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# Consultation Paper

Draft Regulatory Technical Standards

On non-delta risk of options in the standardised market risk approach under Articles 318(3), 341(6) and 347(4) of the draft Capital Requirements Regulation (CRR)

# Consultation Paper on Draft Regulatory Technical Standards on non-delta risk of options in the standardised market risk approach under Articles 318(3), 341(6) and 347(4) of the draft Capital Requirements Regulation (CRR)

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## 1. Responding to this Consultation

The EBA invites comments on all proposals put forward in this paper and in particular on the specific questions summarised in 5.2.

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 views expressed/ rationale proposed; and
- describe any alternative regulatory choices the EBA should consider.

Please send your comments to the EBA by email to [EBA-CP-2013-16@eba.europa.eu](mailto:EBA-CP-2013-16@eba.europa.eu) by 31.08.2013, indicating the reference 'EBA/CP/2013/16' 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 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 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](http://www.eba.europa.eu) under the heading 'Legal Notice'.

## 2. Executive Summary

This Consultation Paper proposes draft RTS in accordance with Articles 318(3), 341(6) and 347(4) of the CRR relating to the treatment of non-delta risks of options and warrants in the calculation of own funds requirements for market risk under the standardized approach.

In particular the CRR requires the EBA to further define a range of methods to reflect in the own funds requirements other risks, apart from delta risk in a manner proportionate to the scale and complexity of institutions' activities in options and warrants.

The proposal of the EBA follows broadly the Basel II Framework which provides for the following alternative methods:

- a simplified-approach which can be applied exclusively by institutions that only buy options;
- the delta-plus method which can be applied by banks that also sell options;
- the scenario approach which is more sophisticated and is addressed to bank with a considerable trading activity in options.

The simplified approach and the scenario approach as provided for in the Basel framework have been adapted to the European specificities and the requirements of the CRR. Furthermore, since the EBA believes that certain non-standard options are not suitable for the simplified approach and the delta-plus method, a new conservative treatment for such instruments was introduced.

### 3. Background and rationale

The EBA has developed these draft regulatory technical standards (RTS) on the basis of the versions of the legislative texts for the CRR produced after the Trialogues agreement among the EU institutions.

The latest version of the CRR draft text requires the EBA to *'develop draft regulatory technical standards defining a range of methods to reflect in the own funds requirements other risks, apart from delta risk in a manner proportionate to the scale and complexity of institutions' activities in options and warrants'* referring to:

- (i) options on interest rates, debt instruments, equities, equity indices, financial futures, swaps and foreign currencies referred to in Article 318 ;
- (ii) foreign currency options referred to in Article 341 (5) and (6);
- (iii) commodities options referred to in Article 347(3) and (4).

The EBA has agreed to refer to the treatment of option risk outlined in the Basel Framework, though it is proposing to introduce some adaptations from the 1996 Market Risk Amendment. One of the advantages of this approach is to promote continuity in the regulatory framework of those countries which did implement the Basel Framework in their national legislation<sup>1</sup>. The impact assessment (see section 5.1) discusses this point.

The Basel framework provides for three alternative methods:

- (i) the simplified approach;
- (ii) the delta-plus approach;
- (iii) the scenario approach.

#### Adaptation of the Basel Framework to the CRR

The CRR requires positions in options to be treated on a delta equivalent basis and non-delta risks to be treated separately from delta risks. Accordingly, positions in options have to be treated on a delta equivalent basis and the treatment of non-delta risks is provided separately by these RTS.

The Basel Framework is not always aligned with this provision. In particular, the simplified approach and the scenario approach measure the delta and non-delta risks jointly, while only the delta-plus approach enables to determine delta and non-delta risks separately.

For this reason, the EBA has decided to adapt the simplified method and the scenario approach to the CRR as follows:

- (i) under the adapted simplified approach the capital requirements are determined as the difference (if positive) between the capital requirements as determined following the simplified Basel Approach and the risk weighted delta equivalent amount.
- (ii) under the adapted scenario approach the simulated price changes determined by the scenario matrix are calculated net of delta effects.

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<sup>1</sup> Currently Directive 2006/EC/49 generally states that 'Other risks, apart from the delta risk, associated with options shall be safeguarded against.' (Annex V, point 5).

## Utility of the simplified approach

The Basel Framework includes a simplified approach, which can be applied exclusively by institutions that only buy options, since it is very simplistic.

The EBA would like to clarify the extent to which this approach may still be useful for very small institutions with a basic options portfolio.

## Combination of methods

The EBA considers that a combination of the different methods should be allowed between separate legal entities within a group. Regarding the combination of different methods within a single institution two alternative options are considered.

According to the first option a combination of different approaches to non-delta risks within a single entity would not be allowed. This option is supported by the following arguments:

- (i) the Basel Framework contains a similar provision<sup>2</sup>,
- (ii) the problem of 'cherry picking' would be avoided.

According to the second option single institutions would be allowed to combine the delta-plus and the scenario approach following precise predefined rules (i.e. a precise definition of the scope of application of the scenario approach). This option is supported by the following arguments.

- (i) the possibility of different levels of sophistication in different trading areas would be addressed, allowing banks to treat non standard options in a more risk-sensitive way.
- (ii) the use of the scenario approach would be limited to positions for which the institutions fulfil the relevant requirements.

## Prudential treatment of certain types of options

The EBA considers that certain types of options might not be suitable for the simplified and the delta-plus approach as outlined in the Basel Framework. In particular the following types of options have been identified:

- (i) for the purpose of the simplified approach: all options different from American or European call or put options;
- (ii) for the purpose of the delta-plus approach: options with discontinuities in delta and gamma (e.g. barrier options)<sup>3</sup>.

