

Discussion Paper

Relating to Draft Regulatory Technical Standards
on prudent valuation under Article 100 of the draft Capital Requirements Regulation
(CRR)



Discussion Paper on Draft Regulatory Technical Standards on prudent valuation, under article 100 of the draft Capital Requirements Regulation (CRR).

Table of contents

1.	Responding to this Discussion Paper	3
2.	Executive Summary	4
3.	Background and rationale	5
4.	Discussion	7
4.1.	Introduction	7
4.2	The minimum required valuation adjustments	8
4.3	Process to calculate AVAs	8
4.4	Description of how to calculate AVAs	13
4.5	Testing for prudence of valuation	16
4.6	Aggregation of valuation adjustments	17
4.7	Offsets to AVAs when calculating the adjustment to common equity tier 1 capital	18
4.8	Documentation, systems and controls requirements	18
4.9	Reporting requirements	20
	Annex 1: A tool for testing the prudence of valuation	22
	Annex 2: A statistical test	25
	Annex 3: Examples of use of AVA decision tree	26
	Annex 4: Examples of aggregation approaches allowing diversification	29
	Annex 5 - Summary of questions	30

1. Responding to this Discussion Paper

The EBA invites comments on all proposals put forward in this paper and in particular on the specific questions stated in the boxes below (and in Annex 6 of this paper).

Comments are most helpful if they:

- respond to the question stated;
- indicate the specific point to which a comment relates;
- contain a clear rationale;
- provide evidence to support the view expressed;
- describe any alternatives the EBA should consider; and
- provide where possible data for a cost and benefit analysis.

Please send your comments to the EBA by e-mail to EBA-DP-2012-03@eba.europa.eu by 13.01.2013, indicating the reference to 'EBA/DP/2012/03' on the subject field. 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 on the EBA's website 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 publically 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 public 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 'Legal Notice'.

Disclaimer

The views expressed in this discussion paper are preliminary and will not bind in any way the EBA in the future development of the draft regulatory technical standards. They are aimed at eliciting discussion and gathering the stakeholders' opinion at an early stage of the process.

2. Executive Summary

Reasons for publication

Articles 31 and 100 of the latest version of the draft Capital Requirements Regulation (CRR)¹ require the application of prudent valuation requirements for all positions measured at fair value. They also require the EBA to draft regulatory technical standards (RTS) on how those requirements should be applied.

This discussion paper expresses the EBA's preliminary views on the above topic and aims at eliciting discussion and gathering the stakeholders' opinions at an early stage of the process. The input from stakeholders will assist in the development of the RTS, to be drafted and submitted to the European Commission (EC) for endorsement in the form of a Commission Regulation, i.e. a legally binding instrument directly applicable in all member States of the European Union. The development of the draft RTS is also required to cover the analysis of the costs and benefits that those legal provisions will imply. Input in this respect and any supportive data will be highly appreciated and kept confidential, where required.

Contents

The considerations in this paper aim to further specify how to apply the prudent valuation requirements in Article 100 of the draft CRR, and set out the EBA's preliminary view on how valuation adjustments could in practice be applied by institutions in a consistent manner.

In the EBA's preliminary view the best way to achieve consistency of implementation is to tie valuation adjustments to a specified confidence level, whilst accepting that for many instruments the confidence level can only be used in a judgement-based manner due to a lack of data. To help achieve a level playing field, a standardised reporting form is also proposed that would allow competent authorities to have data on valuation adjustments across institutions in a consistent format and level of detail.

Next steps

As provided for by Regulation No 1093/2010 of the European Parliament and Council establishing the EBA, before submitting the draft RTS to the Commission, the EBA will conduct a public consultation and analyse the potential costs and benefits of the proposed standards. The consultation paper will include the proposed legal text of the provisions constituting the draft RTS, an explanation of the proposed measures and a cost-benefit analysis.

¹ See fifth Council compromise version text from 11 May 2012, which can be found on the Council's website: <http://register.consilium.europa.eu/pdf/en/12/st09/st09715.en12.pdf>

3. Background and rationale

Articles 31 and 100 of the fifth Council compromise version text from 11 May 2012 of draft Capital Requirements Regulation ('CRR' or 'the Regulation') require institutions to apply prudent valuation standards to all positions that are measured at fair value when calculating the amount of their own funds. Any additional value adjustments necessary to reduce the fair value of those positions as calculated in accordance with the relevant accounting standards, to the relevant prudent value, should be deducted from common equity tier 1 capital. The draft Regulation requires RTS to be developed to provide more detail on how the standards set out in Article 100 should be applied.

Article 100 lays out a number of valuation adjustments that should be considered when calculating a prudent valuation. The intended effect of these adjustments is to set valuations at a level that achieves an appropriate degree of certainty that the valuation used for regulatory purposes is not higher than the true realisable value.

The importance of these requirements became evident during the credit crisis that started in 2007, when a number of markets experienced considerable uncertainty around the true value of positions due to dramatic reductions in liquidity. Crisis periods are not, however, the only periods in which there is uncertainty around valuation. There are many market conditions where adjustments may be required to the fair value, including: where institutions are all positioned in one direction; where only very low levels of trading are observed; where daily pricing is difficult to obtain; or where the value realised when closing an open risk position is observed to regularly be materially different to its valuation prior to closure.

Furthermore, a number of factors can also give rise to valuation uncertainty in so-called normal market conditions. Some are related to the characteristics of the instruments being valued. These may include complexity of payoffs stemming from embedded non-linearities and option-type structures; longer term maturity; and the absence of readily available market prices on closely related instruments that can guide the valuation through arbitrage and comparison. Other factors that can influence valuation uncertainty are related to the trading environment. For instance, the depth and breadth of the market in which a financial instrument is traded will affect its liquidity and hence the price at which a transaction can take place. In addition, characteristics of the holder can be important. The liquidation of an open risk position that represents a significant share of the overall open risk positions held by market participants is likely to affect the market price and so have an impact on the realised value for the seller.

As an example of valuation uncertainty, one may consider the following simplified illustration: a security might have, in a first case, a likely range of values (determined, for example, by analysing trades in the security in the period before the reporting date or broker prices at around the reporting date) with equal probability of between 79 and 81 or, in another case, of between 70 and 90. In both cases, the average value is 80 and a valuation with a level of confidence of 50% would also be 80. However, in the second case, the level of uncertainty and therefore concern from a prudential regulatory perspective is clearly higher.

In clarifying how to apply the requirements of Article 100, in this paper the EBA considers the possibility of defining what the 'appropriate degree of certainty' (or level of confidence) is that the requirements wish to achieve in the adjusted valuation. The higher the level of confidence that is required, the less risk there is

that the calculation of own funds is based on valuations that are in excess of the true realisable value of the positions of the institution. The EBA recognises the limits inherent to the use of a level of confidence when sufficient data is not available so judgement-based approaches should be applied, where this is the case. In addition, there would be operational issues with using too high a level of confidence. The level of confidence required might therefore not be set as high as, for example, the 99% used elsewhere in the regulatory regime.

A second important aspect is how valuation adjustments at a position level should be added together in order to obtain an aggregate prudent value. An institution with many different positions in different asset classes with small valuation uncertainties may face a very different total valuation uncertainty when compared to an institution with one large position with significant valuation uncertainty.

There is a trade-off between the level of confidence that is used when calculating prudent value and the level of aggregation required. A low level of confidence will create only small position-level additional valuation adjustments and will not require any aggregation methodology to ensure that the aggregate additional valuation adjustment is not unreasonably large (i.e. a simple-sum approach with no diversification benefit could be adopted). However, this low level of confidence could not supply the additional assurance on individual positions' realisable values described earlier as it would not effectively capture increasing uncertainty, and would unfairly penalise a well-diversified institution with many small positions in comparison to an institution with a few large and highly illiquid positions. This paper sets out the EBA's preliminary view on an appropriate level of confidence, and discusses all of the above issues in order to elicit stakeholders' views on key topics at an early stage in the development of the RTS.

4. Discussion

4.1. Introduction

Scope of the requirements

1. Article 31 of the draft Regulation requires that an institution must assess the prudent value of all fair valued positions² on its balance sheet including those classified as trading book, available for sale and fair value option in the banking book. The approaches discussed in this paper are intended to be relevant to all of these positions on a standalone or consolidated basis (depending on the scope of permission with respect to Article 314).
2. Based on the valuation assessment, Article 31 requires that the institution must deduct from its common equity tier 1 capital, the additional valuation adjustments made for fair value assets and liabilities on its balance sheet. This would mean the deduction of the aggregate additional valuation adjustment.

Q1. Do you believe that a proportionality threshold should be considered before requiring an institution to assess the prudent value of all fair value positions? If yes, how would you define the threshold?

