KPMG

Circular 2008/20 Market risks - Banks

Capital requirements for market risks at banks

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Addressees

BA			ISA			SESTA		CISA									AMLA			OTHERS	
Banks	Financial groups and congl.	Other intermediaries	Insurers	Insurance groups and congl.	Insurance intermediaries	Stock exchanges and participants	Securities dealers	Fund management companies	SICAVs	Limited partnerships for CISs	SICAFs	Custodian banks	Asset managers CIS	Distributors	Representatives of foreign CIS	Other intermediaries	SROs	DSFIs	SRO-supervised institutions	Audit firms	Rating agencies
X	X						X														

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I. Object and Purpose of the Guidelines

The present guidelines govern the measurement and capital adequacy requirements for risks arising due to changes in interest rates and share prices in the trading book, as well as currency, gold and commodity risks throughout the bank. 1

The guidelines concretize the relevant provisions in the Capital Adequacy Ordinance (Articles 80-88 CAO; SR 952.03) and describe the measurement and capital adequacy requirements for market risk based on the standardized and model-based approaches; furthermore, they also describe the methods for calculating the capital required to cover market risk at consolidated level. References to the revised Basel Capital Accord of the Basel Committee on Banking Supervision (Basel minimum standards) are shown in square brackets. The guidelines are based on the current Capital Accord of the Basel Committee on Banking Supervision including its addenda: 2*

- "International Convergence of Capital Measurement and Capital Standards – A Revised Framework / Comprehensive Version" dated June 2006 (Basel Basic Text) 2.1*
- "Revisions to the Basel II market risk Framework" revised as of 31 December 2010 (Basel Market Risk Amendments) 2.2*
- "Guidelines for computing capital for incremental risk in the trading book" of July 2009 (IRC Guidelines) 2.3*
- "Basel III: a global regulatory framework for more resilient banks and banking systems" dated December 2010 and revised in June 2011 (Basel III text) 2.4*

In addition to the capital adequacy requirements for market risk as per Articles 80-88 CAO dealt with in these guidelines, capital must also cover all additional risks arising from positions in interest or equity instruments in the trading book and from positions in currency, gold and commodity instruments in the entire bank pursuant to Article 49 CAO. 3

II. Trading Book

A. Definition

According to Article 5 CAO, the trading book consists of positions in financial instruments and commodities held either for trading or to hedge other elements of the trading book. To be eligible for the trading book, positions must either be unencumbered by any restrictive covenants regarding their tradability or fully hedgeable at all times. Trading intent exists if the bank intends to hold the positions for a short term, or with a view of benefiting from short-term fluctuations in their market price or realizing arbitrage gains (examples include proprietary trading positions, positions arising from client servicing (e.g. matched principal broking) and market-maker positions). The positions must be valued frequently and precisely, and the portfolio must be actively managed. 4

In principle, trading book positions as per Article 5 CAO constitute "trading business" as described in margin no. 233 of the guidelines to the accounting rules for banks (FINMA circular 08/2 "Accounting – 5

Banks"). On the other hand, trading positions to be valued according to the lowest value principle (margin no. 22d FINMA circular 08/2 "Accounting – Banks") are not trading book positions as per Article 5 CAO.

B. Trading Strategy and Active Management

A clearly documented trading strategy approved by senior management must be in place for the positions or portfolios that must also include information on the expected holding period for said positions. 6

The instructions and processes for the active management of the positions must cover the following aspects:

- The positions are managed on a trading desk. 7
- Position limits are set and monitored for appropriateness. 8
- Dealers have the autonomy to enter into and manage the positions within the agreed limits and strategies. 9
- Position prices are marked to market at least daily. When marking to model, the valuation parameters must be assessed on a daily basis. 10
- Positions are reported to senior management as an integral part of the bank's risk management process. 11
- Positions are actively monitored using market information. For the valuation process, this includes assessing the quality and availability of market inputs, the volume of market turnover and the sizes of positions traded in the market. 12
- The principles and processes used to monitor the positions against the bank's trading strategy, including the monitoring of turnover and stale positions. 13

C. Delimitation to the Banking Book

The bank must define appropriate and uniform criteria for allocating positions to the trading book. In order to ensure that these criteria are complied with and internal transactions are treated in a proper and accountable manner, the institutions also need control systems. 14

Institutions must implement clear directives and processes to determine which positions can be held in the trading book and which cannot. At a minimum, these directives and processes must provide answers to the following questions: 15

- Which activities does the bank define as trading and thereby the relevant positions in the trading book to determine capital adequacy requirements? 16
- To what extent can the positions be valued daily with reference to an active, liquid market? 17
- For positions valued using a model, to what extent can the bank:

- identify the material risks of these positions? 18
- hedge the material risks of these positions? And to what extent do the hedging instruments have an active liquid market? 19
- reliably deduct estimates for the most important assumptions and parameters used in the model? 20

- To what extent can the bank perform valuations of positions which can be validated externally in a consistent manner? 21
- To what extent could legal provisions or other operating requirements prevent the bank from liquidating positions immediately? 22
- To what extent can the bank actively manage the risk of the positions? 23
- What are the criteria for transferring positions between the trading book and the banking book? 24

If a bank hedges a credit risk in the banking book with a credit derivative entered in the trading book ("internal hedging"), the position in the banking book can only be recognized as hedged for the purpose of calculating capital adequacy requirements if the trading desk has transferred this internal risk transfer to an external third party with an exactly opposite transaction (cf. margin no. 204, FINMA circular 08/19 "Credit Risk – Banks"). Otherwise, a credit risk in the banking book can only be hedged with a credit derivative that meets the requirements for being recognized as credit derivative purchased from a recognized external protection seller (cf. margin nos. 220-231 FINMA circular 08/19 "Credit Risk – Banks"). If the hedging effect of an external credit derivative is recognized, the banking book requirements will apply to calculate the capital adequacy requirements. 25

Banks that calculate capital adequacy requirements for credit risk using the International Standardized Approach (SA-BIS) must treat equities and other equity-type securities issued by companies operating in the financial sector in accordance with Appendix 4 CAO. Banks that apply the IRB approach must treat these positions analogous to the SA-BIS (Appendix 4 CAO), whereby the IRB risk weights must be determined using a market-based approach or the PD/LGD approach. 26*

A bank may request a special exemption from the FINMA to calculate capital adequacy for these positions according to the trading book rules if it is:

- an active market maker; 27
- and disposes of adequate systems and controls for trading such positions. 28

