "Use tests" specifies use test requirements.

The Guidelines on Stressed VaR are expected to contribute to a level playing field among institutions and to enhance convergence of supervisory practices among the competent authorities across the EU. It is expected that the national competent authorities around the EU will implement the Guidelines by incorporating them within their supervisory procedures within six months after

---

[1] Capital Requirements Directive (CRD) is a technical expression which comprises Directive 2006/48/EC and Directive 2006/49/EC. Please note that in general references to "Directive 2006/48/EC" and "Directive 2006/49/EC" or the "CRD" refer to the amended versions of the Directives and references in these Guidelines to a particular Article of the CRD refer to the amended Directives.

2 Directive 2010/76/EU was published on 24 November 2010 and can be found under: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:329:0003:0035:EN:PDF

[3] The European Banking Authority was established by Regulation (EC) No. 1093/2010 of the European Parliament and of the Council of 24 November 2010. The EBA has officially come into being as of 1 January 2011 and has taken over all existing and ongoing tasks and responsibilities from the Committee of European Banking Supervisors (CEBS).

publication of the final guidelines. After that date, the competent authorities must ensure that institutions comply with the guidelines effectively.

III. Background and Rationale

The CRD III trading book amendments, including the inclusion of Stressed Value at Risk (VaR) modelling for the calculation of the required capital for market risk in the trading book, are the result of widespread international (G20, Basel, FSF) recognition in 2008 that further regulatory reform was needed to address weaknesses in the current regulatory capital framework and in the risk management of financial institutions that contributed to the turmoil in global financial markets.

In January 2009, the Basel Committee for Banking Supervision (BCBS) proposed supplementing the current VaR-based trading book framework with, among other measures, an incremental risk capital charge (IRC), which includes default risk as well as migration risk for unsecuritised credit products and a stressed value-at-risk requirement[4].

As observed losses in banks' trading books during the financial crisis have been significantly higher than the minimum capital requirements under the Pillar 1 market risk rules, the BCBS proposed to enhance the framework through requiring banks to calculate, in addition to the current VaR, a stressed VaR taking into account a one-year observation period relating to significant losses. The additional stressed VaR requirement is expected to help reduce the pro-cyclicality of the minimum capital requirements for market risk.

In the process of refining capital requirements for market risk, the BCBS a quantitative impact study[5]. In the summer of 2009, the Trading Book Group (TBG) investigated the impact of the provisions of the "Revisions to the Basel II market risk framework" and "Guidelines for computing capital for incremental risk in the trading book" consultation papers published in January 2009, focusing (generally) on big internationally active banks with extensive trading activities.

The amendments to the Capital Requirements Directive by Directive 2010/76/EU (CRD III) relating to Stressed VaR in the trading book are a direct translation of the proposals from Basel.

The European Banking Authority is requested to monitor the range of practices in this area and to provide guidelines on Stressed VaR models.

The objectives of the guidelines on Stressed VaR are to:

I.   achieve a common understanding among the competent authorities across the EU on Stressed VaR modelling in order to enhance convergence of supervisory practices; and to

II.   create more transparency for institutions when implementing Stressed VaR into the calculation of the required capital for market risk in the trading book and into their risk management practices; and to

III. create a level playing field between institutions in this area.

---

[4]Revisions to the Basel 2 market risk framework - final version (July 2009), Guidelines for computing capital for incremental risk in the trading book - final version (July 2009), Enhancements to the Basel II framework (July 2009)

[5]Analysis of the trading book quantitative impact study (October 2009)

The guidelines presented in this paper do not aim to be a comprehensive set of rules, but rather to complement the new CRD provisions relating to Stressed VaR where additional guidance by the EBA was deemed necessary or appropriate.

IV. Draft EBA Guidelines on Stressed VaR

Contents

In between the text of the draft Guidelines that follows, further explanations on specific aspects of the proposed text are occasionally provided, which either offer examples or provide the rationale behind a provision. Where this is the case, this explanatory text appears in a framed text box.

Title I -Subject matter, Scope and Definitions

1. Subject matter

These guidelines aim at achieving a common understanding among the competent authorities across the EU on Stressed Value at Risk (VaR) models in order to enhance convergence of supervisory practices in line with Annex V of Directive 2006/49/EC, as amended by Directive 2010/76/EU.

2. Scope and level of application

1. Competent authorities shall require institutions to comply with the provisions laid down in these Guidelines on Stressed VaR.

2. These guidelines shall apply to institutions using an Internal Model Approach (IMA) for the purpose of calculating the capital requirement for market risk in the trading book.