Definition of key terms used in this paper

3. Throughout this DP, a number of key terms are used which are defined below:
4. **Financial Instrument:** An instrument as defined in Article 4 Paragraph 57 of the draft Regulation.
5. **Fair Value:** Fair value as determined in accordance with applicable accounting standards.
6. **Valuation Uncertainty:** The possibility that a valuation estimate of a valuation position would differ from the price in an actual transaction on the same terms, at the reporting date and time. This is caused by uncertainty around the actual transaction price that would be obtainable if the valuation position were to be closed.
7. **Valuation Position:** A financial instrument or portfolio of financial instruments which are fair valued (the fair value might be based on a directly observable market price or a set of valuation parameters put in a pricing model). The notion of position in this DP does not refer to the notion of position as referred to in the Regulation.
8. **Valuation Parameter:** A market observable or non observable parameter that influences the fair value of a position.

For ease of reference throughout the DP, we have used the term **Position** to refer to either a valuation position as defined above or to an open risk to the price of a fungible security or a valuation parameter.

9. **Prudent Value:** The value which accounts for all the AVAs listed in Section 3 and for which there is an appropriate level of confidence that the actual realisable value at the reporting date and time is greater from the institution's perspective.

² The EBA's preliminary view is that the RTS will not apply when the valuation basis is lower of cost or market (LOCOM) as applicable in the relevant accounting framework.

-
10. **Additional Valuation Adjustment (AVA):** The difference between the fair value, as reported in the balance sheet including all fair value adjustments, and the prudent value. This difference should take account of all of the factors and risks potentially requiring additional valuation adjustments listed in Article 100 of the draft Regulation and described in more detail in Sections 3 and 4.
 11. **Independent Price Verification (IPV):** The process by which the valuations of positions on the balance sheet are independently verified for accuracy.
 12. **Confidence Level for Prudent Valuation:** The probability that an institution can exit a position without a loss against the current prudent value. The value associated with such a level of confidence should be determined based on relevant data, where available, or if not via a judgemental approach.

4.2 The minimum required valuation adjustments

13. Under Article 100 Paragraph 10 of the draft Regulation, a prudent valuation must include, at a minimum, AVAs for all of the following elements:
 - Unearned credit spreads;
 - Close-out costs;
 - Operational risks;
 - Market price uncertainty;
 - Early termination;
 - Investing and funding costs;
 - Future administrative costs; and
 - Model risk, when relevant.
14. Article 100 Paragraph 11 also requires institutions to consider AVAs for concentrated or illiquid positions.

4.3 Process to calculate AVAs

15. The starting point for the assessment of prudent value is fair value. Fair-valued positions should be revalued daily. They should also, where possible, be marked directly to a market in the exact same instrument rather than marked to a model based on inputs from the prices of other instruments. Where an institution does mark to model, it should maximise the use of relevant observable inputs and minimise the use of unobservable inputs. Article 100 requires that all of these fair-valued positions should be re-assessed from a prudent view point and AVAs calculated.
16. The exit price of a position, on which the prudent value should be based, is the value that could be obtained in an arm's-length transaction with a willing counterparty. This should include all factors that a market participant who does not hold that position would take into account, for example, Front Office (FO) pricing adjustments for funding or regulatory capital costs. The EBA considers that the assumed period over which the exit should be achieved does not need to be instantaneous. The prudent value should reflect exit prices at which the institution can transact within the time horizon for capital purposes.

- Q2. Do you agree that the exit price used as the basis of prudent value does not necessarily need to be based on an instantaneous sale? If yes, provide argument to support your view.**
- Q3. Should a specific time horizon for exit be set when assessing the prudent valuation? If so, how the time horizon should be set (e.g. the same time horizon for calculating Value-at-Risk (VaR), Credit Risk Capital Requirements, etc.), what should it be and how would it feed into the calculating of AVAs?**

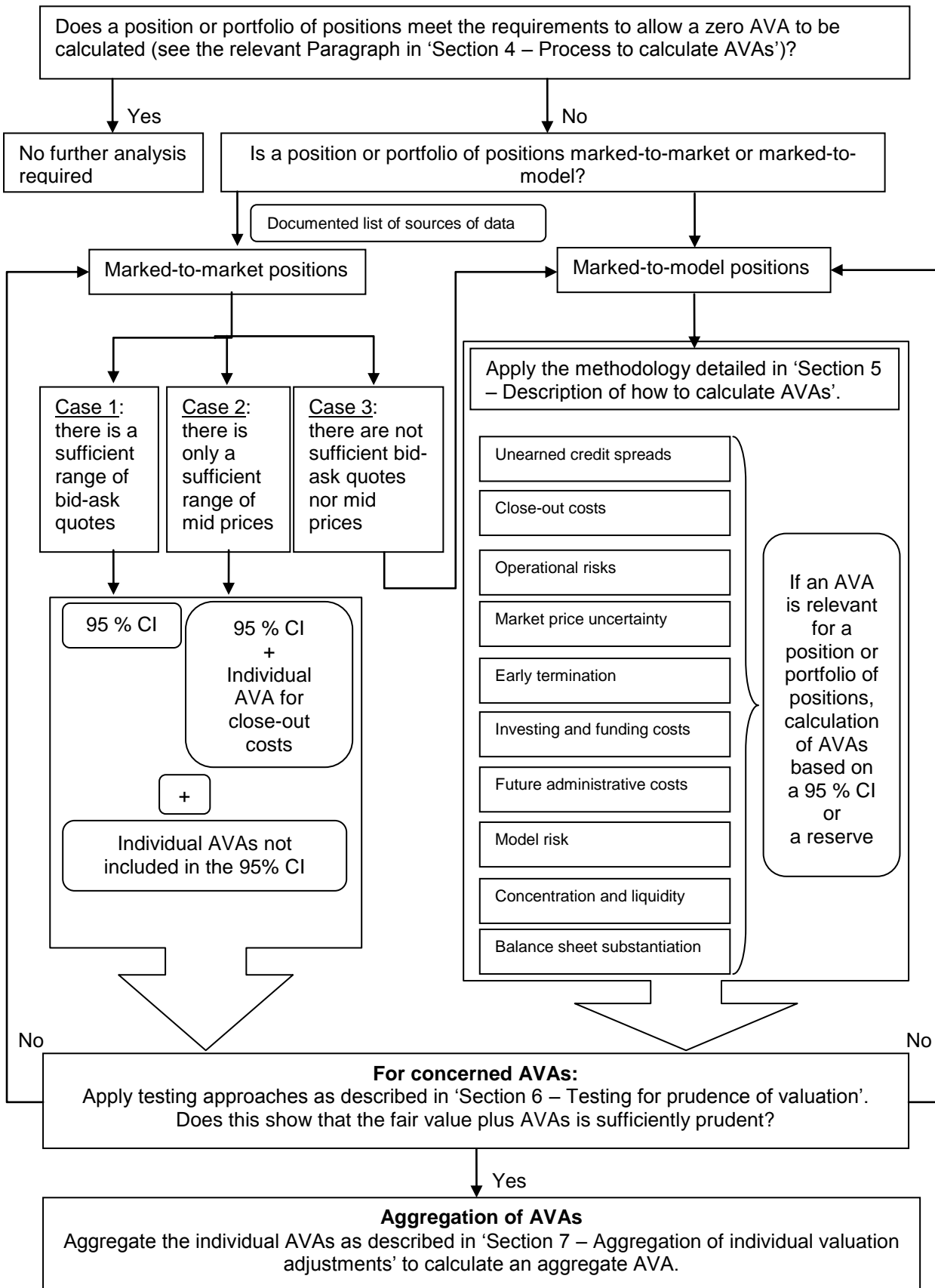
-
17. Institutions should consider all of the elements set out in Section 3 when they determine an AVA. The AVA should be calculated to achieve an appropriate level of confidence that the actual realisable value at the reporting date and time is greater from the institution's perspective. The EBA's preliminary view is that an explicit confidence level should be defined and that an appropriate confidence level would be 95%³. For positions where there is extensive independent and reliable data available, institutions should be able to use a statistical approach to calculate the value with a 95% level of confidence, while for other positions where there is less independent and reliable data available, the 95% level of confidence would be used as guidance for a more judgemental approach. To the extent that all the AVAs listed in Article 100 are not reflected in available data used in this approach they should be considered separately.

- Q4. Do you support the concept of a specified level of confidence to determine AVAs? If not, why? Are there any AVAs where the use of a specified level of confidence is not appropriate?**
- Q5. If you support a specified level of confidence, do you support the use of a 95% level of confidence? What practical issues or inconsistencies with other parts of the CRR might arise when using this level of confidence?**
- Q6. How prescriptive do you believe the RTS should be around the number of data points that are required to calculate a 95% level of confidence without any more judgemental approach being necessary?**
- Q7. If you support a specified level of confidence, do you support the explicit allowance of using the level chosen as guidance for a more judgemental approach where data is lacking?**

18. An institution may assume that a position does not require an AVA where the balance sheet valuation (the fair value) including adjustments can be shown to already be at a prudent level, i.e. there is 95% confidence that the realisable value is the same or greater than the fair value based on the methods, controls and data quality laid out elsewhere in this paper. As a minimum, this would require that all of the elements set out in this section have been considered in the fair value calculation. The institution could justify this result in two ways.
- The institution could demonstrate that the level of valuation uncertainty is not material. To achieve this, an institution would need to show that there is strong evidence of actual trades or readily-tradable quotes at the balance sheet date and time (meaning this could only be applied to very liquid positions) for sizes of trade that indicate the position could be closed in its entirety at the fair value on the balance sheet. Institutions should have policies and controls in place to identify positions where no AVAs are required.
 - The institution could show that, while material valuation uncertainty does exist, the balance sheet value is already at a 95% level of confidence or greater. Since this justification would be likely to be used in circumstances where there is limited evidence to support the valuation, evidence of significant prudence would be required (e.g. 100% provisioning).