At present, the following positions do not meet the criteria to be allocated to the trading book and must therefore be covered by capital according to the rules applicable for the banking book:

- positions in securitization warehouses that do not meet trading book criteria, private equity investments, real-estate holdings and 29*
- equity stakes in hedge funds. 30*

Repealed 31*

Repealed 31.1*

D. Guidelines for Prudent Valuation

The following guidelines for prudent valuation of fair-valued positions apply to all positions carried at fair value, regardless of whether they are classified as trading book or banking book positions. They are particularly important for positions with no current market prices or without observable valuation inpu parameters, as well as for less liquid positions. The institution must be in a position to ensure a prudent and reliable valuation also during times of stress and to be able to use alternative valuation methods if valuation inputs or methods are not available due to illiquidity or market interruptions. 32*

The institution must have appropriate systems and controls in place which ensure prudent and reliable valuations 33

The institution must have documented guidelines and procedures for the valuation process. These include clearly defined responsibilities of the units involved in the valuation, sources of market information and the review of their suitability, directives for using non-observable inputs, the frequency of independent valuations, timing for recording daily closing prices, procedures for valuation adjustments, as well as end-of-month and ad-hoc reconciliation procedures. 34*

The unit responsible for reporting the valuations must be independent of trading, right up to senior management level. 35

a) Mark-to-Market Valuations:

This refers to the at least daily valuation of positions, using readily available close out prices that are sourced independently. The institution must mark to market its positions to the farthest extent possible. The more prudent side of bid/offer must be used unless the institution is a significant market maker in a particular position type and it can close out at mid-market. 36

Where it makes sense, observable input should be used as often as possible, non-observable input as little as possible. However, it should be borne in mind that while observable input values from distress sales should be taken into account, they do not necessarily determine prices. 36.1*

b) Mark-to-Model Valuations:

This refers to any valuation which has to be inferred from market data. Marking to model should only be used where marking to market is not possible. A prudent mark-to-model valuation requires the following: 37*

- Senior management must be aware of the positions which are marked to model and must understand the significance of the uncertainty this creates in the reporting of the risk/performance of the business. 38*

- To the extent possible, market data should come from the same sources as the market prices. The suitability of market data for the individual positions being valued should be reviewed regularly. 39

- Where available, products should be valued with generally accepted valuation methodologies. 40

- Where the model is developed by the institution itself, it should be based on

appropriate assumptions, which have been assessed and challenged by suitably qualified parties independent of the development process. The model must be developed or approved independently of the trading unit. 41

- A formal change control procedure must be in place and a secured copy of the model must be archived. 42

- Risk management must understand the model's weaknesses and how best to reflect these in the valuation output. 43

- The model must be verified regularly to determine the precision of its results. 44

Both marking to market and marking to model must be verified at least monthly by a unit independent of trading. 45

c) Valuation Adjustments

The institution must have directives on how to account for valuation adjustments. Valuation adjustments must be formally verified in at least the following cases: unearned credit spreads, close-out costs, operational risks, early termination, investing and refinancing costs, and future administrative costs and, where appropriate, model risk. Third-party valuations should be used to determine whether valuation adjustments are necessary; this is also applicable for mark-to-model valuations. 46*

In addition, value adjustments for less liquid positions must be considered. When deciding whether value adjustments for less liquid positions are necessary, the following factors must be taken into consideration: the time it would take to hedge a position, the average volatility of bid/offer spreads, the availability of independent market prices and the extent to which a valuation is marked to model. In the case of risk concentrations and stale positions it must be taken into account that close-out prices are more likely to be adverse. 47*

Particularly for complex instruments (such as securitization exposures and n^{th}-to-default credit derivatives), an institution must ponder the necessity of valuation adjustments in order to consider two forms of model risk: the model risk associated to the use of a possibly incorrect valuation method and the model risk arising from the use of unobservable (and possibly incorrect) calibration parameters for the valuation model. 47.1*

Valuation adjustments performed in accordance with margin nos. 46-47.1 may exceed accounting rules and could affect Tier 1 capital in such a case. 48*

III. De Minimis Approach for Equity and Interest Rate Instruments (cf. Article 83 CAO)

If an institution does not hold any credit derivatives in its trading book (Article 5 CAO), it does not need to use the standardized or model-based approach to calculate capital adequacy requirements for market risk arising from changes in interest rates and share prices if its trading book 49

- at no time exceeds 6% of the balance sheet total since the last quarterly statement, which has been supplemented by the absolute amounts of the contingent liabilities, irrevocable commitments, payment commitments and additional payment obligations, funding commitments and contract volumes of all open derivative financial instruments and 50

- at no time exceeds CHF 30 million. 51

Both conditions must be fulfilled cumulatively and permanent compliance must be assured by the institution's governance - in particular with a limit system. 52

The trading book's size is determined by adding

- the absolute market values of all spot positions in the trading book, plus 53

- the absolute delta-weighted market values of all underlying instruments of the individual option positions in the trading book, plus 54

- the absolute market values of the largest components (in terms of amounts) of all forward positions in the trading book.[1] 55

Positions that can be netted as per margin nos. 73-80 may be disregarded, while observing the following points:

- When verifying compliance with both limits relevant to the de-minimis approach (de-minimis-test), the netting option for futures provided in margin no. 75 is not limited to interest rate futures. It applies analogously to equity, equity index, currency, gold and commodity futures. 56

- Contrary to margin nos. 77-80, swaps, FRAs and forwards may be netted with each other regardless of their term until the next interest rate fixing date or their maturity if the interest rate fixing date or the maturity date are within 10 calendar days of each other. 57

Positions which can be netted as described in margin no. 123 may be disregarded when determining the decisive size of the trading book. However, the restrictions of margin nos. 74-75 are also applicable complementarily to equity and stock market index futures; i.e. in order for their mutual netting to be admissible, equity and equity index futures' maturity dates must also not be further apart than seven calendar days. Moreover, these futures must be denominated in the same currency. 58

[1] For instance, if a bank holds a forward contract to purchase a German share for EUR 100 in a year's time, the current forward price of this share should be compared with the current forward price of EUR 100. For the de minimis test, the higher of these two forward prices must be used.