3. The guidelines apply to institutions at the level (solo and/or consolidated) on which the model is authorised to be used by the relevant competent authority, unless stated otherwise in these Guidelines.

3. Definitions

In these guidelines the term *institutions* shall have the following meaning: credit institutions and investment firms as set out in Directives 2006/48/EC and 2006/49/EC.

Title II – Requirements regarding institutions' Stressed VaR modeling

A. Identification and validation of the stressed period

Explanatory text

Paragraph 10a of Annex 5 of Directive 2006/49/EC as amended by Directive 2010/76/EU, requires the calculation of a Stressed VaR measure calibrated to a continuous 12-month period of financial stress relevant to an institution's portfolio. The approach to be applied to identify the stressed period is the most material element determining the output of the model and is therefore subject to approval by the competent authorities.

4. Length of the stressed period

1. The requirement set out in the CRD is that the historical data used to calibrate the Stressed VaR measure have to cover a continuous 12-month period.

2. Even in cases where institutions identify a period which is shorter than 12 months but which is considered to be a significant stress event relevant to an institution's portfolio, calibration of the Stressed VaR has to be based on a continuous 12-month historical period which includes that stress period, rather than the shorter period.

5. Number of stressed periods to use for calibration

1. A single period is required to be identified based on each portfolio for which a VaR number is reported for own funds requirements calculation purposes.

Explanatory text

The CRD requires that the historical period used for calibration of the Stressed VaR measure be relevant to the institution's portfolio.

---

2. More in particular, if different legal entities of a group report their capital requirements based on individual VaR measures, then each legal entity needs to separately identify a relevant stressed period for that portfolio for which it calculates the VaR. On the other hand, if a supervisor permits different legal entities' positions all to feed into a single internal VaR model at a consolidated level, then the stressed period may be defined based on the entire group's trading book positions.

6. The approach for identifying the appropriate historical period

1. In order to choose a historical period for calibration purposes institutions shall formulate a methodology for identifying a stressed period relevant to their current portfolios, based on one of the following two ways:

  i.   judgement-based approaches; or
  ii. formulaic approaches.

2. A judgement-based approach is one that does not use a detailed quantitative analysis to identify the precise period to use for calibration, but rather relies on a higher level analysis of the risks inherent in an institution's current portfolio and past periods of stress related to those risk factors. This judgement-based approach shall include quantitative elements of analysis.

3. A formulaic approach instead applies, in addition to expert judgement, a more systematic quantitative analysis to identify the historical period representing a significant stress for an institution's current portfolio. This more systematic approach could be employed in a number of ways, for example:

  i.   A risk-factor based approach: an institution identifies a restricted number of risk factors which are considered to be a relevant proxy for

the movement in value of its portfolio. The historical data for these risk factors can then be fully analysed to identify the most stressed period (through either identification of the period of highest volatility of the risk factors, or the inferred period that would for example produce the highest VaR measure) in the historical data window.

ii. A VaR based approach: the historical period is identified by running either the full VaR engine or an approximation over a historical period to identify the 12-month period which produces the highest resulting measure for the current portfolio.

4. While either approach can be used by institutions, the use of the formulaic approach, where possible, shall be preferred for the identification of the historical period. This approach shall be employed to determine a historical period that would provide a conservative capital outcome rather than just selecting the period of highest volatility.

5. Institutions may also combine both approaches to limit the computational burden of the formulaic approach, by using the judgement-based approach to restrict the historical data periods to be considered in the formulaic approach.

6. Irrespective of the approach used, institutions must provide evidence that the stressed period is relevant for their current portfolio and that they have considered a range of potential historical periods in their analyses. The institutions also have to prove that the portfolio on which the identification of the stressed periods is based is representative of the institutions' current portfolio, e.g. by applying the approach to identify the stressed period to other typical or previous portfolios.

7. In all cases no weighting of historical data shall be applied when determining the relevant historical period or when calibrating the Stressed VaR model, as the weighting of data in a stressed period would not result in a true reflection of the potential stressed losses that could occur for an institution's portfolio.

8. Finally, institutions could consider the use of antithetic data when calibrating the Stressed VaR model. This would be particularly relevant between two regular reviews of the stressed period in the case of a dynamic portfolio.

7. Documentation to support the approach used to identify the stressed period

1. Irrespective of the approach applied, institutions must produce robust documentation justifying the choice of approach made. This shall include statistical assessments to support the current choice of the historical period and its relevance for the current portfolio. This shall also include documentation of the modelling of risk factors' returns.