³ Throughout the rest of this DP, 95% is used when discussing the confidence level for prudent valuation.

A decision tree guide to the proposed AVA calculation process



A more detailed description of the steps to take is shown below.

1. An institution may calculate a zero AVA where the balance sheet valuation (the fair value) including adjustments can be shown to already be at a prudent level. Evidence to support this could be one of

two types:

- i) There is strong evidence of actual trades or readily-tradable quotes at the balance sheet date and time for sizes of trade that indicate the position could be closed in its entirety at the fair value on the balance sheet.
 - ii) The balance sheet valuation is already suitably prudent. Where there is little evidence to support the price level, incontrovertible evidence would be required to show that this is the case (for instance 100% provisioning).
2. If a zero AVA is not appropriate, institutions should analyse the need for AVAs by considering separately marked-to-market positions on the one hand, and marked-to-model positions on the other. In all cases, if AVAs, wholly or partially, are already accounted for in the fair value, institutions may offset them against the AVAs calculated in this regulatory standard.
 3. A marked-to-market position is defined here as being one that is in a standardised product with a price quoted that is relevant to that exact instrument such as a fungible security or exchange-traded derivative. It does not include OTC derivatives as these will be traded on individual maturities, strikes or other terms which will not generally be the same as the terms of the standard trade quoted for on a later reporting date.
 4. When considering marked-to-market positions, institutions should use a full range of reliable data sources, including but not limited to:
 - i) Exchange prices in a liquid market.
 - ii) Recent trades in the exact same or very similar instrument, either from the institution's own records or, where available, trades from across the market.
 - iii) Tradable quotes from brokers and other market participants.
 - iv) Consensus service, where judged to be of sufficient quality (i.e. with sufficient contributors and not representing a one-way or highly illiquid market).
 - v) Indicative broker quotes.
 - vi) Counterparty collateral valuations.
 5. In all cases, the source will need to be analysed to gain assurance that it is of high enough quality to be relied on. The order is of generally decreasing reliability but should not be taken as a strict hierarchy as different sources will be of varying quality for different markets and instruments.
 6. Three cases should be considered when determining AVAs for marked-to-market positions, based on the available sources of data:

Case 1: there is a sufficient range of bid-ask quotes to determine the range of plausible values.

Case 2: there is only a sufficient range of mid prices to determine the range of plausible values.

Case 3: there is not a sufficient range of bid-ask quotes nor of mid prices to determine the range of plausible values. In this case, AVAs should be determined based on the methodology developed for marked-to-model positions.
 7. For the first two cases described above, a single AVA will be determined based on the calculation of a 95% level of confidence of the plausible range of values. In the second case, an AVA for close-out costs shall also be included in addition to the one determined based on the 95% level of confidence.
 8. Institutions should also consider the necessity to calculate other separate individual AVAs if the use of a 95% confidence level of a range of plausible values does not include all required AVAs (e.g. for concentrated positions or future administrative costs). In all cases of additional AVAs, the requirement to use a 95% level of confidence as guidance as to how prudently to calculate the AVA remains, even where there is not enough evidence to produce a range of plausible values sufficient to calculate the 95% confidence level statistically.
 9. Institutions should document the justification for which AVAs are included in the calculation of the 95% level of confidence and which ones require a separate calculation.
 10. Examples of the use of this decision tree for marked-to-market positions can be found in Annex 4.
 11. When considering marked-to-model positions, institutions should determine an amount for each listed AVA as defined in Section 5 based either on a 95% level of confidence of a plausible range of values or estimating the level for which there is approximately 95% confidence, depending on the AVA.

-
12. Institutions should document the justification for which method is used and provide evidence that the AVA is likely to be at the 95% level of confidence, including for AVAs where there is no observable range of plausible values that would enable this to be calculated statistically.
 13. When determining a range of plausible values for the purpose of calculating an individual AVA or group of AVAs, institutions should first use the sources of data listed in the methodology developed for marked-to-market positions. Where there is insufficient observable data to determine the range for all inputs to the valuation of a position, institutions should use alternative methods or sources of data, including the following non-exhaustive list:
 - i) Look for proxies to other instruments for which sufficient data is available. An additional level of uncertainty would need to be assumed in the instrument being tested however as a liquid instrument is being used to estimate valuation uncertainty for an illiquid one.
 - ii) Analyse historical volatility in the value of the instrument may help to provide some bounds around the current valuation uncertainty.
 - iii) Use appropriately prudent shifts to price inputs or model choices.
 - iv) Use natural bounds to valuation (e.g. the most expensive co-terminal European swaption as a lower bound for a Bermudan swaption).
 14. Examples of the use of this decision tree for marked-to-model positions can be found in Annex 4.
 15. After an institution has calculated the AVAs required for both the marked-to-market and the marked-to-model positions, it should test them as described in Section 6. In particular, ongoing analysis of trading activity should be undertaken to ensure that the valuation, including AVAs, is not greater than actual trade prices achieved.
 16. Except in a case where an institution has obtained valuation evidence for a whole portfolio, there are likely to be many individual AVAs at a position level. These should be aggregated using an appropriate aggregation approach as described in Section 7 and the aggregated AVA deducted from common equity tier 1 capital.

Q8. Should any additional possible sources of market prices be listed in the RTS?

Q9. Should more description be included of how to use the various sources of market prices to obtain a range of plausible prices?

Q10. Should the RTS be more prescriptive on how to use the various alternative methods or sources of data to obtain a range of plausible prices where there is insufficient observable data to determine the range by direct statistical methods? If so how?

19. For each fair valued position where an AVA is determined to be required, the EBA's preliminary views on the appropriate methodology considerations for the required elements to be considered when calculating AVAs are set out below.
20. While an institution should take all of the below factors that may require an AVA into account, it will sometimes not be necessary or possible to allocate the overall AVA exactly to each of the factors. For example, an institution might be able to obtain a cash bid price for the whole of a portfolio. Since the whole portfolio could be exited at this value, the price includes evidence for the total of all of the AVAs necessary to correct the portfolio valuation to a prudent level but provides no evidence as to how much of this relates to, for example, future administrative costs.

4.4 Description of how to calculate AVAs

Unearned credit spreads

21. An institution should assess the uncertainty in its credit valuation adjustment (CVA) in a consistent way to an exotic derivative position considering model and parameter uncertainty. Any difference between the prudent assessment of the CVA and the fair value should be included as an AVA. Article 30 states that the DVA (the gain or loss on liabilities reported by the institution due to its own credit quality) should not be included in the calculation of own funds. Therefore, DVA does not need to be assessed for prudent valuation purposes.

Close-out costs

22. Uncertainty in the exit price of a position arises from uncertainty in the mid price of the position and from uncertainty in the bid offer spread. The impact of the bid offer spread on an institution's balance sheet value should be incorporated either by the use of a direct mark to exit price or through the use of a portfolio level bid offer adjustment that estimates the cost of neutralising the risk in the portfolio.
23. An institution should determine the uncertainty in the bid offer adjustment, for each position, considering both the market bid offer spread and, where relevant, the netting approach used in calculating a portfolio level bid offer adjustment. Where the bid offer adjustment calculation is based on net portfolio level risks an institution should select a methodology for the aggregation of risk exposures. This methodology should be consistent with, or demonstrably more prudent than, the most accurate hedging of the risk available using tradable instruments taking into account liquidity.
24. The exemption in Article 100 Paragraph 5 which allows institutions to use the mid price provided it can close out its positions at that level assumes there is always sufficient liquidity and client demand to take up the specific positions held by the institution at that price level. If this exemption is to be used when calculating the prudent value, the institution should provide evidence that this level of liquidity and client demand exists to a 95% level of confidence.
25. An institution should calculate AVAs for all position level bid offer uncertainties. This may be incorporated directly through the assessment of prudent exit prices at a position level or by separately determining a prudent mid value and combining this with a prudent bid offer spread.

Operational risks

26. An institution should make an estimate of the potential losses that may be incurred as a result of operational risks around the pricing and valuation processes which could cause an error at the balance sheet date. It is possible that there may be overlap with the operational risk capital charge, provided that this charge is assessed broadly enough. To the extent that this is not the case, any additional estimated losses should be included as an AVA.