Apart from the possibilities provided for in margin nos. 73-80 and 123, no further netting of derivatives with corresponding underlying instruments or of derivatives among themselves is permissible for the de-minimis test. In particular, the breakdown of equity indices into individual components, as provided for in margin no. 121 for the standardized approach, is not permissible for the de-minimis test. 59

Banks using the de-minimis approach to calculate their capital requirements may completely disregard the relevant gamma or vega effects from option positions on interest rate and equity instruments as per the standardized market risk approach.[2] However, even if a bank uses the de-minimis approach, capital adequacy requirements for non-linear currency, gold or commodity positions (regardless of whether they are allocated to the banking book or the trading book) must be determined analogously to the standardized market risk approach. 60

The de-minimis approach can only be used to calculate the capital requirements for interest rate and share price risks in the trading book. The requirements for currency and commodity risks must always be determined using the standardized or the model-based approach. 61

Institutions which make use of this exceptional ruling must calculate capital required for risks arising from changes in interest rates and share prices in the trading book in the same way as the requirements for interest rate and equity instruments outside the trading book set out in Articles 63-76 CAO. Through defining a risk policy, the limit structure for the dealers and the risk control, they have to ensure that the limits are never attained. 62

IV. Standardized Approach for Market Risk (Article 84-87 CAO)

When applying the standardized market risk approach, the capital required for each risk category (risks arising from interest rate changes, share price, currency and commodity risk) is calculated separately according to the procedures defined in margin nos. 65-227.1. 63*

In contrast to when using the model-based approach, banks that use the standardized market risk approach to calculate capital requirements as a rule do not need to comply with any specific qualitative requirements. The only exceptions are the provisions for ensuring data integrity pursuant to margin nos. 298-301 of the present circular. 64

A. Interest Rate Risk

Calculations of the interest rate risk in the trading book must comprise all fixed and floating-rate debt securities, including derivatives, and all other positions which exhibit interest-induced risks. 65

[2] Banks which do not meet the requirements for using the de-minimis approach must calculate the capital required for options on interest rate and equity instruments according to a procedure set out in margin nos. 157–199 if these options positions are allocated to the trading book. If, however, they are in the banking book, there is no capital adequacy requirement for the gamma and vega effects.

The capital required to cover interest rate risk consists of two components, which must be calculated separately:

- A component for specific risk: all risks that relate to factors other than changes in the general interest rate structure are captured and subject to capital adequacy requirements. 66

- A component for general market risk: risks related to a change in the general interest rate structure are captured and subject to capital adequacy requirements. 67

The component for specific risk is calculated for each issue, while the component for general market risk is calculated separately for each currency, except for general market risk for currencies traded in small amounts (margin no. 99). 68*

If interest rate instruments entail other risks (e.g. foreign exchange risk) in addition to the interest rate risk dealt with here, these other risks must be captured in accordance with the provisions of margin nos. 116-156. 69

a) Mapping of Positions

When calculating the components for general market risk and specific risk, all positions must initially be marked to market. Foreign currencies must be translated into CHF at the current spot rate. 70

The capital adequacy and measurement system includes all derivatives and off-balance sheet instruments in the trading book which are sensitive to interest rates.[3] These should be mapped as positions corresponding to the present value of the actual or fictional underlying instrument (contract volume, i.e. market value of the underlying instruments) and should subsequently be treated according to the procedures applied for general market risk and specific risk. 71

Positions in identical instruments that match entirely or almost entirely and which meet the conditions listed in margin nos. 73-80 are excluded when calculating the components for general market risk and specific risk. When calculating the requirements for specific risk, derivatives based on reference rates (e.g. interest rate swaps, currency swaps, FRAs, forward foreign exchange contracts, interest rate futures, futures on an interest rate index, etc.) may not be included. 72

aa) Permissible Netting of Matching Positions

Netting is permissible for the following matching positions:

- Future or forward positions matching in terms of amounts their corresponding underlying instruments, i.e. all deliverable securities. However, both positions must be denominated in the same currency. It must be borne in mind that futures and forwards must be treated as a combination of a long and a short position (cf. margin nos. 81-84) which is why one of the two future or forward positions will remain once it is netted with a related spot position in the underlying instrument. 73

[3] Options are to be treated as per approaches listed in margin nos. 157-199.

- Opposite positions in derivatives which relate to the same underlying instruments and are denominated in the same currency.[4] In addition, the following conditions must be met: 74
  - Futures: identical underlying instruments and maturities not more than seven calendar days apart. 75
  - Swaps and FRAs: identical reference rates (floating-rate positions) and fixed-interest rates which are not more than 15 basis points apart. 76
  - Swaps, FRAs and forwards: the next interest rate fixing date or, in the case of fixed-interest positions or forwards, the maturity dates are within the following limits:[5] 77
    - if less than one month after the cut-off date: the same day; 78
    - if between one month and one year after the cut-off date: a maximum of 7 calendar days apart; 79
    - if more than one year after the cut-off date: a maximum of 30 calendar days apart. 80

bb) Futures, Forwards and FRAs

Futures, forwards and FRAs are treated as a combination of a long and a short position. The term of a future, forward or FRA contract corresponds to the time until delivery or exercise of the contract plus - if applicable - the term of the underlying instrument. 81

For example, a long position in an interest rate future should be mapped as follows:

- a fictional long position in the underlying interest rate instrument with interest maturity on its maturity and 82
- a short position in a fictional government bond of the same amount and maturity on the settlement date of the futures contract. 83

If different instruments can be delivered to fulfill the contract, the institution may choose which deliverable financial instrument to use in its calculations. At the same time, however, the conversion factors defined by the stock exchange should be taken into account. In the case of a futures contract on a corporate bond index, the positions are mapped at the market value of the fictional underlying portfolio. 84

cc) Swaps

Swaps are mapped as two fictional positions in government bonds with the corresponding maturities. An interest rate swap in which a bank receives a floating interest rate and pays a fixed interest rate will, for example, be mapped as 85

[4] A possibility also exists to net cross-currency relationships (see detailed presentation in Appendix 5).

[5] If using the de minimis test, the limits stipulated in margin nos. 56-57 apply.