2. Whilst a long period of complete historical data may not be available for all asset classes, institutions should consider at a minimum, on a judgemental basis, historical periods which, in spite of incomplete data, could be more relevant for calibration purposes. In particular, institutions should consider significant stress periods prior to 2008 as part of their justification for the historical period chosen.

3. Where institutions apply a formulaic approach to identify the stressed period the following issues should, as a minimum, be addressed in the related documentation:

   iii.   Justification for the choice of risk factors used if a risk-factor based approach is applied.

   iv.   Justification of any simplifications where a simplified VaR engine is used to identify the historical period.

4. In cases where a formulaic approach based on a simplified VaR engine is applied, an institution shall also provide adequate evidence that the simplified measure gives directionally the same VaR results as the full VaR engine (and therefore is accurate in determining the most stressed period). This support shall include empirical analysis.

5. In cases where a formulaic approach which aims to identify the most volatile period for a set of risk factors is applied, an institution shall provide adequate evidence that a period of high volatility is a suitable proxy for a period in which the VaR measure would be high and that the lack of inclusion of correlations or other factors that would be reflected in the VaR measure does not result in the possibility that this proxy would be unsuitable.

B. Review of the stressed period

8. Frequency

1. According to the CRD, the review of the identified 12-month period of significant stress shall be performed yearly by institutions.

> *Explanatory text*
>
> See paragraph 10a of Annex V of Directive 2006/49/EC, as amended by Directive 2010/76/EU.

2. While a yearly review is to be considered as the lowest allowed frequency, different circumstances (such as, for example, a very high turnover in the trading book or specific trading strategies) may require a review of the stressed period at a higher frequency.

3. Any changes to the choice of the historical period following the outcome of the review of the stressed period shall be communicated to the competent authority at least two weeks before the intended implementation date of the proposed changes.

9. Monitoring the stressed period

1. In addition to the above-mentioned regular review, an institution must have in place procedures which ensure on an on-going basis that the specified stressed period remains representative. These procedures are of particular importance when market conditions or portfolio compositions have been subject to significant change.

2. In order to put in place sound procedures for the ongoing monitoring of the relevance of a stressed period, an institution must document the soundness of the implemented approach. Monitoring can be based on a variety of factors which may differ between institutions. Factors to be considered are, for example, changes in market conditions, in trading strategies or also in portfolio composition. These factors may be analysed by changes in the allocation of market values or notionals, in risk factor loadings, in the level of VaR or sensitivities, in the repartition of VaR or sensitivities over portfolios and risk categories, in the P&L and back-testing results or also by the impact of newly approved products on the risk profile.

3. In addition, monitoring of new trading book positions which materially reduce the Stressed VaR shall be implemented. The identification of positions entered with the main aim of significantly reducing the Stressed VaR shall then be used in the review of the stressed period.

4. Besides the above-mentioned procedures, monitoring of Stressed VaR relative to VaR should be performed on an on-going basis. The ratio between Stressed VaR and VaR at the moment of identification of the relevant stressed period should be used as a reference value for ongoing monitoring. A significant decrease in the ratio may indicate that a stressed period should be reviewed. While in theory, due to differences in parameterisation, Stressed VaR can be smaller than VaR, also at inception, a ratio between Stressed VaR and VaR below one shall be considered as a warning signal triggering a review of the stressed period.

5. The frequency of regular reviews chosen by an institution should be in accordance with the extent of the on-going monitoring activities. This means that an institution with very sophisticated on-going monitoring may have a regular review with a lower frequency than an institution having in place less detailed ongoing monitoring.

C. Stressed VaR methodology

10. Consistency with VaR methodology

1. The Stressed VaR methodology should in principle be based on the current VaR methodology. Any risk factor occurring in the VaR model should therefore be reflected in the Stressed VaR model.

Explanatory text

In accordance with the current VaR requirements, the Directive does not prescribe a particular type of model for the calculation of the Stressed VaR charge. Instead it refers essentially to the model inputs, which should be "calibrated to historical data from a continuous 12-month period of significant stress relevant to the institution's portfolio". Notwithstanding this fact, since the intention of Stressed VaR requirements is to deliver a capital charge based on a measure of VaR, it could be assumed that institutions will run the same VaR model normally used for capital requirements, acknowledging that specific techniques could be required to adjust the current VaR model into one that delivers a Stressed VaR measure.