Market price uncertainty

27. The fair values of financial instruments are represented as point estimates for the purpose of the financial statements. However, at the balance sheet date it is likely that there will be a range of plausible estimates for the valuation of many financial instruments. The choice of the point estimate used is influenced by a variety of factors, including different market data points and valuation methodologies. The range of plausible estimates will tend to widen for markets that are less liquid or lack transparency. Indicators for this will include instruments for which large exit P&L (the P&L realised relative to its pre-exit valuation when closing out a position) or large day 1 P&L (the P&L created by the difference between the trade price and the valuation at the end of the day when a new position is added to the institution's portfolio) is being observed, or markets where institutions are all positioned in one direction, where only very low levels of trading are observed or where daily pricing is difficult to obtain.

Q11. Are there any other indicators of large market price uncertainty which should be included?
--

-
28. Valuation uncertainty at the position level leads to a potential error in the fair value balance sheet. The position level should be clearly defined by the institution. When selecting a methodology to determine the appropriate level at which to net risk exposures across an institution or portfolio, an institution should apply an approach that is consistent with, or demonstrably more prudent than, the most accurate hedging of the risk available using tradable instruments taking into account liquidity. This netting approach is the same as that specified for close-out costs.
 29. For each position measured at fair value, an institution should determine a range of plausible values to allow the prudent value to be determined to a 95% level of confidence. This should consider the uncertainty in the mid-price and in the bid-offer spread. Depending on the market data available these two elements may be captured together.
 30. This range should preferably be obtained from analysis of a range of trades (either those traded by the institution itself or, where available, trades from across the market) or tradable quotes unless there is reason to believe this data is not relevant (e.g. the trades are very small relative to the size of the position held or the quotes are stale).
 31. Where this is not obtainable, a consensus service that has been determined to be of good quality (i.e. with sufficient contributors and not representing a one-way or highly illiquid market) may be used. Other possible alternative sources of data are indicative broker quotes, counterparty collateral valuations, proxies, historic volatility or appropriately prudent shifts as an approximate estimate for the 95% level of confidence.
 32. Institutions should aim to use as many sources as possible in their overall assessment of the level of uncertainty and not use an overly strict hierarchy that excludes analysis of other sources of data. Institutions should have policies and controls in place to identify instances where it is not appropriate to rely on each potential source.
 33. Alternatively, where a natural limit exists to the downside valuation this may be taken as the prudent value.
 34. An inactive market does not exempt an institution from being required to calculate a prudent value.
 35. The calculation of the valuation uncertainty caused by the uncertainty in each valuation parameter should preferably be calculated by completing a full revaluation of the affected instruments using the same pricing model, systems and other valuation parameters as were used to value the instruments at the reporting date. However, where this is not possible and it can be shown that the difference is likely to be immaterial, a risk-based calculation may be allowed where the risk to the parameter calculated by the risk systems of the institution is multiplied by the difference between the prudent level of the parameter and the level used for the valuation at the reporting date.
 36. When the prudent value is determined to be below the value held in the fair value accounts, the difference should be included as an AVA.

Early termination

37. An institution should make a prudent assessment of potential losses arising from non-contractual early terminations on client trades. This should combine an assessment of the percentage of client trades that are terminated early with an assessment of losses that arise from trading away from fair value for client relationship purposes. Where this assessment exceeds any adjustments held in the fair value accounts the difference should be included as an AVA.

Investing and funding costs

38. An institution should assess the uncertainty in its valuation framework for strongly-collateralised derivatives arising from methodologies that do not coincide with the market standard approaches for valuing them as reflected by the discounting calculations for collateral posting within typical clearing houses.
39. An institution should assess the costs and benefits of funding assets and liabilities for derivative positions which are not strongly-collateralised.
40. These assessments should be used to calculate a funding valuation adjustment to be incorporated into prudent value. In all cases, the valuation adjustment should be sufficient to cover the institution's funding costs and benefits over the contractual lifetime of the trade. Where this

adjustment exceeds any adjustments held in the fair value accounts the difference should be included as an AVA.

Future administrative costs

41. Where an institution calculates a close-out costs adjustment that is not based on the full exit of all positions (e.g. the adjustment is calculated for an OTC derivative portfolio using netted risk exposures) the institution should either calculate a full exit cost bid offer adjustment or a future administration cost adjustment for the purposes of prudent value. Where an institution elects to calculate a full exit cost the additional cost should be added to the AVA for close-out costs. Where an institution elects to calculate a future administration cost adjustment, and this is not included in the fair value accounts, it should be included as an AVA.
42. The institution should calculate the future administration cost adjustment taking into consideration the operational costs and future hedging costs over the expected life of the portfolio of positions for which a full exit cost is not applied. In this respect, an institution should make a prudent assessment of the expected life of the portfolio that is consistent with the calculation of future hedging costs.
43. Finally, the institution should include all the staffing and fixed costs that will be incurred in managing the portfolio when calculating a future administration cost adjustment but may allow a reasonable reduction in these costs as the size of the portfolio reduces.
44. In considering the above costs, any future costs that contribute to the future administration cost adjustment may be discounted using a rate which reasonably approximates the risk free rate.

Model risk

45. Institutions should include the impact of valuation model risk when assessing the prudent value of its balance sheet. Valuation model risk arises for a position where a range of different models or model calibrations are used by market participants and there is no clear market price for the specific product being valued. The higher the level of netting used when calculating valuation uncertainty at a position level, the more model risk is increased due to the level of interpolation or extrapolation used in pricing away from the positions that have been directly tested.
46. At a position level, where the prudent valuation uncertainty arising from model risk is greater than any fair value adjustments held for this purpose (excluding those held for model inadequacies which represent corrections to fair value where the valuation model is known to be wrong rather than uncertainty around the accuracy of the model) then the difference should be included as an AVA.
47. An institution's assessment of model risk should consider the diversity of modelling approaches in the market and the complexity of the product. Where possible an institution should quantify model risk by comparing the valuations produced from the full spectrum of modelling and calibration approaches.
48. Where quantification of model risk by model comparison is not possible an institution should establish a framework for scoring model risk with an associated uncertainty charging structure.
49. An institution's model risk framework should consider; product complexity, diversity of possible mathematical approaches, the degree to which the market is one way, and the risk profile of the portfolio.
50. Where an institution has calculated uncertainty for a given product with reference to output price data then it may seek to justify taking no further prudent value adjustment for model risk on that product.

Concentration and liquidity

51. An institution should assess the size of all fair value positions in relation to the liquidity of the market and its ability to trade in that market in order to establish a threshold beyond which a prudent concentration adjustment should be calculated. This assessment should take into account the average daily market volume and typical daily trading volume of the institution.
52. When an institution identifies a concentrated position, unless a market price is available for a position of its size, the EBA believes that a prudent exit period should be calculated and the prudent

concentration adjustment calculated should take into account the volatility of the price or parameter, the volatility of the bid offer spread and the impact of the exit strategy on the market.

53. At a position level an institution should then compare the level of its prudent concentration adjustment with that held in the fair value balance sheet and an AVA calculated for the difference.

Balance sheet substantiation

54. As part of its balance sheet controls, an institution should substantiate each of its balance sheet accounts by testing that the balances can be agreed to lists of all the relevant individual assets and liabilities of the institution and their valuations. Where this test fails or is not completed, the institution should make an assessment of the amount that could be gained or lost and the percentage probability of this gain or loss materialising. This probability should be based, where possible, on previous experience of similar situations. The probability assessed should be used to determine whether any potential loss should be included in the prudent value by calculating an AVA.

Q12. Do you believe the approaches set out above are appropriate for each of the adjustments listed in Article 100? If not, what approaches do you believe would be more relevant?

Q13. Are there any other material causes of valuation uncertainty that the RTS should describe an approach for? Or are any of the adjustments listed above not material and should not be included?

4.5 Testing for prudence of valuation

55. The aim of prudent valuation is to ensure that, to an appropriate level of confidence, an institution can realise a value for any position that is greater from the institution's perspective than the sum of the fair values of the instruments that form the position including any AVAs that the institution has made for this position.
56. To test that valuations achieve this aim, where a sufficient number of actual transactions are available that are valued using similar methods and parameters to the positions on the institution's book, the price of the instruments sold or acquired in these transactions can be compared to the change in the value of the position when the instruments are removed or added (this hypothetical change in value would be determined using the valuation parameters as they stood prior to the transaction). The comparison would provide information on whether the institution's prior valuation is in line with the prices that are observed in the market.
57. The testing approach outlined in Annex 1 puts such comparisons to systematic use. The example testing approach may be necessary but is not sufficient, for example due to its reliance on actual trades, too few of which may be available for the specific position being tested, and its use of valuations as at the end of the previous day to compare to trade prices during the day as well as the fact that the testing tool does not cover all AVAs. However, where there are actual transactions available to enable the use of the testing approach, the EBA proposes that an institution should use it.

Q14. Do you believe that the testing approach in Annex 2 represents a useful tool to test for prudence of valuation? If not, what weaknesses make it unsuitable?