- a long position in a floating-rate instrument with a term corresponding to the period until the next interest rate fixing date and 86

- a short position in a fixed-rate instrument with a term corresponding to the swap's residual term to maturity. 87

Should one leg of a swap be linked to another reference value, such as an equity index, the interest component should be considered with a residual term to maturity (interest maturity) that corresponds to the term of the swap or the period until the next interest rate fixing date, while the equity component should be treated according to the rules pertaining to shares. In the case of interest rate/currency swaps, the long and short positions should be taken into account in the calculations for the currencies concerned. 88

Banks with significant swap books which do not make use of the netting possibilities specified in margin nos. 73-80 may also use sensitivity or pre-processing models to calculate the positions to be reported in the maturity or duration bands. The following possibilities exist: 89

- Calculation of the present values of the payment flows generated by each swap by discounting each individual payment by the corresponding zero coupon equivalent and allocating them to the corresponding maturity band (for bonds with coupons < 3%) (cf. margin nos. 100-108). 90

- Calculation of the sensitivity of the net present values of the individual payment flows on the basis of the yield changes specified in the duration method. The sensitivities should then be allocated to the relevant time bands and treated with the duration method (cf. margin nos. 109-115). 91

If one of the above options is used, the bank's external auditor must explicitly verify and confirm the adequacy of the systems used. In particular, the calculation of the capital required must accurately reflect the sensitivities to interest rate changes of the individual payment flows. 92

b) Specific Risk

aa) Interest Rate Instruments (Except Securitized Instruments with Risk Tranching)

In calculating the capital required for specific risk, the net position for each issuance is determined according to Article 51 CAO.[6] 93*

The requirements for specific risk are determined by multiplying the net position for each issuance calculated in accordance with Article 51 CAO with the following percentage rates (Appendix 5 CAO): 94*

[6] An exception applies if the simplified approach is used for options (see margin nos. 162-166). In this case the capital required for the general market risk and for the specific risk of the position are calculated simultaneously and the option's positions no longer need to be included when determining the net positions as per Article 51 CAO.

Category	Rating	Rate
Interest-rate tools of central governments and central banks	1 or 2 3 or 4 5 or 6 7 without a rating	0.00 % 0.25% (residual maturity ≤ 6 months) 1.00% (residual maturity > 6 months and ≤ 24 months) 1.60% (residual maturity > 24 months) 8.00 % 12.00 % 8.00 %
Qualified interest rate instruments pursuant to Article 4(e) CAO		0.25% (residual maturity ≤ 6 months) 1.00% (residual maturity > 6 months and ≤ 24 months) 1.60% (residual maturity > 24 months)
Other interest rate instruments	5 6 or 7 without a rating	8.00 % 12.00 % 8.00 %

bb) Securitization Exposures

Securitization positions are defined in [§538] to [§542]. A re-securitization position is a securitization position where the risk related to the underlying pool of positions is tranched and at least one of the underlying positions is a securitization position. An exposure to one or more re-securitization positions is also considered to be a re-securitization position. 94.1*

When calculating the capital required for the specific risk for interest rate instruments of securitizations with risk tranching, the net position pursuant to Article 51 CAO must be calculated for each position (specific tranche).[7] To calculate the requirements for the position's specific risk, the net position is multiplied by the appropriate rate pursuant to margin no. 94.4 (under the SA-BIS approach) or margin no. 94.5 (under the IRB approach). During a transitional phase lasting until and including 31 December 2013, it is permitted to calculate the capital adequacy requirements for all net long positions and all net short positions separately and to hold capital only for the larger amount of these two. After this transitional phase, capital has to be held for both the long and the short positions. If a position's specific risk is covered at a rate of 100%[8], it is not necessary to calculate the capital required for general market risk. 94.2*

For the recognition of external ratings, the operational requirements pursuant to [§565] must be complied with. 94.3*

[7] An exception applies if the simplified approach is used for options (see margin nos. 162-166). In this case the capital required for the general market risk and for the specific risk of the position are calculated simultaneously and the option's positions no longer need to be included when determining the net positions as per Article 51 CAO.

[8] See [§561].

aaa) Institutes Using the SA-BIS Approach in their Banking Book 94.4*

External Ratings[9]	AAA to AA- A-1/P-1	A+ to A- A-2/P-2	BBB+ to BBB- A-3/P-3	BB+ to BB-	Below BB- and below A-3/P-3 or without a rating
Securitization positions	1.6%	4%	8%	28%	100%
Re-securitization positions	3.2%	8%	18%	52%	100%

bbb) Institutes Using the IRB Approach in their Banking Book 94.5*

External Ratings[10]	Securitization positions			Re-securitization positions	
	Senior[11], granular[12]	Subordinated, granular	Non-granular	Senior	Subordinated
AAA/A-1/P-1	0.56%	0.96%	1.60%	1.60%	2.40%
AA	0.64%	1.20%	2.00%	2.00%	3.20%
A+	0.80%	1.44%	2.80%	2.80%	4.00%
A/A-2/P-2	0.96%	1.60%		3.20%	5.20%
A	1.60%	2.80%		4.80%	8.00%
BBB+	2.80%	4.00%		8.00%	12.00%
BBB/A-3/P-3	4.80%	6.00%		12.00%	18.00%
BBB-	8.00%			16.00%	28.00%
BB+	20.00%			24.00%	40.00%
BB	34.00%			40.00%	52.00%
BB-	52.00%			60.00%	68.00%
Below BB-/A-3/P-3	100%				

[9] See the concordance tables for details on assigning ratings by recognized external rating agencies to these rates.
[10] See concordance tables for mapping of the external rating agencies recognized by the FINMA to these rates.
[11] Senior is defined in [§613].
[12] Granular is defined in [§633].

ccc) Securitization Positions Without a Rating

For securitization positions without a rating, specific risk may be treated using the following approaches: 94.6*

If a bank is authorized to use the IRB approach for exposure types serving as an underlying to a securitization transaction, the bank may apply the supervisory formula approach [§623] to [§636]. In estimating the probability of default and the loss given default for calculating KIRB the bank must meet the minimum requirements for the IRB approach. 94.7

If a bank is authorized to use the IRC approach (margin no. 283) for the exposure types underlying in a securitization transaction, it may use the probabilities of default and loss given default values estimated using this approach to calculate KIRB and apply the supervisory formula approach stated in [§623] to [§636]. 94.8*

In all other cases, the capital requirements can be calculated using 8% of the weighted average of the SA-BIS risk weights of the underlying exposures multiplied by a concentration ratio. The concentration ratio is defined as the sum of the current nominal amounts of all tranches divided by the sum of the nominal amounts of the subordinated or equal-ranking tranches of the position in question. If the concentration ratio is 12.5 or greater, the position must be deducted from capital. 94.9*