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<sup>2</sup> '718(Lvi) In recognition of the wide diversity of banks' activities in options and the difficulties of measuring price risk for options, several alternative approaches will be permissible at the discretion of the national authority:

- Those banks which solely use purchased options will be free to use the simplified approach described in paragraph 718(Lviii) below;
- Those banks which also write options will be expected to use one of the intermediate approaches as set out in paragraphs 718(Lix) to 718(Lxix) or a comprehensive risk management model under the terms of paragraphs 718(Lxx) to 718(xcix) of this Framework. The more significant its trading, the more the bank will be expected to use a sophisticated approach.'

<sup>3</sup> In these cases the second order Taylor approximation on which the delta-plus approach is based might not be appropriate.

For this reason the RTS proposes a prudential treatment for these kinds of options. Under this proposal the capital requirements on non-delta risks shall be equal to:

- (i) in the case of bought options, the market value of the option less the risk weighted delta-equivalent amount;
- (ii) in the case of written (ie sold) options<sup>4</sup>, the market value of the underlying asset (or the maximum payable amount if contractually fixed) less the risk weighed delta-equivalent amount.

This prudential treatment applies also to the delta plus approach in cases where the values for gamma or vega cannot be calculated.

The EBA believes that this conservative treatment should also incentivize institutions that operate in non-standard options to switch to more advanced approaches.

### **Unified treatment of bond options and interest rate options**

The Basel Framework proposes a separate treatment of bond options and interest rate options in the delta-plus and in the scenario approach. In particular, following the Basel Framework, bond options are considered to be sensitive to price changes in the price of the underlying bond, while interest rate options are considered to be sensitive to the underlying interest rate. The treatment of the two cases should be 'equivalent'.

The EBA proposes to introduce a unified treatment where bond options as well as interest rate options are considered to be interest-rate sensitive. The relevant interest rate is (i) for bond options the yield-to-maturity of the underlying bond in the case of bond options; (ii) for interest rate options the underlying interest rate; (iii) for swaptions the rate of the underlying swap.

The EBA believes that such a unified treatment improves the risk sensitivity of the own funds requirement and is, at the same time, coherent with the risk management practices,

### **Scenario approach: allowance for significant option traders**

The Basel Framework [718(Lxiii)] proposes that banks that are significant option traders can be allowed to aggregate some time bands in the treatment of interest rate options. The EBA believes it is not clear why institutions that are significant traders (and are therefore rather sophisticated) should be allowed to use a simpler approach than other banks. Such a provision is contrary to the proportionality principle (the approach shall be proportionate to the scale and the complexity of the operations of an institution).

Advanced institutions should be expected to use the internal model approach which is more risk sensitive and considers such correlations. The EBA believes that the Basel provision, by reducing own funds requirements for option traders, does not create the right incentives for the use of an internal model.

For the above reasons the EBA proposes not to implement this Basel provision in the RTS.

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<sup>4</sup> This treatment only applies to the delta-plus approach.

4. Draft Regulatory TS on non-delta risk of options in the standardised market risk approach under Articles 318(3), 341(6) and 347(4) of the draft Capital Requirements Regulation (CRR)

In between the text of the draft RTS 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, or set out specific questions for the consultation process. Where this is the case, this explanatory text appears in a framed text box.

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EUROPEAN COMMISSION

Brussels, **XXX**  
[...](2012) **XXX** draft

**COMMISSION DELEGATED REGULATION (EU) No .../..**

**of **XXX****

**[...]**

**supplementing Regulation (..) No xx/XXXX[CRR] of the European Parliament and of the Council with regard to regulatory technical standards for non-delta risk of options in the standardised market risk approach under Articles 318(3), 341(6) and 347(4)**

COMMISSION DELEGATED REGULATION (EU) No .../..

of **XXX**

[...]

**supplementing Regulation (..) No xx/XXXX[CRR] of the European Parliament and of the Council with regard to regulatory technical standards for non-delta risk of options in the standardised market risk approach under Articles 318(3), 341(6) and 347(4)**

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (..) No xx/xxxx [CRR] of the European Parliament and of the Council of dd/mm/yyyy on ....<sup>5</sup>, and in particular Articles 318(3), 341(6) and 347(4) thereof,

Whereas:

- (1) With the view to ensuring consistency of EU rules with internationally agreed standards, it is desirable to base the rules for the measurement of the risk of options and warrants on the methods provided in the framework of the Basel Committee for Banking Supervision (BCBS), adapted to take into account the requirements of Regulation xx/xxx [CRR]. The use of these approaches is further desirable given they are designed to apply to institutions of different levels of sophistication, thereby ensuring respect of the principle of proportionality in the application of these rules; as a result, the risk sensitivity of each of these methods is also different.
- (2) It is necessary to restrict the possibility of combining different methods by a single entity, in order to avoid regulatory arbitrage ('cherry-picking').

**Explanatory text for consultation purposes**

Recital (2) would be reviewed depending on which one of the two options contemplated in Article 1 is finally approved after consultation

- (3) Non-delta risks related to options and warrants may include, but are not limited to convexity risk ('gamma risk'), volatility risk ('vega risk'), interest rate risk ('rho risk'), nonlinearities which cannot be captured by gamma risk, the risk of implied correlation on basket options or warrants. Of these risks, only the gamma and vega are of such materiality that justifies the imposition of own funds capital requirements, even for the more sophisticated institutions, and therefore only these types of risks should be covered in the calculation of own funds requirements under this Regulation.

<sup>5</sup> OJ.....

According to the provisions of Directive xx/xxx [CRD IV] relating to the Supervisory Review and Evaluation Process of institutions, all such residual risks are expected to be monitored and considered under the so-called Pillar 2 approach.