---

2. With respect to standards used in both measures, and further to the ones prescribed by the Directive (e.g. the 99% confidence level), institutions can consider the use of "square root of time" scaling to calculate a 10-day Stressed VaR measure. Nevertheless, and taking into account some known limitations of the scaling factor, an analysis to demonstrate that the assumptions underlying the use of the "square root of time" rule are appropriate should form part of the internal model validation process.

3. However, while the Stressed VaR model should share some of the current VaR standards, others could diverge due to explicit Directive requirements or to methodological incompatibilities related to the Stressed VaR concept. In particular, this is the case in the following areas:

(i) Length of the stressed Period

As outlined in Section A, the length of the stressed period must be 12 months. Therefore any action to reduce or increase the stated stressed period based on the need for consistency between VaR and Stressed VaR is not permitted.

(ii) Back-testing requirement

The multiplication factor m_s used for capital requirements should be at least 3 and be increased by an addend between 0 and 1 depending on the

VaR backtesting results. As such, backtesting is not prescribed for the Stressed VaR measure.

Explanatory text

For the multiplication factor ms used for capital requirements, see paragraphs 7, 8 and 10b(b)(ii) of Annex V of Directive 2006/49/EC.

(iii)   Periodicity of the Stressed VaR calculation

The Directive defines that the calculation of the Stressed VaR should be at least weekly. Institutions can choose to compute the measure more frequently, for instance, daily, to coincide with the VaR periodicity.

If, for example, institutions decide on a weekly Stressed VaR computation, and assuming a one-day Stressed VaR scaled up to 10 days, for the daily calculation of capital requirements based on internal models the following would apply:

a) The same Stressed VaR number would be used for 5 subsequent business days following the running of the Stressed VaR model;

b) With respect to the calculation of the average Stressed VaR numbers during the preceding sixty business days, institutions should use the previous 12 Stressed VaR numbers to compute that average;

Explanatory text

See 10b(b)(ii) of Annex V of Directive 2006/49/EC.

c) An institution should be able to prove that, on the day of the week chosen for Stressed VaR calculation, its portfolio is representative of the portfolio held during the week and that the chosen portfolio does not lead to a systematical underestimation of the Stressed VaR numbers when computed weekly.

4. There are other circumstances under which there could be methodological incompatibilities between the current VaR and the Stressed VaR model. Two (non-exhaustive) examples include changes in the current VaR methodology that cannot be translated into the Stressed VaR measure and the use of local valuation (sensitivity analysis/proxies) as opposed to full revaluation.

5. As a general rule, changes in an institution's VaR engine or VaR methodology should be reflected in changes to the model/methodology used to calculate the Stressed VaR charge.

6. Under exceptional circumstances, if an institution can demonstrate that it cannot incorporate enhancements to the current VaR methodology in the Stressed VaR, such situations shall be documented and the institution should be able to demonstrate that the impact (for example, in terms of VaR or capital requirements) resulting from the current VaR developments which are not implemented in the Stressed VaR measure is limited.

7. Where sensitivities rather than full revaluation are used within a VaR model the institution concerned should demonstrate that this approach is still appropriate for Stressed VaR when higher order derivatives/convexity are factored in.

8. Any revaluation ladders or spot/vol matrices employed should be reviewed and extended to include the wider shocks in risk factors that occur in stressful scenarios. It is preferable that full revaluation be used for Stressed VaR with shocks applied simultaneously to all risk factors.

2. In terms of calibration to market data, the process of "de-meaning" is not considered necessary for Stressed VaR. If there is a significant drift in market data, the use of antithetic data is preferable to "de-meaning".

Explanatory text
"De-meaning" is a quantitative process to remove a trend from historical data. Depending on the positions and the size of the trend, not removing the drift from the historical data to simulate the price variations could generate mainly profitable scenarios and very few and limited losses.

10. The table below summarises the main issues described above concerning the level of consistency between the methodological aspects of the current VaR and Stressed VaR measure.

Is consistency between VaR and Stressed VaR required?		
Yes for…	**No for…**	**Subject to verification**
Confidence level	Weighting scheme	Changes to models
Holding period	Back-testing	Use of Taylor series approximations
	Length of historical observation period	
	Frequency of computation	Scaling method

11. Implications of the use of proxies and other simplifications on Stressed VaR

1. A proxy is defined as an observable variable or price taken from a liquid market that is used to substitute a variable that cannot be observed (or whose hypothetical price does not reflect real transactions from a deep two-way market) and thus cannot be accurately measured. Institutions use proxies both for valuation and risk measurement purposes.