The resulting capital adequacy requirement for the specific risk may not be smaller than that of a senior tranche with a rating. If an institution is unable to or prefers not to use the above approach for calculating the specific risk for securitization positions without a rating in accordance with margin nos. 94.7 to 94.9, it must apply a capital adequacy requirement rate of 100%. 94.10*

ddd) Correlation trading securitization positions in the Lending Business

Correlation trading in the lending business (hereinafter referred to as correlation trading) refers to securitization exposures and n^{th}-to-default credit derivatives (including first-to-default and second-to-default credit derivatives) which have the following characteristics: 94.11*

The positions are neither re-securitizations nor derivatives of securitizations not generating a pro rata share of the income of the securitization tranche. This means that all options on a securitization tranche or a synthetic, leveraged super-senior tranche are excluded. 94.12*

Positions referencing an underlying exposure which the standardized approach would treat as a retail position, residential mortgage exposure or commercial mortgage exposure are also excluded, as are positions referencing a claim on an SPV. 94.13*

Positions referencing an underlying exposure consisting of single-name products or derivatives on single-name products, as well as commonly traded indices based on these underlying exposures are included. However, a liquid market with independent bid/offer prices must exist for all these underlyings, such that a price can be found within one day which is reasonably related to the last traded price or to the last price quoted in the market and which also allows the transaction to be settled within a customary time frame. 94.14*

A bank may include in its correlation trading portfolio hedges which are neither securitization exposures nor n^{th}-to-default credit derivatives if the hedges or their underlying exposures satisfy the liquidity requirements described in margin no. 94.14. 94.15*

The same rates apply as for securitization positions. However, for correlation trading positions it is always permitted to calculate the capital requirements for all net long positions and all net short positions separately with the capital requirements applying only to the larger of these amounts. 94.16*

Repealed 95*

Repealed 96*

Repealed 97*

c) General Market Risk

In principle, there are two methods for measuring and calculating capital required for general market risk: the "maturity method" and the "duration method" (Article 84(2) CAO). 98

The capital required must be calculated separately for each currency using a maturity ladder. Currencies in which the bank has little business activity can be grouped together in a single maturity ladder. In this case, it is necessary to determine an absolute position value rather than a net position value, i.e. all net long or net short positions of all currencies in a maturity band must be added together, regardless whether they are positive or negative values, and no further netting is permitted. 99

aa) Maturity Method

When applying the maturity method, the capital required for general market risk is calculated as follows:

- Allocating the positions marked to market to the maturity bands: 100
  All long and short positions are allocated to the maturity ladder's relevant maturity band. Fixed-interest instruments are classified according to their residual terms up until final maturity and variable interest instruments are classified according to their residual term up until the next interest rate fixing date. The boundaries of the maturity bands are defined differently for instruments with coupons equal to or greater than 3% and for instruments with coupons of less than 3% (cf. Table 1 in margin no. 101). The maturity bands are split into three different zones.

- Weighting by maturity band: 101
  In order to take account of price sensitivity in relation to interest rate changes, the positions in the individual maturity bands are multiplied by the risk-weighting factors listed in Table 1.

	Coupon ≥ 3%		Coupon < 3%		Risk-weighting factor
	more than	up to and including	more than	up to and including	
Zone 1		1 month		1 month	0.00%
	1 month	3 months	1 month	3 months	0.20%
	3 months	6 months	3 months	6 months	0.40%
	6 months	12 months	6 months	12 months	0.70%
Zone 2	1 year	2 years	1.0 year	1.9 years	1.25%
	2 years	3 years	1.9 years	2.8 years	1.75%
	3 years	4 years	2.8 years	3.6 years	2.25%
Zone 3	4 years	5 years	3.6 years	4.3 years	2.75%
	5 years	7 years	4.3 years	5.7 years	3.25%
	7 years	10 years	5.7 years	7.3 years	3.75%
	10 years	15 years	7.3 years	9.3 years	4.50%
	15 years	20 years	9.3 years	10.6 years	5.25%
	20 years		10.6 years	12 years	6.00%
			12 years	20 years	8.00%
			20 years		12.50%

Table 1: Maturity method: maturity bands and risk-weighting factors

- Vertical netting: 102
  The net position is determined from all weighted long and short positions in each maturity band. The risk-weighted closed position[13] must be assigned a ratio of 10% for each maturity band. This is to take account of the underlying risk and the interest rate structure risk within each maturity band.

- Horizontal netting: 103
  To determine the total net interest rate position, it is also possible to net opposite positions with differing maturities. The resulting closed positions are then assigned a rate. This process is called horizontal netting. Horizontal netting takes place at two levels: first, within each of the three zones and then between the zones.

  - Horizontal netting within a zone 104
    The risk-weighted open net positions of individual maturity bands are aggregated and netted with each other within their respective zone to obtain a net position for that zone. The closed positions resulting from the netting must be assigned a rate. This amounts to 40% for zone 1 and 30% each for zones 2 and 3.

[13] The smaller of the absolute amounts of the sums of netted and weighted long and short positions, respectively, is referred to as a closed position.

- Horizontal netting between different zones 105
  Provided that they have opposite signs (i.e. one is "+" and the other "-"), the net zone positions of adjacent zones may be netted with each other. Resulting closed net positions must be assigned a rate of 40%. An open position remaining after the netting of two adjacent zones remains in its zone and forms the basis for any further netting. Any closed net positions arising from netting between the non-adjacent zones 1 and 3 must be assigned a rate of 100%.

This means that with the maturity method, the capital required for the interest rate risk in a given currency is obtained from the sum of the following components, which should be assigned different weightings: 106

	Components	**Weighting factors**
1.	Net long positions or net short positions in total	100%
2.	Vertical netting: • Weighted closed position in each maturity band	10%
3.	Horizontal netting: • Closed position in Zone 1	40%
	• Closed position in Zone 2	30%
	• Closed position in Zone 3	30%
	• Closed position from netting adjacent zones	40%
	• Closed position from netting non-adjacent zones	100%
	• If applicable, add-on for option positions (pursuant to margin no. 162-166, 171-188 or 189-199)	100%

Table 2: Components of capital adequacy requirements

Netting is only possible if positions with opposite signs can be netted with each other within a maturity band, within a zone or between zones. 107

An example for determining the capital required according to the maturity method is given in Appendix 1. 108

bb) Duration Method

As an alternative to the maturity method, banks with the necessary governance, personnel and technical resources may use the duration method. Once they have decided on the duration method, they may only switch back to the maturity method if they can substantiate this switch. The duration method must in principle be used by all branches and for all products. 109

For this method, the price sensitivity of each financial instrument is calculated separately. It is also possible to split the financial instrument into its payment streams as per margin nos. 89-92, taking account of the duration for each individual payment. The capital adequacy requirements for general market risk are calculated as follows: 110

- Calculation of price sensitivities: 111
  Price sensitivity is calculated separately for each instrument or for its payment streams. Depending on the duration listed in Table 3 in margin no. 112, the respective changes in yield should be assumed. The price sensitivity is obtained by multiplying the market value of the instrument or payment stream by its modified duration and the assumed change in yield.