- (4) Given that Article 319 of Regulation (..) No xx/xxxx [CRR] concerning the treatment of fixed-to-floating interest-rate swaps applies only ‘for interest rate risk purposes’, it should not apply to this Regulation.
- (5) The provisions in this Regulation are closely linked, since they all deal with the measurement of non-delta risk of options and warrants related to different underlyings. To ensure coherence between those provisions, which should enter into force at the same time, and to facilitate a comprehensive view and compact access to them by persons subject to those obligations, it is desirable to include all the regulatory technical standards required by Regulation (..) No xx/xxxx [CRR] on this topic in a single Regulation.
- (6) This Regulation is based on the draft regulatory technical standards submitted by the European Supervisory Authority (European Banking Authority) to the Commission.
- (7) The European Supervisory Authority (European Banking Authority) has conducted open public consultations on the draft regulatory technical standards on which this Regulation is based, analysed the potential related costs and benefits and requested the opinion of the Banking Stakeholder Group established in accordance with Article 37 of Regulation (EU) No 1093/2010].

HAS ADOPTED THIS REGULATION:

### *Section 1 – General Provisions*

#### *Article 1 –*

#### *Determination of the Own funds requirements for the non-delta risk of options and warrants*

1. Institutions shall calculate their own funds requirements for market risk in relation to the non-delta risk of options or warrants as required by Articles 318(3), 341(6) and 347(4) of Regulation xx/xxx [CRR], according to one of the methods described in Sections 2, 3 and 4.

#### **Explanatory text for consultation purposes**

Q1. Do you agree with the choice to use the Basel Framework to determine the capital requirements for the non-delta risks of options and warrants? Are there other approaches that can effectively be used for the purposes of these RTS? Which ones? Explain your reasoning.

2. Where institutions use the scenario approach described in Section 4, they shall notify its predefined scope of application to competent authorities.
3. At the consolidated level, institutions may combine the use of different approaches.

#### *Option 1*

4. At the individual level institutions shall not combine the use of different approaches.

**Option 2**

4. At the individual level institutions may only combine the scenario approach indicated in Section 4 and the delta-plus approach indicated in Section 3 according to the predefined scope of application of the scenario approach as notified to competent authorities in accordance with paragraph 2.

**Explanatory text for consultation purposes**

*Two options are considered (see 'combination of methods' on the 'Background and rationale' section)*

Q2. Do you prefer the first option (exclusion of a combination of methods within a single institution) or the second option (exact definition of the scope of the scenario approach)? Explain your reasoning. If you prefer the second option, what additional conditions and controls should be established?

5. In the course of the calculation described in paragraph 1, institutions shall:

- (a) break down baskets of options or warrants into their fundamental components;
- (b) break down caps and floors or other options which relate to interest rates at various dates, into the separate caplets or floorlets relating to a single date;
- (c) treat options or warrants on fixed-to-floating interest rates swaps into options or warrants on the fixed interest leg of the swap.

*Section 2 – Simplified approach*

*Article 2 –*

*Conditions for application of the Simplified approach*

Institutions may use the simplified approach only when they only purchase options and warrants.

**Explanatory text for consultation purposes**

Q3. Do you believe that it is useful to implement the simplified approach established in the Basel text?

*Article 3 –*

*Determination of own funds requirements according to the Simplified approach*

1. Institutions applying the simplified approach shall calculate the own funds requirements relative to non-delta risks of call and put options or warrants as the higher amount between zero and the difference between the following values:

- a) the gross amount, as described in paragraphs 3 to 5;
- b) the risk weighted delta equivalent amount, which shall be calculated as the market value of the underlying instrument, multiplied by the delta and then multiplied by one of the following relevant weightings:
  - (i) for specific and general equity risk or interest rate risk, according to Part Three, Title IV, Chapter 2 of Regulation (..) No xx/xxxx [CRR];
  - (ii) for foreign exchange risk, according to Part Three, Title IV, Chapter 3 of Regulation (..) No xx/xxxx [CRR];
  - (iii) for commodity risk, according to Part Three, Title IV, Chapter 4 of Regulation (..) No xx/xxxx [CRR].

2. For options or warrants which fall under one of the following two categories:

- (a) where the buyer has the unconditioned right to buy the underlying at a predetermined price at the expiration date or at any time before the expiration date, and where the seller has the obligation to fulfil the buyer's demand ('simple call options or warrants')
- (b) where the buyer has the unconditioned right to sell the underlying in the same manner ('simple put options or warrants')

the gross amount referred to in paragraph 1 shall be determined according to paragraphs 3 to 4.

3. Where one of the following conditions are met:

- (i) the option or warrant incorporates a right to sell the underlying asset ('long put') and is combined with holdings in the underlying asset ('long position in the underlying instrument')
- (ii) the option or warrant incorporates a right to buy the underlying asset ('long call') and is combined with the promise to sell holdings in the underlying instrument ('short position in the underlying asset')

the gross amount referred to in paragraph 1 shall be calculated as the maximum between zero and the market value of the underlying security multiplied by the sum of specific and general market own funds requirements for the underlying minus the amount of the profit, if any, resulting from the instant execution of the option ('in the money').

4. Where one of the following conditions are met:

- (i) the option or warrant incorporates a right to buy the underlying asset ('long call')
- (ii) the option or warrant incorporates a right to sell the underlying asset ('long put')

the gross amount shall be the lesser of the following two amounts:

- (i) the market value of the underlying security multiplied by the sum of specific and general market risk requirements for the underlying asset
- (ii) the value of the position determined by the mark-to-market method or the mark-to-model method as provided in points (b) and (c) of Article 99.2 of Regulation (..) No xx/xxxx [CRR] ('market value of the option or warrant').

5. For all types of options or warrants which do not have the characteristics of paragraph 2, the gross amount shall be the market value of the option or warrant.