Q15. Do you believe that the RTS should be prescriptive with respect to validation techniques? If not, how do you believe that comparable levels of prudence should be ensured for the valuations across institutions? Are there other validation techniques that you believe should be detailed in the RTS?

4.6 Aggregation of valuation adjustments

58. The EBA's preliminary view is that, both at the individual position level and at the legal entity level, the prudent value may not be higher than the fair value including position-specific adjustments. Therefore, when the fair value of a position or the net value of the legal entity fair value balance sheet is lower than the prudent value obtained using the institution's standard approach, the prudent value should be set to the fair value.

Q16. Do you support the concept that prudent value can never be greater than fair value including fair value adjustments at both the individual position and the legal entity level? If not, what would be the reason to justify your view?

59. The EBA is currently discussing two approaches for aggregating position level AVAs:
- Firstly, that the aggregation should use simple summation of all position level AVAs for prudence and simplicity.
 - Secondly, to allow a diversification benefit to be calculated. This approach raises several issues which are discussed in more detail in the following paragraphs.
60. The principle for simple summation is that fair values and AVAs are determined unilaterally by an institution on the basis of a few data points and usually no correlation observable between them. On the contrary, the principle of allowing for a diversification benefit is based on the theory that an institution with many small valuation uncertainties may face a very different total valuation uncertainty when compared to an institution with one large valuation uncertainty. As the correlations between the potential valuation errors at a position level are unobservable however, this would require a judgemental approach to the setting of any correlations used taking into account any factors that could give rise to increased correlation.

Q17. Would simple aggregation better reflect your assumptions and practices or would you support the availability of a diversification benefit within the aggregation of position-level AVAs? Please explain the reasons and justification why, providing any evidence available to support your arguments

Q18. If you support the availability of diversification benefit, do you support creating a simplified standard approach, an example of which is shown in Annex 4? If you do, do you have alternative suggestions on how this standard approach should be specified? Are the suggested correlations in the example appropriate, if not what other values could be used?

Q19. If you support the availability of diversification benefit, do you support allowing an in-house approach which should be subject to approval by the regulator, an example of which is shown in Annex 4?

61. If the aggregation approach used is not simple summation, any diversification benefit should in any case only apply to certain AVAs as some relate to uncertainty around the fair value of individual positions which could be positive or negative (and which would not all be expected to be at the bottom of the range of plausible values at the same time) while others relate to reserves that are required for particular reasons that are only negative.
- Unearned credit spreads: AVAs for uncertainty in the level of the CVA should be included in the diversification calculation.
 - Close-out costs: AVAs for uncertainty in the level of the close-out costs adjustment should be included in the diversification calculation.
 - Operational risks: AVAs for additional operational risks should not be included in the diversification calculation.

- Market price uncertainty: AVAs for market price uncertainty should be included in the diversification calculation.
- Early termination: AVAs for early termination risk should not be included in the diversification calculation.
- Investing and funding costs: AVAs for expected investing and funding costs should not be included in the diversification calculation.
- Future administrative costs: AVAs for expected future administrative costs should not be included in the diversification calculation.
- Model risk: AVAs for uncertainty in valuations caused by model risk should be included in the diversification calculation.
- Concentration and liquidity: AVAs for concentrated positions should not be included in the diversification calculation.
- Balance sheet substantiation: AVAs for potential losses arising from balance sheet substantiation should not be included in the diversification calculation.

4.7 Offsets to AVAs when calculating the adjustment to common equity tier 1 capital

62. As stated in the scope section of this paper, the draft Regulation requires that an institution should recalculate its common equity tier 1 capital using the aggregated prudent value of fair value assets and liabilities on its balance sheet.
63. Overlaps between the AVAs required by Article 31 and other Pillar 1 capital requirements may exist where the effect of summing the AVA and the incremental capital requirement resulting from a position would be excessive, however with the exception of operational risk the EBA believes this would only be the case in extreme circumstances.

Q20. Would you agree that offsets against AVAs for overlaps with other Pillar 1 capital requirements should not be permitted? If not, what offsets might be appropriate and under what conditions might they be allowed (e.g. individually assessed by the institution and agreed with the regulator rather than specified in the RTS)?

4.8 Documentation, systems and controls requirements

64. The calculation of AVAs requires supporting documentation and systems and controls to ensure the process can be supervised and is performed in a robust manner. The EBA has collated its preliminary views on the required documentation, systems and controls and sets them out below for comments.

Documentation

65. When assessing the prudent value of a position, an institution should:
- Develop a Prudent Valuation Methodology document subject to appropriate regular review and sign-off by senior management.
 - Define a range of methodologies for quantifying uncertainty for each fair value position making use of all relevant market data (e.g. traded levels, price quotes, consensus services and collateral valuations).
 - Document a hierarchy to determine the preferred methodology for the calculation of uncertainty for each asset class, product or position.

-
- Establish a clear link between the fair value methodology (including fair value adjustments), the quality of the IPV and the level of uncertainty.
 - Clearly define the circumstances required to justify "zero uncertainty".
 - Define procedures to identify when an active market has become an inactive one as this will affect the quality, transparency and reliability of market data.
 - Define the holding period to be used when determining the possible exit cost. In particular, for the downside risk to the valuation, this should be a short-term period and should not take into account any opinion of the institution that the only prices available at the balance sheet date are unrealistic and purely distressed so that the institution would never sell at those prices.
 - Provide sufficient information to allow management to understand the source of valuation uncertainty on the balance sheet.
 - Keep sufficient records such that, for any figure in the uncertainty calculations, the reasoning and calculations at a position level can be efficiently drilled down to and analysed.
 - Analyse the relationship between valuation uncertainty and gross IPV variances.

Systems and controls

66. When valuing the positions on the balance sheet, there are a number of controls around the valuation process that should be in place.
67. The responsibilities for governance structures applicable to all financial instruments measured at fair value should include:
 - Ongoing review of significant valuation model performance for issues escalated for resolution and all significant changes to valuation policies.
 - Ensuring adequate resources are devoted to the valuation process.
 - Articulating the institution's tolerance for exposures subject to valuation uncertainty and monitoring compliance with the board's overall policy settings at an aggregate institution-wide level.
 - Ensuring the independence in the valuation process between risk taking and control units.
 - Ensuring the appropriate internal and external audit coverage of fair valuations and related processes and controls.
68. The controls and procedures around valuations should:
 - Include well documented policies for all significant valuation methodologies, which would be approved by senior management and reported to the board as frequently as necessary and at least annually.
 - Detail the range of acceptable practices for the initial pricing, marking-to-market/model, valuation adjustments, observability and reliability of inputs, and periodic independent revaluation depending on the nature of the financial instruments and sources of independent prices.
 - Establish the information feeds and thresholds for determining when there is a presumptive case for challenging the valuation model.
 - Be applied consistently across similar positions and across business lines and be subject to internal audit review with the resources and expertise required to identify and provide an effective review of practices.
 - Include IPV for which the unit responsible sources prices independently of the relevant trading desk.
 - Include new product approval processes which include all internal stakeholders relevant to risk measurement, risk control, financial reporting and the assignment and verification of valuations of financial instruments and which are supported by a transparent, well-documented inventory

of acceptable valuation methodologies that are specific and relevant to products and businesses.

69. Key characteristics which indicate a sound process for valuation methodology design and validation include:
- Rigorous validation, independent from the design and risk-taking functions. This should include sensitivity analyses performed to assess the impact of variations in model parameters on fair value, including under stress conditions and benchmarking of the valuation result with the observed market price at the time of valuation or with an independent benchmark model.
 - Integrated control processes. An institution should have explicit links between the results of the IPV process or indicators of performance of positions such as profit and loss attribution and the review process of models. Whenever possible, these links should be expressed in terms of explicit quantitative thresholds, the crossing of which should trigger a review of the valuation model and/or valuation procedure.
 - Sufficiently resourced internal and external audit programmes which devote considerable resources to reviewing the control environment, the availability and reliability of information or evidence used in the valuation process, and the reliability of estimated fair values, including IPV processes and testing valuations of significant transactions.
70. An institution should have adequate capacity, including during periods of stress, to establish and verify valuations for instruments in which it engages. The institution should also test and review the performance of its valuation models under possible stress conditions, so that it understands the limitations of the models under such conditions. Institution valuation methodologies are expected to not place undue reliance on a single information source (e.g. external ratings) especially when valuing complex or illiquid products. Processes should emphasise the importance of assessing fair value using a diversity of approaches and having in place a range of mechanisms to cross-check valuations.
71. Senior management should ensure that appropriate control policies and practices are in place as regards classification and any subsequent reclassification of financial instruments and that those policies are applied consistently over time and within a group.
72. Valuation adjustments should be initially authorised and monitored subsequently by an independent control group.
73. Outside of actual transactions, uncertainty about the current value of a financial instrument should be viewed as an inherent characteristic of the valuation process. Institution valuation and risk measurement systems should systematically recognise and account for valuation uncertainty. In particular, valuation processes and methodologies should produce an explicit assessment of uncertainty related to the assignment of value for all instruments or portfolios. Assessments of all material valuation uncertainty should be included in the information communicated to the board and senior management.
74. If an institution exhibits significant weaknesses in its risk management policies, systems and controls related to valuations relative to the standards set out above, the EBA's view is that competent authorities should be allowed to require additional adjustments to Tier 1 capital to reflect those control weaknesses.