- Allocating price sensitivities to time bands: 112
  The resulting sensitivities are entered in a ladder with 15 time bands based on the duration of the instrument or its payment stream.

	more than	up to and including	Assumed change in yield
Zone 1		1 month	1.00%
	1 month	2 months	1.00%
	3 months	6 months	1.00%
	6 months	12 months	1.00%
Zone 2	1.0 year	1.9 years	0.90%
	1.9 years	2.8 years	0.80%
	2.8 years	3.6 years	0.75%
Zone 3	3.6 years	4.3 years	0.75%
	4.3 years	5.7 years	0.70%
	5.7 years	7.3 years	0.65%
	7.3 years	9.3 years	0.60%
	9.3 years	10.6 years	0.60%
	10.6 years	12 years	0.60%
	12 years	20 years	0.60%
	20 years		0.60%

Table 3: Duration method: time bands and changes in yield Vertical netting:

- Vertical netting within the individual time bands is performed analogously to the maturity method, whereby the risk-weighted closed position is assigned a rate of 5% for each maturity band. 113

- Horizontal netting: 114
  Horizontal netting between time bands and zones is performed analogously to the maturity method.

The capital required for the general interest rate risk for each currency is obtained in the duration method as the sum of the net position, the various netting operations and, where applicable, an add-on for option positions pursuant to margin nos. 162-166, 171-188 or 189-199. 115

B. Equity position risk

To determine the capital required for equity position risk, all positions in equities, derivatives and positions which behave like equities (generally referred to hereinafter as "equities") must be taken into account. Investment fund shares must also be treated as equities, unless they are split up into their components and the capital required for these is determined as necessary for the corresponding risk category. 116

The capital required for equity position risk consists of two components, which must be calculated separately:

- The component for specific risks: risks which are attributable to the issuer of the equity and cannot be explained by general market fluctuations must be recorded and are subject to capital requirements. 117

- The component for general market risk: risks due to fluctuations in the relevant national equity market must be recorded and are subject to capital requirements. 118

If positions entail other risks (e.g. foreign exchange risk or interest rate risk) apart from the equity position risk dealt with here, these risks must be recorded in accordance with the relevant provisions of this circular. 119

a) Mapping of Positions

All positions must initially be marked to market. Foreign currency positions must be translated into Swiss francs at the spot rate. 120

Index positions may be treated either as index instruments or split up into their individual equity positions and treated as normal equity positions. However, the bank must opt for one method for each index and apply that method consistently. 121

Equity derivatives and off-balance sheet positions which are affected by changes in equity prices must be recorded in the measurement system at the market value of the actual or fictional underlying instruments (contract volume, i.e. market value of the underlying instruments).[14] 122

aa) Permissible Netting of Matching Positions

Opposite positions (different positions in derivatives or in derivatives and corresponding underlying instruments) in each identical equity or in each identical equity index can be netted with each other. However, it must be remembered that futures and forwards are to be mapped as a combination of a long and a short position (see margin no. 124), i.e. when netting with a corresponding spot position in the underlying instrument, the interest rate position remains. 123

bb) Futures and Forward Contracts

Futures and forward contracts must be treated as a combination of long and short positions in an equity, an equity basket or an equity index on the one hand, and a fictional government bond on the other hand. Equity positions are recorded at the current market price and equity basket or equity index positions are recorded at their current market price of the fictional underlying equity portfolio. 124

[14] Equity options and equity index options are treated in accordance with the methods described in margin nos. 157–199.

cc) Swaps

Equity swaps are also mapped as a combination of a long and a short position. This can either be a combination of two equity, equity basket or equity index positions or a combination of an equity, equity basket or equity index position and an interest rate position. 125

b) Specific Risk

In calculating the capital required for specific risk, the net position for each issuer is determined according to Article 51 CAO.[15] This means that positions with opposite signs from the same issuer can be netted with each other. 126

The capital required corresponds to 8% of the net position for each issuer (Article 85(1) CAO). 127

Repealed 128*

Repealed 129*

c) General Market Risk

The capital required for general market risk corresponds to 8% of the net position for each national equity market (Article 85(3) CAO). A separate calculation must be made for each national equity market. At the same time, long and short positions in instruments of different issuers of the same national market may be netted with each other.[16] 130

C. Foreign Exchange Risk

All positions in foreign currencies and gold must be included when calculating the capital required for foreign exchange risk. 131

a) Determining the Net Position

An institution's net position in a currency is calculated in accordance with Article 51 CAO. It corresponds to the sum of the following positions: 132

- Net spot position, i.e. all assets less all liabilities; 133
- Net forward position, i.e. all receivables less all payables for all forward transactions in this currency. The net present values should be applied, i.e. the positions discounted with the current foreign currency interest rates. As these are net present values, forward positions are also translated into Swiss francs at the spot rate and not at the forward rate; 134

[15] An exception applies if the simplified approach is used for options (see margin nos. 162-166). In this case the capital required for the general market risk and for the specific risk of the positions are calculated simultaneously and the option's positions no longer needs to be included when determining the net positions as per Article 51 CAO.

[16] Equities from the Principality of Liechtenstein may be included in the Swiss equity market.