### *Section 3- Delta-plus method*

#### *Article 4 –*

#### *Overview of determination of own funds requirements according to the Delta-plus method*

1. Where institutions apply the Delta-plus method, the own funds requirements for non-delta risks on options or warrants shall be calculated as the sum of:

- (a) the own funds requirements relating to the partial derivative of delta with reference to the price of the underlying ('gamma risk'), which, for bond options or warrants is the partial derivative of delta with reference to the yield-to-maturity of the underlying bond, and for swaptions is the partial derivative of the delta with reference to the swap rate;
- (b) the requirement relating to the first partial derivative of the value of an option or warrant, with reference to the implied volatility ('vega risk')

where the options and warrants have all of the following characteristics ('continuous options and warrants'):

- (a) their gamma is a continuous function in the price of the underlying;
- (b) their vega is a continuous function in the implied volatility.

2. Implied volatility shall be taken to be the value of the volatility in the option or warrant pricing formula for which, given a certain pricing model and given the level of all other observable pricing parameters, the theoretical price of the option or warrant is equal to its market value.

3. The own funds requirements for non-delta risks related to non continuous options or warrants shall be determined as follows:

- (a) where the options or warrants have been bought, as the maximum amount between zero and the difference between the following values:

- (i) the market value of the option or warrant
- (ii) the risk weighted delta equivalent amount.

(b) where the options or warrants have been sold, as the maximum between zero and the difference between the following amounts:

- (i) The relevant market value of the underlying asset, which shall be taken to be either the maximum possible payment at expiry date, if it is contractually fixed, or the market value of the underlying asset or the effective notional value if no maximum possible payment is contractually fixed;
- (ii) the risk weighted delta equivalent amount.

**Explanatory text for consultation purposes**

Q4. Do you agree with this prudential treatment, not contemplated in the Basel Framework, for non-standard options?

4. The value for gamma and vega used in the calculation of own funds requirements shall be calculated in accordance with Articles 318(1), 341(1) and 347(3) of Regulation xx/xxx [CRR]. Where either gamma or vega cannot be calculated in accordance with the conditions of these Articles, the capital requirement on non delta risks shall be calculated according to paragraph 3.

**Explanatory text for consultation purposes**

Q5. Do you agree that the RTS should require that the conditions of Articles 318(1), 341(1) and 347(3) of the CRR are met for the calculation of gamma and vega?

*Article 5 –*

*Determination of the Own funds requirements for convexity risk ('gamma risk') according to the Delta-plus method*

1. For the purposes of Article 4(1)(a), the own funds requirements for gamma risk shall be calculated by a process consisting of the following sequence of steps:

- (a) For each individual option or warrant a gamma impact shall be calculated;
- (b) The gamma impacts of individual options or warrants which refer to the same distinct underlying type shall be summed up;

(c) The absolute value of the sum of all of the negative values resulting from step (b) shall provide the own funds requirements for gamma risk. Positive values resulting from step (b) shall be disregarded.

2. For the purpose of step (a) of paragraph 1, gamma impacts shall be calculated in accordance with the formula described in Annex 1.

3. For the purposes of step (b) of paragraph 1, a distinct underlying type shall be:

(a) for interest rates in the same currency, each maturity time band as set out in Table 2 of Article 328 of Regulation (..) No xx/xxxx [CRR];

(b) for equities and stock indices, each market as defined in the rules to be developed pursuant to Article 330(3) of Regulation xx/xxx [CRR];

(c) for foreign currencies and gold, each currency pair and gold;

(d) for commodities, commodities considered identical as defined in Article 346(5) of Regulation (..) No xx/xxxx [CRR].

**Explanatory text for consultation purposes**

Q6. Do you think that the unified treatment of interest rate risk is sound? Could there be difficulties in implementing it in practice?

Q7. How many hybrid options does your portfolio account for in terms of number of options and notional amounts (i.e. options which can be assigned to more than one underlying type as defined above)? Should the BTS specify the treatment of these hybrid options?

*Article 6 –*

*Determination of the Own funds requirements for volatility risk ('vega risk')*

For the purposes of Article 4(1)(b), the own funds requirement for vega risk shall be calculated by a process consisting of the following sequence of steps:

(a) For each individual option the value of vega shall be determined;

(b) For each individual option an assumed +/-25 % shift in the implied volatility shall be calculated, where implied volatility shall be understood in the manner described in Article 4(2);

(c) For each individual option the vega value resulting from step (a) shall be multiplied by the assumed shift in implied volatility resulting from step (b);

(d) For each distinct underlying type – understood in the manner described in Article 5(3), the values resulting from step (c) shall be summed up.

(e) The sum of absolute values resulting from step (d) shall provide the total own funds requirement for volatility risk.

## Section 4 – Scenario approach

### Article 7- Conditions of application of the scenario approach

Institutions may use the scenario approach where they fulfil all of the governance requirements of Regulation xx/xxx [CRR] in relation to:

- (a) Integration of the scenario approach in the institution’s risk-management process in accordance with Article 357(1)(a) of Regulation (..) No xx/xxxx [CRR];
- (b) presence of an independent risk control unit that designs and implements the scenario approach, reports directly to senior management and produces daily reports on the output of the scenario approach, as per Article 357(1)(b) of Regulation (..) No xx/xxxx [CRR];
- (c) active involvement of the management body and the senior management in the risk-control process; review of the daily reports by a level of management with sufficient authority to enforce both reductions of positions take by individual traders as well as in the institution’s overall risk exposure, as per Article 357(1)(c) of Regulation (..) No xx/xxxx [CRR];
- (d) presence of sufficient number of staff skilled in the use of the scenario approach as per Article 357(1)(d) of Regulation (..) No xx/xxxx [CRR];
- (e) frequent conduct of a rigorous program of stress testing concerning the price of the underlyings as well as the implied volatility and satisfying the conditions laid out in Article 357(1)(g) of Regulation (..) No xx/xxxx [CRR];
- (f) independent review of the scenario approach as part of the regular internal auditing process as per Article 357(1)(h) of Regulation (..) No xx/xxxx [CRR], which has to satisfy the conditions laid out in Article 357(2) of Regulation (..) No xx/xxxx [CRR].