2. From a theoretical perspective three types of proxies can be identified:

   i.   Those applied in the valuation of instruments (which would affect the adequacy of VaR and Stressed VaR as capital measures);

   ii. Those used for VaR calculations (which would also be present in Stressed VaR metrics); and

   iii. Those affecting solely the Stressed VaR calculation.

12. Estimation of proxies for Stressed VaR

1. The data constraints that make necessary the use of proxies for VaR, become even more relevant for Stressed VaR. Thus, it is expected that any proxies used in VaR will also be necessary for Stressed VaR, and that additional ones may also be needed.

2. In this regard, any new risk factor not present in the historical data would naturally require the use of a proxy for VaR calculation, but only on a "temporary" basis (e.g. after one year there would be enough real information to complete a 12-month data series) whilst the same proxy would have to be more "permanent" for Stressed VaR purposes (due to the more constant nature of the historical time series).

3. If a risk factor is missing in the stressed period because it was not observable during that period (for example for a newly listed equity) the institution is permitted to use another risk factor (following the example, another equity from the same sector and with a similar risk and business profile) for which there is information available and for which a highly correlated behaviour with the factor that the institution is trying to capture can be demonstrated. Where these proxies are used, institutions should consider whether an assumption of 100% correlation between the risk factor and its proxy is appropriate.

4. An alternative approach could imply mapping the missing factor to another one similar in terms of volatility (though not necessarily correlated). If this approach is used, institutions must demonstrate that it is conservative and appropriate.

5. If a VaR model is enhanced by incorporating a risk factor, an institution is also expected to incorporate it into its Stressed VaR calculations. In certain cases, this may mean reviewing the historical data series for the risk factors and introducing an appropriate proxy.

> *Explanatory text*
>
> For example where a new risk factor used for valuation purposes is incorporated into the VaR model as required under Annex V point 12 first Paragraph of Directive 2006/49/EC as amended by Directive 2010/76/EU.

6. In all cases, the use of these proxies, including simplifications and any omissions made, would only be acceptable provided they are well documented and their limitations are taken into account and addressed in the capital requirement through capital add-ons or other means.

13. Validation of proxies

1. Whereas validation of a proxy should be broadly performed in the same way for VaR and Stressed VaR, the assumption should be that any proxy validated for the day-to-day VaR may not automatically be acceptable for Stressed VaR. Proxies in use shall be reviewed periodically to assess their adequacy and ensure that they provide a conservative outcome.

2. Regarding those proxies which might be used for Stressed VaR purposes only (for instance, due to lack of data in the selected period), an institution shall ensure that the risk factor used as proxy is conservative.

14. Validation of model inputs/outputs

1. All qualitative standards defined for the control of consistency, accuracy and reliability of data sources of VaR also apply to Stressed VaR.

2. Underlyings for which institutions do not have a history of data complete enough to cover the reference period need to be shocked by approximation, using closely related underlyings (same market, similar structure and characteristics). Following the same process that has been approved for institutions' internal models, it is important that, in order to ensure the quality of historical data used for the reference period, institutions document the methodology followed for identifying and for proxying missing data. Institutions shall also perform tests of the potential impact of the use of these proxies.

3. With a view to preserving arbitrage inequalities, institutions may need to apply data cleaning for Stressed VaR. Where this is the case, the removal of outliers from historical data series must be appropriately justified and documented, as it should not end up decreasing the magnitude of extreme events.

Explanatory text

Stressed VaR entails, by definition, the application of highly stressed scenarios to current market parameters. As this may lead to incoherent market conditions (e.g. negative forward rates), calibration failures may materialise more frequently than within a VaR computation. Institutions using full revaluation when estimating their Stressed VaR may be more frequently confronted with those calibration failures than institutions not using full revaluation, not because failures will not happen, but because their methodology will not enable them to spot these calibration failures when they occur.

D. Use tests

15. Use tests

1. The Stressed VaR model should be subject to a use test through use of Stressed VaR output in risk management decisions (e.g. limit setting, reporting and escalation procedures, etc.). Stressed VaR output should be in place as a supplement to the risk management analysis based on the day-to-day output of a VaR model. The results of Stressed VaR should be monitored at different aggregation levels and reviewed periodically by senior management.

2. Stressed VaR should also be used to periodically validate the impact of current VaR modelling choices. Where Stressed VaR outputs reveal particular vulnerability to a given set of circumstances, prompt steps should be taken to manage those risks appropriately.

Title III- Final Provisions and Implementation

16. Date of application

Competent authorities shall implement these Guidelines by incorporating them within their supervisory procedures within six months after publication of the final guidelines. Thereafter, competent authorities should ensure that institutions comply with it effectively.