- Net amount of known, future and already fully hedged income and expenditures; optionally, non-hedged future income and expenditure may be taken into account – but only if done so consistently and at all times; 135

- Currency options pursuant to margin nos. 157-199. 136

This results in a net long or net short position for each currency. These are translated into Swiss francs at the current spot rate. 137

Baskets of currencies may be treated as currencies in their own right or split into their component currencies. However, the selected method must be applied consistently and at all times. 138

Positions in gold (spot and forward positions) should be converted to standard units of measurement (normally ounces or kilograms). The net position should then be valued at the current spot price. Any interest rate and/or foreign exchange risk arising from forward transactions in gold must be recorded in accordance with the corresponding sections of the present guidelines. Provided they do so consistently and at all times, banks also have the option of treating their net gold position as an additional foreign currency position.[17] 139

b) Exceptions

The following positions may be excluded from the calculation:

- Positions which are not allowed to be included in the calculation of eligible capital in accordance with Articles 32-40 CAO; 140

- Other participations disclosed at historic cost; 141

- Positions which demonstrably and constantly serve as a hedge against foreign currency fluctuations in order to secure the capital ratio. 142

c) Determining the Capital Adequacy Requirements

The capital required for foreign currencies and gold amounts to 8%*

- Of the sum of net long or net short currency positions converted to CHF, whichever is the higher (Article 86 CAO); plus 143

- Of the net gold position, disregarding plus or minus signs (Article 86 CAO). 144

[17] If for example a bank were also to treat its net long position in gold as a USD exposure, it would then be able to net any existing USD position already in the portfolio with this additional USD (long) position. However, the additional treatment of net positions in gold as USD exposure would have to be applied consistently and could not be omitted for opportunistic reasons – e.g. if there were already an existing net long position in USD.

D. Commodity Risk

This section defines capital adequacy requirements for positions in commodities, including precious metals other than gold (see margin nos. 131-144). All balance sheet and off-balance sheet positions which are affected by changes in commodity prices must be included. Commodities are defined as physical goods which are, or can be, traded on a secondary market, such as agricultural products, minerals and precious metals. 145

The standardized approach for market risk for calculating commodity risk is only suitable for banks with insignificant commodity positions. Banks with significant trading book positions in commodities in either absolute or relative terms must use the model-based approach. In principle, the following risks must be taken into account (cf. margin no. 265) to determine the capital required for risks arising from positions in commodities: 146

- The risk of change in spot prices; 147
- The "forward gap risk", i.e. the risk of change in forward prices for reasons which cannot be explained by interest rate changes (for example because of changes in inventory costs); 148
- The basis risk that denotes the risk of a change in price relationships between two similar but not identical commodities. 149

Interest rate and foreign exchange risks arising in connection with commodity transactions are to be treated in accordance with the corresponding sections of this circular. 150

Positions which serve only to finance inventory (i.e. a physical inventory is sold as a forward and financing costs are contractually defined up to the day of the forward sale) may be excluded from the calculation of capital adequacy requirements for commodity risk. 150.1*

a) Determining Commodity Positions

Repealed 151*

All long and short commodity positions (spot and forward positions) must be converted to a standard measurement unit (barrels, kilograms etc.) and valued at the current spot price in the reference currency of the financial statements. Netting sub-categories is only admissible if the sub-categories are exchangeable at delivery. Commodities may also be netted if they are close substitutes and their price development in a period of at least 1 year has an observable correlation of at least 0.9. An institution wishing to rely on correlations to calculate the capital adequacy requirements for commodities must convince the FINMA of the accuracy of the chosen method and request the FINMA's prior approval. For markets with daily delivery dates, contracts with maturity dates that are not further than 10 days apart may also be netted. 152*

b) Commodity Derivatives[18]

Futures and forward contracts must be treated as a combination of a long or short position in a commodity on the one hand, and a fictional government bond on the other hand. 153

Commodity swaps with a fixed price on the one hand and the respective market price on the other hand must be treated as a series of positions which correspond to the nominal amount of the contract. In doing so, any payment in connection with the swap must be viewed as a position. A long position exists if the bank pays a fixed price and receives a variable price (short position: vice versa). Commodity swaps relating to different commodities must be recorded separately in the relevant categories. 154

Commodity futures and forwards are treated as analogously to equity futures and forwards. 155

c) Maturity Band Method

In order to cover the „forward gap risk" as well as the interest rate risk for each maturity band (both risks may be subsumed as yield curve/spread risk) the offsetting long and short positions in each maturity band are subject to capital adequacy requirements. The positions held in individual commodities (expressed in standard measurement units) are assigned to a maturity ladder. Physical inventory must be placed in the first maturity band. A separate maturity ladder must be created for each commodity. In each maturity band, the sum of offsetting long and short positions is first multiplied by the spot price of the commodity and then by the relevant spread factor for that particular maturity band (cf. table below). 155.1*

Maturity bands with spread factors 155.2*

Maturity band	Spread factor
≤ 1 month	1.5%
> 1 month up to ≤ 3 months	1.5%
> 3 months up to ≤ 6 months	1.5%
> 6 months up to ≤ 12 months	1.5%
> 1 year up to ≤ 2 years	1.5%
> 2 years up to ≤ 3 years	1.5%
> 3 years	1.5%

The remaining net positions from shorter maturity bands can be carried forward and netted with longer-term maturity bands. As the hedging of positions between different maturity bands is imprecise by nature, a capital adequacy requirement of 0.6% is calculated for each maturity band over which the net position is carried forward. The capital adequacy requirement is calculated for each position which is closed due to net positions being carried forward as per margin no. 155.2. After this, the bank has either only long or short positions, for which a capital requirement of 15% is calculated. 155.3*

[18] Options on commodities are treated in accordance with the methods described in margin nos. 157–199.

d) Simplified Approach

The capital required for commodity risk corresponds to 15% of the net position for each commodity (Article 87(2) CAO). To account for the basis risk, interest rate risk and forward gap risk, additional capital of 3% of the gross positions (sum of the absolute values of the long and short positions) is required for each commodity. 156

E. Options

a) Differentiation

For financial instruments with an option element which does not play a substantial and dominant role, the option element need not necessarily be treated as an option for purposes of capital adequacy requirements. Convertible bonds may be treated as bonds or equities depending on the specific characteristic of the financial instrument. Bonds with early redemption rights for the issuer may be treated as pure bonds and be assigned to the corresponding maturity band on the basis of the most likely redemption date. The calculation of required capital for credit derivatives is dealt with in margin nos. 200-227. 157

b) Treatment of Financial Instruments with Option-like Characteristics

If the option-like characteristic plays a substantial and dominant role, the financial instruments in question must be treated as follows:

- analytical breakdown into options and underlying instruments or 158
- approximation of their risk profiles by means of synthetic portfolios consisting of options and underlying instruments. 159

The capital adequacy requirement for options identified in this way is determined according to margin nos. 161-199. 160

c) Approaches for Calculating Capital Required

Three approaches are permitted for calculating the capital required for options positions: the simplified approach for institutions that only use purchased options and the delta-plus approach and scenario analysis approach for all other banks. 161

aa) Simplified Approach

Under the simplified approach, options should not be included in the standardized approach for market risk for either specific risk or general market risk. Instead, they are subject to a separately calculated capital requirement. This is then added to the capital required for the individual categories, i.e. interest rate instruments, equities, foreign currencies, gold and commodities. 162