### Article 8 – Definition of the scenario matrix

1. For each distinct underlying type, understood in the manner described in Article 5(3), an institution has to define a scenario matrix which contains a set of scenarios.

#### **Explanatory text for consultation purposes**

*Scenario approach: allowance for significant option traders*

The Basel Framework [718(Lxiii)] proposes that banks that are significant option traders can be allowed to aggregate some time bands in the treatment of interest rate options. The EBA believes it is

not clear why institutions that are significant traders (and are therefore rather sophisticated) should be allowed to use a simpler approach than other banks. Such a provision is contrary to the proportionality principle (the approach shall be proportionate to the scale and the complexity of the operations of an institution).

Advanced institutions should be expected to use the internal model approach which is more risk sensitive and considers such correlations. The EBA believes that the Basel provision, by reducing own funds requirements for option traders, does not create the right incentives for the use of an internal model. For the exposed reasons the EBA proposes not to implement this Basel provision in the RTS.

Q8. Do you agree with the rationale behind the exclusion of this provision contemplated in the Basel accord in the RTS? If not, please provide arguments in favour of its implementation.

2. The first dimension of the scenario matrix shall be the price changes in the underlying above and below its current value. The range of changes shall be:

(a) for interest rate options or warrants, plus/minus the assumed change in interest rates set out in column 5 of Table 2 of Article 328 of Regulation (..) No xx/xxxx [CRR];

(b) for options or warrants on equity or equity indices, plus/minus the weighting provided in Article 332 of Regulation (..) No xx/xxxx [CRR];

(c) for foreign exchange and gold options or warrants, plus/minus the weighting indicated in Article 340 of Regulation (..) No xx/xxxx [CRR] or, where appropriate, plus/minus the weighting indicated in Article 343 of Regulation (..) No xx/xxxx [CRR];

(d) for commodity options (warrants), plus/minus the weighting indicated in point (a) of Article 349 (1) of Regulation (..) No xx/xxxx [CRR].

3. The price change scenarios in the underlying shall be defined by a grid of at least seven points which includes the current observation and divides the range indicated in paragraph 2 in equally spaced intervals.

4. The second dimension of the scenario matrix shall be defined by volatility changes. The range of changes in volatilities shall be between  $\pm 25$  % of the implied volatility, where implied volatility shall be understood in the manner described in Article 2(4). This range shall be divided in a grid of at least three points which include a 0 % change and divide the range in equally spaced intervals. The competent supervisory authority may require a different rate of volatility and/or different intermediate points.

5. The scenario matrix is determined by all possible combination of points, defined in paragraphs 3 and 4. Each combination shall constitute a single scenario.

#### *Article 9 – Determination of the own funds requirements*

According to the scenario approach, the own funds requirement on non-delta risk of options or warrants shall be calculated by a process consisting of the following sequence of steps:

- (a) For each individual option or warrant all the scenarios defined in Article 8 shall be applied to calculate simulated net loss or gain corresponding to each scenario. The simulation shall use full revaluation methods, meaning that it simulates the price changes by the use of pricing models and without relying to local approximations of these models.
- (b) For each distinct underlying type understood in the manner described in Article 5(3), the values obtained at point (a) and referring to the individual scenarios shall be aggregated.
- (c) For each distinct underlying type the ‘relevant scenario’ shall be defined as the scenario for which the values determined in step (b) result in the largest loss, or the lowest gain if there are no losses.
- (d) For each distinct underlying type understood in the manner described in Article 5(3), the own funds requirements shall be calculated in accordance with the formula described in Annex 2.
- (e) The total own funds requirement on non-delta risk of options or warrants is the sum of the own fund requirements obtained in step (d) for all distinct underlying types understood in the manner described in Article 5(3).

*Article 10- Final provision*

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels,

*For the Commission  
The President*

*[For the Commission  
On behalf of the President*

*[Position]*

Annex 1- Formula to be used for the purposes of Article 5(2).

$$\text{Gamma impact} = \frac{1}{2} \times \text{Gamma} \times \text{VU}^2$$

where VU:

(a) for options or warrants on interest rates or bonds is equal to the assumed change in yield indicated in column 5 of Table 2 of Article 328 of Regulation (..) No xx/xxxx [CRR];

(b) for equity options or warrants and equity indices the market value of the underlying multiplied by the weighting indicate in Article 332 of Regulation (..) No xx/xxxx [CRR];

(c) for foreign exchange and gold options or warrants is equal to the market value of the underlying, calculated in the reporting currency and multiplied by the weighting indicated in Article 340 of Regulation (..) No xx/xxxx [CRR] or – if appropriate – the weighting indicated in Article 343 of Regulation (..) No xx/xxxx [CRR];

(d) for commodity options or warrants is equal to the market value of the underlying, multiplied by the weighting indicated in point (a) of Article 349.1 of Regulation (..) No xx/xxxx [CRR].

Annex 2- Formula to be used for the purposes of Article 9(d)

$$\text{Own funds requirement} = -\min(0, \text{PC-DE})$$

where

- (a) PC ('Price Change') is the sum of price changes of the options with the same distinct underlying type understood in the manner described in Article 5(3) (negative sign for losses and positive sign for gains) and corresponding to the relevant scenario determined in step (c) of Article 8;
- (b) DE is the 'delta effect' calculated as follows:

$$\text{DE} = \text{ADEV} \times \text{PPCU}$$

where

- (i) ADEV ('aggregated delta equivalent value') is the sum of negative or positive deltas, multiplied by the market value of the underlying of the contract, of options that have the same distinct underlying type understood in the manner described in Article 5(3);
- (ii) PPCU ('percentage price change of the underlying') is the percentage price change of the underlying understood in the manner described in Article 5(3), corresponding to the relevant scenario determined in step (c) of Article 8.