Q21. Do you believe the above requirements are appropriate? If not, what other requirements could be necessary and what requirements stated above are considered not to be relevant?

4.9 Reporting requirements

75. The purpose of the RTS required by draft Article 100 is to promote a level playing field in Europe in the application of the prudent valuation requirements. Article 100 Paragraph 2 requires institutions to have systems and controls sufficient to provide prudent valuation estimates. These should include internal reporting as detailed in Section 6 above. In order to aid reviews of consistency of

implementation, and therefore promote a level playing field, the EBA believes that there would be significant benefit in requiring institutions to produce these reports in a consistent format.

76. The EBA is therefore considering proposing a common reporting form for prudent valuation.

Q22. What would be the sources of costs and benefits of requiring (a) the implementation of a unique AVA methodology and (b) a consistent format for reporting AVA? Do you agree that the benefits of such requirements outweigh the costs associated with them?

Q23. If you agree with a reporting form being introduced, could you please provide a suggested template?

77. In addition to any formal return, the EBA would expect that more detailed analysis of how AVAs have been calculated should be made available to competent authorities for their review. This detailed analysis could include, for example, details of concentrated positions or model risk assessments along with granular breakdowns of uncertainty per portfolio, product or position. Details of how the aggregation is calculated within an asset class and the diversification benefit gained would be required along with other details as required by the competent authority to understand the valuation uncertainty at that institution or in the market as a whole.

.Annex 1: A tool for testing the prudence of valuation

The box below represents a tool for testing the prudence of valuation.

Valuation System: All of the information, pricing models (where applicable) and IT systems that an institution uses to determine the fair value for a set of positions and the applicable AVAs.

Validation of AVAs

A very useful source of data on the prudence of valuations is actual trades entered into by the institution. Article 100 Paragraph 7g of the Regulation requires an institution to compare “actual close out values to model outputs” in the context of testing model performance for positions which are marked-to-model but the comparison of actual trade prices to fair values, adjusted for AVAs where necessary, should be completed for all positions. Note that the tool described in this section is purely a testing tool. It is not designed to assist institutions with the determination of the individual valuation adjustments that the institution may have to make according Articles 31 and 100 of the Regulation in conjunction with this regulatory technical standard.

For this testing the institution must follow the following steps:

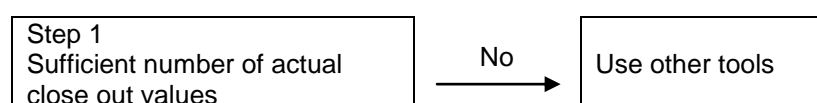
- a. It must identify any AVAs that are not generally reflected in actual close out values (e.g. AVAs for concentration risk, operational risk and future administrative costs). These must be removed from the comparison.
- b. It must decompose its portfolio of fair-valued positions into ‘valuation sets’, i.e. sets of positions that are part of the same valuation system.
- c. For each valuation set the institution must perform the testing as described in figure 1 below.
- d. When the results of the testing suggest that the institution takes insufficient AVAs for a valuation set, the institution must reconsider its AVAs in light of these results and increase the AVAs for this valuation set as necessary.

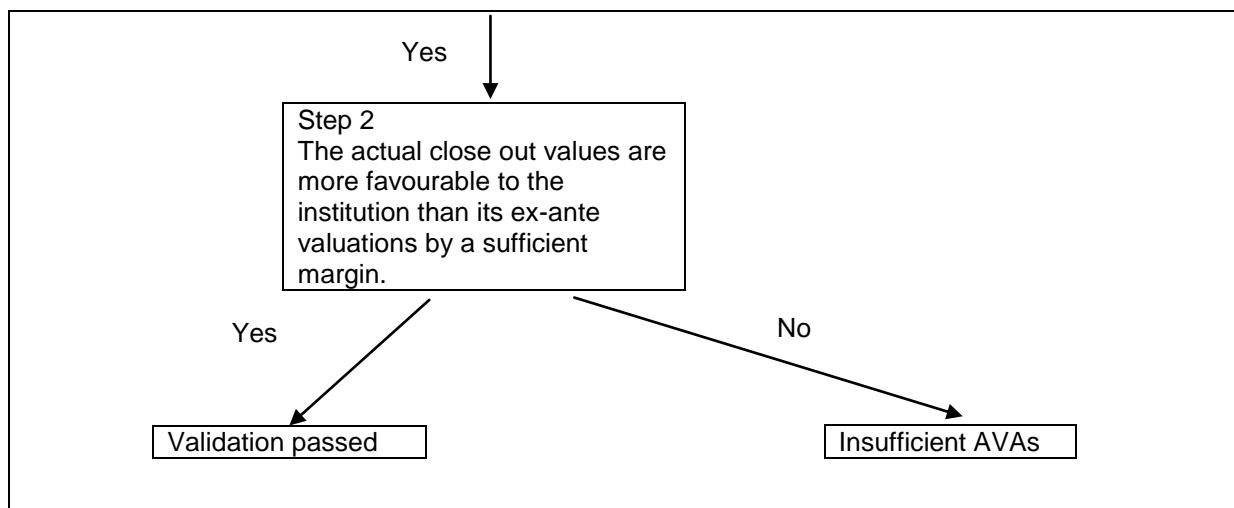
Step a: For this validation process the institution must analyse the standards that it applies for the determination of its fair values (as confirmed by the auditor) and its AVAs. It must perform this analysis separately for each valuation system. For certain items it will find that these will not generally be reflected in actual close out values. These may include AVAs for concentration risk, operational risk, and future administrative cost. Such AVAs must be removed before the testing as described in Figure 1 because this testing tool will not identify any shortcomings for such AVAs. The testing tool described in this annex is not suitable for the testing of these AVAs and they must therefore be checked separately. For this check, formal statistical tools are currently not at hand.

Step b: For some sets of instruments actual close out values are observed much more frequently than for others. For example, bonds issued by large corporates may trade much more frequently than, say, corporate bonds issued by small or medium sized enterprises (SME bonds). The wealth of information that is available for bonds issued by large corporates is however probably of little relevance for the testing of the institution’s valuations of its SME bonds. Therefore the institution must perform separate tests for each valuation system. Accordingly step b. requires the institution to decompose its portfolio of fair-valued positions into separate valuation sets.

Step c: Figure 1 outlines the testing approach:

Figure 1
Validation of model output for a valuation system





The two steps in figure 1 are described in more detail below.

Step d: When the test with respect to a valuation system suggests that the institution has insufficient AVAs the institution must reconsider its AVAs in the light of these results. It must increase the AVAs for the instruments in the valuation set as necessary.

The testing approach from figure 1 is now explained in more detail.

Step 1: In order for statistical tools to provide meaningful results a sample of sufficient size, a sufficient number of actual close out values for instruments from the valuation set must be available over a period of time. At a minimum [15 transactions over a quarter of a year] would be required. If the number of close out values is not sufficiently high other tools for validation can be used. One tool would be simply expert judgment, with a documented thought process. Another tool under consideration is to compare the institution's valuations to other institutions' valuations as collected by consensus pricing services. This tool would use the data as provided by the consensus pricing system, i.e. the valuation of the instruments as such, or the pricing parameters that feed into a commonly used pricing model. A concern with this approach is that the range of opinion that institutions transmit to consensus pricing services may narrow over time when more and more institutions use consensus pricing systems to validate their valuation systems.

Step 2: When a sufficient set of actual close out values is available, the institution could use statistical tools to test its valuation system.

Specifically, the institution would make the assessment in the following steps:

- i) The institution determines the value of the valuation set before the transaction with the transaction 1. included, and 2. excluded. The difference is the "ex-ante change in value" from the transaction. To determine the ex-ante change in value, the institution values the valuation set with the valuation parameters and, where applicable, the pricing model and the IT systems that define the valuation system at the end of business of the trading day prior to the transaction.
- ii) The institution determines the difference between the actual price of the traded instrument (the close out value) and the ex-ante change in value of the valuation set from the transaction.
- iii) The institution performs analysis on the observed differences between the actual close out value of its traded instruments and the corresponding ex-ante change in values.

It is an indication of an imprudent model output (= fair value after application of any AVAs), when the price of the instrument is lower than the ex-ante change in value from the transaction. This means:

- When the institution has sold an instrument it makes a loss relative to the valuation prior to the transaction.
- When the institution has acquired an instrument it makes a gain ("day one profit") relative to the valuation prior to the transaction.