## 5. Accompanying documents

### 5.1 Cost-benefit analysis on the draft RTS on addressing the capital requirements for the non-delta risk of options (and warrants)

#### 5.1.1 Introduction

The European Banking Authority (EBA) has been discussing with its members the amendment of the existing framework, aiming at addressing the non-delta risk of option (and warrant) holdings in view of enhancing the capital absorbing capacity of the banking sector against potential unfavourable market movements. To do so, the EBA requested feedback by submitting a questionnaire to the national supervisory authorities (NSAs). The Questionnaire attempted to come across the current level of application of the internationally recognised market practices and implementation of the non-binding BCBS's regulatory provisions across the European Banking System.

Apart from the requested feedback on the "current market practices and level of implementation of Basel rules" applied in their jurisdiction, the EBA requested the NSAs to provide their views on what would be the (sources of) main costs / benefits arising from the amendment of the existing regulatory framework.

The present impact assessment is based on the responses to the aforementioned questionnaire which was circulated to the EBA members and answered by the majority of them<sup>6</sup> by mid-February 2013.

#### 5.1.2 Procedural issues and stakeholder consultation

While developing the questionnaire for the Impact Assessment (IA), it was felt important to consult members of the EBA (and thus the competent authorities they represent) on the options of the possible amendment of the existing framework, with special focus on whether i) the Basel regulatory framework on addressing non-delta option risk will be the basis for the amendment or ii) the EBA will discuss an ad-hoc approach to be developed from scratch. The members expressed the unanimous view that the second option should be excluded as it will be time-consuming, require a lot of resources and, most probably, would result in coming up with the same methods proposed by the Basel Committee on Banking Supervision (BCBS).

In this context, the EBA staff, in cooperation with the NSA representatives, developed an Impact Assessment Questionnaire, focusing on the assessment of the implementation level of the existing Basel rules by the NSAs. Moreover, it tries to get feedback on possible qualitative and quantitative benefits for their respective banking systems from the future full implementation of Basel rules. The related costs have been assessed in terms of additional capital requirements, to the existing level of

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<sup>6</sup> This analysis is based on the responses submitted by AT, BE, CY, CZ, DE, EL, ES, FI, FR, HR, IT, LT, LV, PL, PT, SE, SI

market risk capital requirements, that the proposed regime would bring, whereas the benefits were assessed in qualitative terms.

Finally, the current impact assessment derives from the responses to the questionnaire as to whether the permanent partial use of more than one option valuation models would have an impact and facilitate the functionality of the entire European banking system or its scope would be limited to a small number of banks.

### 5.1.3 Problem definition

The current version of the CRD does not cope with the calculation of capital requirement for other risks, apart from delta risk, for positions in various option-like financial products, i.e. options and warrants on interest rates, debt instruments, equities, equity indices, financial futures, swaps and foreign currencies and commodity derivatives. The EBA is called to confront this problem, bearing in mind that, for some of the aforementioned option-like products, the use of sophisticated methods by small banks is not required as the latter have no capacities in developing sophisticated models for accessing the embedded non-delta risks. To this end, the EBA should propose a variety of methods, bearing in mind the principle of proportionality in the implementation and application of option valuation models from small banks.

Albeit the current IA cannot concretely answer the question as to whether it is necessary to continue allowing the permanent partial use of calculating non-delta risk capital requirements, it provides some evidence on how such a provision would impact the European banking system and the effort for maximum harmonisation across EU.

The EBA aims at achieving the maximum possible harmonisation as a mean to reach the objectives of the level playing field, the prevention of regulatory arbitrage opportunities, enhance supervisory convergence and legal clarity. In addition, the development of common procedures and practices is expected to reduce the compliance burden of the credit institutions and contribute to the efficient and effective cooperation between the supervisory authorities.

### 5.1.4 Level of implementation and current supervisory framework

The IA questionnaire was submitted to 28 European Economic Area (EEA) member states, whereas 17 of them responded to it. Seven of them reported full implementation of the existing Basel regulatory framework on addressing option risks; ten reported partial implementation. The sample of banks covered consists of 261 banks. The vast majority of the banks (213) applied the “delta plus” approach, followed by those banks that apply the “simplified” approach (7)<sup>7</sup>. Only 15.5% of the sample (41

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<sup>7</sup> It is worth mentioning that in one jurisdiction there are 31 banks which apply the simplified approach. However, due to their small size are excluded from the sample. If they were included the respective figures in table 01 would become: Total sample: 292, Simplified approach: 38 (13%), Delta plus approach: 213 (73%), Scenario approach: 10 (3%), other method: 27 (9%) and No method: 4 (1%).

banks) applies other than the simplified and delta-plus methods (scenario analysis, no method and other methods).

The summary of the results of the current supervisory framework is provided in the following table.

Figure 1: Use of methods by the EEA banks for assessing the market risk arising from options – number of banks and percentage of total

| Total number of banks: 261                    |                              |
|---|------------------------------|
| Methods                                       | Number (percentage) of banks |
| 1. Simplified                                 | 7 (2.8%)                     |
| 2. Delta plus                                 | 213 (81.7%)                  |
| 3. Scenario Approach                          | 10 (3.6%)                    |
| 4. Other method                               | 27 (10.3%)                   |
| 5. No method (even though banks hold options) | 4 (1.5%)                     |

The NSAs were asked whether this allows the partial use of different methods for assessing the risks arising by the options holdings at consolidated level and at the same legal entity level respectively. Out of the 13 NSAs which responded to this question, six NSAs allow the partial use at consolidated level whereas only four allow the partial use at the same legal entity level. The findings show that the partial use of calculating capital requirements for option positions at consolidated or solo basis is not a common supervisory practice in the EEA. It is also inferred from the aforementioned findings that there is no harmonisation of regulatory practices among the NSAs.

The actual partial use of alternative methods by the banks is even lower than what it is indicated by the supervisory framework; only 5.4% of the banks use two or more methods at consolidated level whereas the respective figure at the same legal entity level drops to the immaterial 4.0%. In essence, the market practice in the EEA banks is to use only one method for assessing the market risk arising from option positions.

Figure 2: National provisions for partial use of methods for assessing option risk and actual use of these provisions by the banks – Allowance by national regulators

| Allowance of partial use by the national regulators |         |         |
|---|---------|---------|
|   | Yes     | No      |
| At consolidated basis, within the Group             | 6 (46%) | 7 (54%) |
| At solo basis, within the same legal entity         | 5 (31%) | 9 (69%) |

Figure 3: National provisions for partial use of methods for assessing option risk and actual use of these provisions by the banks – Actual use

| Consolidated / Solo                         | Actual use by the banks (number of different methods) |      |               |
|---|---|------|---------------|
|   | one   | two  | More than two |
| At consolidated basis, within the Group     | 94.6%   | 3.6% | 1.8%          |
| At solo basis, within the same legal entity | 96.0%   | 2.2% | 1.8%          |

According to the experience of the NSAs, the most common combination of methods used under the partial use allowance is the use of Delta plus and Scenario approach<sup>8</sup>. Even if presuming that this is indeed the case, only 3.6% of the banks apply two methods for estimating the capital requirements for options at consolidated level, while the respective percentage at solo (legal entity level) drops to 2.2%. 1.8% of the sample, at consolidated level and at solo level, applies more than two methods for valuing options and estimating the capital requirements for option positions.

### 5.1.5 Objectives

#### 5.1.5.1 General objectives

The impact assessment has been carried out having in mind that the general objective of “ensuring the international competitiveness of EU banking sector (G-3)”<sup>9</sup> is met.

#### 5.1.5.2 Problem drivers

Based on the “Commission Staff Working Paper – Impact Assessment”, the relevant driver of the identified problem (of not having capital requirement provisions for the non-delta option risk) is the “lack of harmonization in application of regulatory adjustments”.

#### 5.1.5.3 Operational objectives / specific objectives

The operational objective that has to be met is to “Develop a harmonised set of provisions in the area of definition of capital” which includes the following “Specific objectives”:

- Prevent regulatory arbitrage opportunities (S-3);
- Reduce compliance burden (S-5);
- Enhance level playing field (S-6);

<sup>8</sup> This view was expressed by the majority of the members of the EBA in the meeting of 21-22 Feb in Brussels.  
<sup>9</sup> For more information refer to the “Commission Staff Working Paper – Impact Assessment” accompanying the document “Regulation of the European Parliament and the Council Regulation on prudential requirements for the credit institutions and investment firms” ([http://ec.europa.eu/internal\\_market/bank/docs/regcapital/CRD4\\_reform/IA\\_regulation\\_en.pdf](http://ec.europa.eu/internal_market/bank/docs/regcapital/CRD4_reform/IA_regulation_en.pdf) )

- Enhance supervisory cooperation and convergence (S-7)

## 5.1.6 Cost-benefit Analysis

### 5.1.6.1 General assessment (first-order) set of policy options

The general assessment (first-order) set of policy options engages the following two options: (a) transpose the basic models and principles of the BCBS rules into the CRD IV or (b) inventing new methods from scratch.

As mentioned at the beginning of the IA, the discussions in the EBA led to excluding the alternative option of exploring the possibility for inventing from scratch new methods for calculating the capital requirements. The main reasoning for this was (a) any survey of this type would be time-consuming and (b) it would probably lead to methods similar to those described in Basel II. Moreover, as shown in Table 1, Chapter 4, the vast majority of the European banks (almost 89%) uses the methods described in Basel II (simplified, delta-plus, scenario approach). By requiring these banks to change the existing modelling infrastructure would impose high cost to them.

To this end, the EBA decided to transpose the existing provisions in Basel II to address the non-delta risk of option holdings of EEA banks. The impact assessment assesses the benefits and costs, as shown below, in view to justify the decision of choosing the proposed option.

### 5.1.6.2 Benefits

The magnitude of the benefits was estimated for all the stakeholders involved (credit institutions, national supervisory authorities and other stakeholders) whereas due to the difficulty to quantify future benefits, it was classified in four generic classes of magnitude: negligible (including no impact), low, medium and high.

The main identified sources of benefits are the following: (a) benefits from the harmonisation of the CRD IV rules with the BCBS rules, (b) reputation benefits (for the credit institutions) arising from their compliance with the internationally widespread market practices and (c) the reduction of unrealised costs (opportunity costs) that would be realised if the supervisors were to impose a different set of capital requirement methods (other than those provisioned in the Basel II).