For some instruments, e.g. certain securities, institutions may apply all the AVAs at the level of the

individual instruments. For valuation sets that consist just of such instruments the ex-ante change in value of the valuation set from a transaction (i.e. a sale or purchase of a security in the example) is simply the value of the security, sold or purchased, given the valuation parameters as of the end of the previous business day. This may be called the “ex-ante value of the security”. The difference of the ex-ante value of the security to the actual price in the market transaction is the profit or loss from the sale or purchase. Again, a loss relative to the ex-ante value of the security when the security is sold, or a profit when it is bought, would be an indication of an imprudent model output.

Example:

For simplicity the example focuses on a valuation set that consists of securities. All securities in this example are held by the institution and subsequently sold.

transaction #	price		ex-ante change in value		difference TEUR
	TEUR	time stamp	TEUR	time stamp	
1	100.05	03.07.12, 09:15	100.15	02.07.12, 18:00,	-0.10
2	1,001.70	06.07.12, 10:11	1,002.10	05.07.12, 18:00	-0.40
3	501.80	06.07.12, 15:45	502.90	05.07.12, 18:00	-1.10
...
50	20.00	28.09.12, 17:45	19.95	27.09.12, 18:00	+0.05

For transaction #1, the institution sells an instrument for 100.05 TEUR on 03.07.12 at 9:15. It would have valued the instrument at close of business of the previous business (02.07.12, 18:00) at a price of 100.15 TEUR. The difference of -0.10 TEUR would mark a loss that would point to an imprudent valuation.

The test in Annex 3 is one way of performing the analysis according step iii. For this test the institution could simply count the number of negative differences. It could check whether this number exceeds 5% of the total number of transactions (50) plus a margin for random errors. If there are more than, for example, 7 transactions with a negative difference this would signal that AVAs are insufficient. The institution should also perform more sophisticated kinds of analysis. For example, it could take the size of the differences into account, or it could look for trends, i.e. whether the number of negative difference or the size of the negative difference (relative to the actual close out values) increases over time.

End of example.

For its internal analyses the institution could consider a variety of exploratory (e.g. graphical) and formal statistical tools. In particular, it could drill down from the level of the instruments to the level of the pricing parameters, e.g. to identify issues with the calibration of a certain subset of the pricing parameters. This should also encompass the analysis of other pricing models using the same set of pricing parameters to verify the appropriateness of the pricing parameters applied (e.g. interest rate curves based on interest rate models).

Institutions must also report summary results to the competent authority. Such reporting would be made in a common format at certain reporting dates. This could include certain descriptive statistics such as quarterly aggregated differences between ex-ante values and actual close out value by valuation systems. More formal statistical tests may also be used. An example is provided in Annex 3. The competent authority could use this summary information in particular to allocate its resources for more detailed inspection.

Annex 2: A statistical test

The box below represents a specification of the testing approach outlined in Annex 2.

Institutions would be required to analyse the differences between ex-ante values and actual close out values by valuation system. They would be required to provide the competent authority with summary results. These could include the results of formal statistical tests. Among those tests could be a sign test. This could be designed as follows:

Statistical hypothesis

H_0 : For all instruments from a valuation set: The model output is more prudent than the actual close out values by a sufficient margin.

H_1 : The institution values the instrument from the valuation set systematically without a sufficient margin relative to actual close out values (i.e. the bank does not value these instruments sufficiently prudently).

Test:

Let X_i denote an indicator variable. If the ex-ante value of a traded instrument i exceeds the actual close out value, then $X_i = 1$, zero otherwise.

Under H_0 the random variable

$$Y = \sum_{i=1}^n X_i$$

is binomially distributed with $p = 0.90$ and n the number of traded instruments valued with the relevant pricing model.

H_0 is rejected when the realisation for Y exceeds a critical value. The probability level at which the critical value is set at [95%].

Annex 3: Examples of use of AVA decision tree

Mark-to-market positions

Example 1

An institution holds a long position in a security for which there are publicly quoted bid and offer prices. This is a marked-to-market position and on first inspection is an example of Case 1 in the AVA decision tree. The institution would need to consider whether the fair value derived from the available bid offer quotes is prudent to a 95% level of confidence. If the quotes are executable in the size of the position held then the institution would be justified in marking to the best bid available with the only additional AVAs required for valuation uncertainty being operational risk.

However, if the available prices are only indicative broker quotes with, for example, the institution calculating its fair exit price as the average bid across the range of broker quotes then the institution must make a prudent assessment, at a 95% level of confidence, of the range of broker bids and take the impact of the difference between this prudent assessment and the fair value as an AVA. Where the institution's position is outside in relation to either executable or indicative quotes the institution must consider the need for a concentration and liquidity AVA rendering it an example of Case 3 on the AVA decision tree. To calculate this AVA the institution must make a prudent assessment, at a 95% level of confidence, of the potential widening of the bid-offer spread to exit its full position. This should reflect the institution's past experience in exiting and pricing large positions in this security. For example, this could involve calculating an exit window for trading in normal size and applying a confidence level to the historic volatility over this time window that is calibrated to past trade levels. The impact of this prudent assessment of the bid offer spread must be compared with any fair value adjustments held for concentration or liquidity against this position and any excess taken as an AVA.

Example 2

An institution holds a long position in a less liquid security for which only mid-price broker quotes are available and are used to determine the position's fair value mark. This is an example of a marked-to-market position that follows Case 2 in the AVA decision tree. Mid-price quotes are by definition not executable so the institution must make a prudent assessment of the mid-price, possibly based on the spread of quotes available. The institution must then make a prudent assessment of the bid-mid spread in order to determine the prudent exit price. For example, this could be based on a historic or proxy analysis of trade prices against broker mid level quotes. The institution must then compare the valuation impact of the derived prudent bid-mid spread with any exit cost reserve held against the position in the fair value accounts with any excess taken as a close-out cost AVA. The institution must also consider whether its position is outside in relation to the indicative broker quotes and consider the need for a concentration and liquidity AVA similar to that introduced in example 1.

Example 3

An institution holds a long position in a security marked to the last traded price but that price is one week old and there are no current market quotes available. This is a marked-to-market position that corresponds to case 3 in the decision tree. In the absence of either indicative or executable quotes the institution must develop a proxy prudent price using the information available in order to calculate a market price uncertainty AVA to allow for the potential movement in the price between the trade date and the valuation date. This could be based on a prudent assessment of historic volatility or could combine the last trade information with price moves in a similar instrument over the intervening period but in either case will need to factor in the bid-offer spread uncertainty allowing for the trade direction and counterparty type for all trade prices used. If a proxy instrument with better price visibility is used then the methodology should prudently allow for the additional liquidity of the proxy. In addition the institution must also consider whether its position is outside in relation to the proxy price methodology and whether there is a need for a concentration and liquidity AVA similar to that introduced in example 1.

Mark-to-model positions

Example

An institution values a portfolio of interest rate options to mid-price using a suite of quantitative models. The institution then applies a fair value exit cost adjustment based on the net risk of the portfolio. This is a marked-to-model portfolio as identified in the AVA decision tree and an institution will need to apply the appropriate methodologies to calculate AVAs (see Section 4) to capture the uncertainty in the portfolio valuation. Specifically, the institution must consider the need for the following AVAs. The EBA expects that for most of the AVAs the 95% level of confidence will be based on a judgemental approach:

- **Unearned credit spreads** - The institution must assess to a 95% level of confidence whether the fair valuation of the portfolio captures counterparty credit risk. Where the portfolio is strongly collateralised the institution may be able to justify that this is true without the need for an AVA. If the portfolio is weakly collateralised or uncollateralised then the institution will need to assess both its CVA model and the CVA model input parameters to a 95% level of confidence including the difference between any fair value CVA held against the portfolio and the prudent value CVA as an AVA.
- **Close-out costs** - As the portfolio is marked to mid with a separate fair value exit cost adjustment the institution must make a prudent assessment of this adjustment by stressing the bid offer spreads and risk netting methodology to a 95% confidence level. The difference between the fair value exit cost adjustment and the prudent exit cost adjustment should be held as a close-out cost AVA. Separate AVAs will be required for each mid-marked risk which, in the case of a typical rate option portfolio, will consist of yield curve, rate volatility, FX rate, FX volatility and combinations of FX and rate correlations.
- **Operational risks** - The institution must assess the level of operational risk reserves held against the portfolio and determine whether, at a 95% confidence level, an AVA is required in line with Chapter 4 Section 5c.
- **Market price uncertainty** - The institution must make a prudent assessment of all model inputs to a 95% level of confidence. For example, the institution may assess the uncertainty in any consensus implied cap, floor and swaption volatility surfaces used by the portfolio valuation models using consensus range statistics. The reduction in the portfolio valuation as a result of using each model parameter set to a 95% level of confidence produces a set of market price uncertainty AVAs. The institution must also consider the materiality of any cross-gamma impacts, to a 95% level of confidence.
- **Early termination** - The institution must assess, to a 95% level of confidence, any losses that could arise where client valuations differ from fair valuations driving the institution to close out trades away from book value. For example an institution's client buyback price for a structured interest rate note may amortise the initial institution profit margin over a defined period of time. If this loss exceeds any fair value reserve held for this purpose then the difference should be held as an Early Termination AVA.
- **Investing and funding costs** - The institution must make a prudent assessment of whether the yield curves used in the quantitative models are prudent to a 95% confidence level. For example if incoming uncollateralised future cashflows are discounted at a rate below the banks funding rate then this will create negative carry (i.e. the daily cost of funding the future cashflow will exceed the daily change in its NPV resulting in a steadily accumulating loss in the P&L) and an AVA will be required to cover the net present value of this loss.
- **Future administrative costs** - The institution must consider an AVA for future administration costs as their bid-offer fair value adjustment assumes net risk hedging rather than complete portfolio exit. The institution must make a prudent assessment of the level of these costs to a 95% level of confidence and include the amount by which this exceeds the future administration cost adjustment in the fair value accounts as an AVA. These costs should include staffing costs, infrastructure costs and any expected future hedging costs not included in the portfolio valuation.

-
- **Model risk** - The institution must consider an AVA for model uncertainty for all marked-to-model products where the model input parameters are based on more vanilla products and the valuation does not use any price data for the product itself (e.g. correlation dependent structured notes). Two examples of how this type of exotic model uncertainty AVA could be calculated include, a valuation comparison using the different models in use by market participants, or the setting of a floor valuation using a sub-replicating portfolio of liquid products (i.e. a portfolio that can be valued accurately and will under-perform the reference portfolio in all instances). The institution should also consider whether an AVA for model uncertainty is required where market prices are available for similar products but a model is used to interpolate or extrapolate valuations to different maturities, expiries, strikes, barrier levels, etc (e.g. the use of an implied swaption volatility matrix to value similar swaptions of intermediate strikes, expiries and maturities). To this end the institution will need to assess the uncertainty in the product model and in the interpolation routines used to extract specific points from yield curves and volatility surfaces. Where the observed price matrix for the same product type is sufficiently dense, the institution may be able to justify that the model uncertainty is immaterial.
 - **Concentration and liquidity** - The institution must consider whether any net risk position for the portfolio is outside in relation to the hedging product prices used to calibrate the valuation models and assess the need for a concentration and liquidity AVA similar to that introduced in the marked-to-market example 1. For example, in the case of an interest rate option portfolio the net swaption vega exposure for a particular strike, expiry and maturity bucket will need to be compared with the normal market size associated with the quotes used to construct the relevant section of the swaption volatility surface.
 - **Balance sheet substantiation** - An institution must make a prudent assessment of potential losses in relation to the portfolio as laid out in Chapter 4 Section 5c. In this case the approach should make reference to the control infrastructure around the interest rate option portfolio. This could involve looking at statistics for losses incurred across all businesses with a common infrastructure to provide an expected loss ratio for unsubstantiated balances.

Annex 4: Examples of aggregation approaches allowing diversification

Use of simplified standard aggregation approach

This involves a two stage aggregation of position level uncertainties where the uncertainty is defined as the difference between the fair value on the balance sheet including all adjustments and the prudent value. The definition of position level in this aggregation approach should be consistent with that used when calculating the AVAs as described in Section 4. The exact correlations suggested in this section are intended to be for illustrative purposes only.

- The first step in the aggregation is to sum uncertainties resulting from risks on points within single market data curves and surfaces with a maturity or strike dimension (e.g. volatility surfaces, yield curves, correlation surfaces etc.).
- All long and short positions are aggregated separately assuming a multivariate normal distribution with correlations of 0.75.
- The absolute long uncertainty and the absolute short uncertainty across each curve/surface are then aggregated assuming a multivariate normal distribution with correlation of minus 0.5. Where there is a material maturity or strike mismatch between netted long and short positions the negative correlation should be replaced with a zero correlation.
- The resultant total uncertainties at a position level for fungible assets and at a curve or surface level otherwise, are aggregated assuming a multivariate normal distribution with correlations of 0.25. The resultant total legal entity level valuation uncertainty is then subtracted from the fair value balance sheet to obtain the legal entity prudent value balance sheet.

Use of in-house aggregation approach

One possible amendment to the simplified standard approach would be for institutions with a prudent bias in their fair value balance sheet to use the expected value (the probability weighted mean of the range of possible values) instead of the fair value when calculating the position-level uncertainties. This is an example of an approach which may be more accurate but is more complex to perform and would require a high burden of proof to evidence the prudent bias.

If an institution were allowed to develop its own aggregation methodology this would be required to be approved by the relevant competent authority.

An in-house aggregation methodology would comply with the following minimum standards:

- The aggregation should be shown to be appropriately prudent for all portfolio risk profiles and analysis of the results compared to those that would be obtained using the simplified standard approach should be completed.
- An institution may choose to use more than one stage of aggregation calculation when calculating the amount of diversification benefit in order to improve computational efficiency to a maximum of 3 stages within an asset class.
- Each stage of the aggregation process that grants diversification benefit (e.g. intra-curve, cross-name, cross-asset class) should be clearly justified and any judgemental correlations used should be selected from a prudent stand point (e.g. if there is no clear reason for any correlation an institution might set the correlation to 0.25 rather than 0).
- The methodology is fully documented and approved.
- There is a review framework in place that ensures the continuing effectiveness of the approach with recalibration where appropriate.

In order to simplify the aggregation calculation, an institution could be allowed to assume that the valuation uncertainty around the expected value is distributed normally. The aggregated uncertainty will therefore be a multivariate normal distribution for which the correlations between each of the individual normal distributions are the required additional input.

Annex 5 - Summary of questions

1. Do you believe that a proportionality threshold should be considered before requiring an institution to assess the prudent value of all fair value positions? If yes, how would you define the threshold?
2. Do you agree that the exit price used as the basis of prudent value does not necessarily need to be based on an instantaneous sale? If yes, provide argument to support your view.
3. Should a specific time horizon for exit be set when assessing the prudent valuation? If so, how the time horizon should be set (e.g. the same time horizon for calculating Value-at-Risk (VaR), Credit Risk Capital Requirements, etc.), what should it be and how would it feed into the calculating of AVAs?
4. Do you support the concept of a specified level of confidence to determine AVAs? If not, why? Are there any AVAs where the use of a specified level of confidence is not appropriate?
5. If you support a specified level of confidence, do you support the use of a 95% level of confidence? What practical issues might arise or inconsistencies with other parts of the CRR when using this level of confidence?
6. How prescriptive do you believe the RTS should be around the number of data points that are required to calculate a 95% level of confidence without any more judgemental approach being necessary?
7. If you support a specified level of confidence, do you support the explicit allowance of using the level chosen as guidance for a more judgemental approach where data is lacking?
8. Should any additional possible sources of market prices be listed in the RTS?
9. Should more description be included of how to use the various sources of market prices to obtain a range of plausible prices?
10. Should the RTS be more prescriptive on how to use the various alternative methods or sources of data to obtain a range of plausible prices where there is insufficient observable data to determine the range by direct statistical methods? If so how?
11. Are there any other indicators of large market price uncertainty which should be included?
12. Do you believe the approaches set out above are appropriate for each of the adjustments listed in Article 100? If not, what approaches do you believe would be more relevant?
13. Are there any other material causes of valuation uncertainty that the RTS should describe an approach for? Or are any of the adjustments listed above not material and should not be included?
14. Do you believe that the testing approach in Annex 2 represents a useful tool to test for prudence of valuation? If not, what weaknesses make it unsuitable?
15. Do you believe that the RTS should be prescriptive with respect to validation techniques? If not, how do you believe that comparable levels of prudence should be ensured for the valuations across institutions? Are there other validation techniques that you believe should be detailed in the RTS?
16. Do you support the concept that prudent value can never be greater than fair value including fair value adjustments at both the individual position and the legal entity level? If not, what would be the reason to justify your view?

-
17. Would you support the availability of a diversification benefit within the aggregation of position-level AVAs? Please explain the reasons and justification why, providing any evidence available to support your arguments
 18. If simple aggregation better reflect your assumptions and practices or would you support the availability of diversification benefit, do you support creating a simplified standard approach, an example of which is shown in Annex 4? If you do, do you have alternative suggestions on how this standard approach should be specified? Are the suggested correlations in the example appropriate, if not what other values could be used?
 19. If you support the availability of diversification benefit, do you support allowing an in-house approach which should be subject to approval by the regulator, an example of which is shown in Annex 4?
 20. Would you agree that offsets against AVAs for overlaps with other Pillar 1 capital requirements should not be permitted? If not, what offsets might be appropriate and under what conditions might they be allowed (e.g. individually assessed by the institution and agreed with the regulator rather than specified in the RTS)?
 21. Do you believe the above requirements are appropriate? If not, what other requirements could be necessary and what requirements stated above are considered not to be relevant?
 22. What would be the sources of costs and benefits of requiring (a) the implementation of a unique AVA methodology and (b) a consistent format for reporting AVA? Do you agree that the benefits of such requirements outweigh the costs associated with them?23. If you agree with a reporting form being introduced, could you please provide a suggested template?