Figure 4: Benefits of the preferred option, expressed in level of magnitude, from the implementation of the existing Basel II framework (percentage of answers to total answers provided)

| Source of benefits   | Level of impact (benefits) / (Negligible=1, Low=2, Medium=3, High=4) |       |    |       |
|--|--|-------|----|-------|
|  | 1  | 2     | 3  | 4     |
| 1. Benefits from the harmonisation of the CRD IV rules with the International Regulatory Standards (BCBS)          | 38.5%  | 30.8% | 0% | 30.8% |
| 2. Reputation benefits arising from the compliance with the internationally widespread and tested market practices | 60.0%  | 20.0% | 0% | 20.0% |
| 3. Unrealised costs  | 75.0%  | 0%    | 0% | 25.0% |
| 4. Other   | 100.0%   | 0%    | 0% | 0%    |

Figure 5: Overall magnitude of benefits

| Source of benefits   | Average level of impact (benefits) |
|--|------------------------------------|
| 1. Benefits from the harmonisation of the CRD IV rules with the International Regulatory Standards (BCBS)          | Low to Medium                      |
| 2. Reputation benefits arising from the compliance with the internationally widespread and tested market practices | Negligible to Low                  |
| 3. Unrealised costs  | Negligible to Low                  |
| 4. Other   | Negligible                         |
| <b>Overall</b>   | <b>Low</b>                         |

5.1.6.3 Costs

It was inferred from the discussions in the EBA meetings, that the cost from the transposition of Basel methods for assessing the non-delta risk will affect only the credit institutions holding option and warrant positions; whereas the other stakeholders will not be impacted or will minimally be affected. To this end, the impact on other stakeholders, apart from the banking sector, was not examined for the purposes of the existing IA.

The impact on the credit institutions was assessed in terms of additional market risk capital requirements that the implementation of the Basel II rules will add to the existing level of market risk capital requirements for the EEA banks. 13 out of 17 member states replied that the additional capital requirements will be less than 2% of the existing level of market risk capital requirements, while another two answered that it will be lower than 15% and only two answered that it will be between 15% and 50%.

Figure 6: Cost of the preferred option, expressed in additional market risk capital requirements arising from the implementation of the proposed framework

| Level of impact (additional cost)      | Answers by the member states (MS) |
|--|-----------------------------------|
| 1. Negligible (ACR<2%)                 | 13 (76.5%)                        |
| 2. Low (2%≤ACR<15%)                    | 2 (11.8%)                         |
| 3. Medium (15%≤ACR<50%)                | 2 (11.8%)                         |
| 4. High (ACR≥50%)                      | 0 (0%)                            |
| <b>Average level of impact (costs)</b> | <b>Negligible to Low</b>          |

It should be noted that, despite the initial costs that the implementation of the RTS implies, in the long-run, the additional capital to be set aside could eliminate the risk of having undercapitalised banks. In this respect, the initial cost could eventually result in the benefit (from a social point of view) of having better-capitalised banks that what would have been the case if the risks were underestimated. However, this benefit is difficult to estimate precisely.

### 5.1.7 Second-order set of policy options

Second-order set of policy options are the following: (a) allow the permanent partial use of models to value the non-delta option risks, (b) do not allow the permanent partial use of models to value the non-delta option risks.

The current IA assesses another set of policy options:

- provision for allowing the permanent partial use of option valuation models for estimating the capital requirements of option holdings at either consolidated or solo basis
- prohibit the partial use of the option valuation models at either consolidated or solo basis

The findings of the questionnaire have shown that the majority of the supervisors do not allow the banks in their jurisdictions to use more than one models for option valuation and, thus, for the estimation of the capital requirements according to this method. However, there is a significant minority of supervisors that allows the partial use (46% at consolidated level, 31% at legal entity level) of option valuation models. The picture though is different when it comes to the actual application of the models from the banks. It appears that only 5.4% of the banks at consolidated level and 4.0% of the banks at solo basis uses two or more methods to calculate the capital requirements for their option holdings.

Deriving from the aforementioned evidence provided by the national supervisors, the prohibition of the partial use of option valuation methods, within the same bank or the same banking group, under the current regime, would impact a limited number of banks in EEA. However, it should be noted that the IA does not take into account that the RTS introduces a new treatment for non-standard options, which might increase the use of a partial use within an institution that invests in this kind of options.

## 5.1.8 Proposal

Taking into account the aforementioned cost-benefit analysis<sup>10</sup>, it is apparent that the transposition and the subsequent implementation of the Basel II rules for addressing the non-delta risk for options and warrants will be of net positive impact as the benefits (Low) are expected to be higher than the costs (Negligible to Low). However, due to the diversity of the characteristics of the national banking systems across EEA, it is suggested that the EBA implements the necessary adjustments in the current RTS, if and where applicable, to cope with the special characteristics of the EEA banks.

The adjustments include the decision as to whether the permanent partial use of option valuation models (and thus the calculation of capital requirements according to different methods) will be prohibited or allowed. The evidence derived from the questionnaire shows that a limited number of banks in EEA will be impacted from the prohibition of the partial use.

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<sup>10</sup> The proposal is based on the data received from the NSAs which responded to the questionnaire.

## 5.2 Overview of questions for Consultation

- Q1. Do you agree with the choice to refer to the Basel Framework? Are there other approaches that can effectively be used for the purposes of this RTS? Which ones? Explain your reasoning.
- Q2. Do you prefer the first option (exclusion of a combination of methods within a single institution) or the second option (exact definition of the scope of the scenario approach)? If you prefer the second option, what additional conditions and controls should be established?
- Q3. Do you believe that it is useful to implement the simplified approach established in the Basel text
- Q4. Do you agree with this prudential treatment, not contemplated in the Basel Framework, for non-standard options?
- Q5. Do you agree that the RTS should require that the conditions of Articles 318(1), 341(1) and 347(3) of the CRR are met for the calculation of gamma and vega?
- Q6. Do you think that the unified treatment of interest rate risk is sound? Could there be difficulties in implementing it in practice?
- Q7. How many hybrid options does your portfolio account for in terms of number of options and notional amounts (i.e. options which can be assigned to more than one underlying type as defined above)? Should the RTS specify the treatment of these hybrid options?
- Q8. Do you agree with the rationale behind the exclusion of this provision contemplated in the Basel accord in the RTS? If not, please provide arguments in favour of its implementation.