- Purchased call and put options: capital required corresponds to the smaller of
  - the market value of the option or 163

- the market value of the underlying instrument (contract volume, i.e. market value of the underlying instruments) multiplied by the sum of the rates for the general market risk and for the specific risk – if any – defined for the underlying instrument. 164

- Long spot position and purchased put option or short spot position and purchased call option:[19] The capital required corresponds to the market value of the underlying instrument (contract volume, i.e. market value of the underlying instruments) multiplied by the sum of the rates for the general market risk and for the specific risk - if any - in relation to the underlying instrument less the intrinsic value of the option. The total requirement cannot be a negative value, however. The corresponding underlying instruments should no longer be included in the standardized approach for market risk. 165

An example for determining the capital required according to the simplified approach is given in appendix 2. 166

bb) Delta-Plus Approach

Where options are treated according to the delta-plus approach, they should be mapped as positions corresponding to the market value of the underlying instrument (contract volume, i.e. market value of the underlying instruments) multiplied by the delta (sensitivity of the option price to changes in the price of the underlying instrument). Depending on the underlying instrument, they are included in the capital adequacy calculation for the specific risk and the general market risk pursuant to margin nos. 65-156. However, as the delta does not adequately reflect the risks of options, banks must also calculate the gamma risk (risk resulting from non-linear relationships between changes in the option price and changes in the price of the underlying instrument) and the vega risk (risk resulting from the sensitivity of the option prices to changes in the volatility of the underlying instrument). 167

a. Delta risk

The capital adequacy requirements for the delta risk of options on interest rate instruments, equities, currencies and commodities are based on the delta-weighted positions. 168

When calculating the general market risk, delta-weighted options on debt instruments or interest rates are assigned to the maturity bands for interest rate instruments as described in margin nos. 98-115 and are also considered in the calculation for specific risks - if any exists. Options on derivatives must be mapped twice just like the corresponding derivatives themselves. Thus, in April, a call option purchased on a three-month interest rate future due in June is regarded - based on its delta equivalent - as a long position with a maturity of five months and as a short position with a maturity of two months. The sold option is therefore classified as a long position with a maturity of two months and as a short position with a maturity of five months. 169

Options on equities, currencies, gold and commodities are also included as delta-weighted positions in the market risk metrics described in margin nos. 116-156. 170

[19] The condition for the formation of these combinations is not the existence of original spot positions. A forward position (or the spot position component resulting from it alongside the fictional government bond) may likewise be used as a basis to form combination pairs with option instruments. At the same time the fictional government bond component is also subject to capital requirements outside the simplified approach for options in accordance with the conventional procedure applicable to interest rate risk (cf. margin nos. 65-115).

b. Gamma risk

For each individual option, the gamma effect must be calculated according to the following definition: 171

$$\text{Gamma effect} = 0.5 * \Gamma * VB^2,$$

where Γ represents the gamma value and VB the price change in the (fictional) underlying instrument of the option. VB is calculated by multiplying the market value of this underlying instrument (contract volume, i.e. market value of the underlying instruments) by the following rates

- Option on bonds or corresponding forward contracts: risk weight pursuant to Table 1 in margin no. 101 (depending on the maturity of the (fictional) underlying instrument); 172
- Options on interest rates or corresponding forward contracts: calculation method analogous to options on bonds, based on the assumed change in yield as per Table 3 in margin no. 112;[20] 173
- Options on equities or equity indices or corresponding forward contracts: 8%; 174
- Options on currencies or gold or corresponding forward contracts: 8%; 175*
- Option on commodities or corresponding forward contracts: 15%. 176*

A net gamma effect for each category of underlying instruments must be calculated from the gamma effects. The individual categories are defined as follows: 177

- interest rate instruments in the same currency and in the same maturity band pursuant to Table 1 in margin no. 101 for institutions that use the maturity method or for institutions that use the duration method pursuant to Table 3 in margin no. 112, 178
- equities and equity indices of the same national market or the same single-currency area, 179
- foreign currencies: each identical currency pair, 180
- gold and 181
- commodities according to margin number 152. 182*

Only the negative net gamma effects are to be included in the calculation of the required capital. These should be added as absolute values to the total capital required. 183

The method presented here for calculating the capital required for gamma effects only takes account of general market risk. However, banks with significant positions in options on individual equity instruments or debt securities must also take account of specific risks when calculating the gamma effects. 184

[20] VB is thus obtained from the change in the present value of the underlying instrument implied by the appropriate assumed change in yield according to Table 3.

c. Vega risk

For each individual option, the vega effect must be calculated according to the following definition: Vega effect = 0.25 * υ * volatility, 185

where υ represents the vega value. Calculate a net vega effect for each category of underlying instruments in accordance with margin nos. 117-182 by adding all vega effects of long positions ("purchased options") and subtracting all vega effects of short positions ("sold options"). The total capital required for the vega risk results from the aggregation of the sum of absolute values of net vega effects computed for each category. 186

The vega effects must be calculated on the basis of implicit volatilities. Exceptionally, other procedures may be used to determine the volatility structure for illiquid option instruments. 187

An example for calculating the capital required according to the delta-plus approach is given in Appendix 3. 188

cc) Scenario Analysis

If the capital required for options and associated hedging positions[21] is determined using the scenario analysis: the potential change in value for all possible combinations of changes in the price of the underlying instruments (first dimension) and in volatility (second dimension) should be calculated using a separate, prescribed matrix for each category of underlying instruments in accordance with margin nos. 117-182. In the case of interest rate instruments, it is possible to waive a separate analysis for the instruments in each maturity band but rather combine the maturity bands into groups. However, only a maximum of three maturity bands may be grouped together and at least six different groups must be formed. 189

Cross-currency relationships may be taken into account in the scenario analysis approach. The corresponding procedure is presented in detail in Appendix 8. 190

The two dimensions of the matrices to be used are defined as follows:

- First dimension: change in the value of the underlying instrument:

Within the prescribed range, at least seven different changes in value (including a change of 0%) must be calculated. The intervals between the assumed changes in value must be equal in length. The ranges are defined as follows: 191

- Interest rate options: ± change in yield in accordance with Table 3 in margin no. 112; if several maturity bands are grouped together, the highest rate of all grouped maturity bands applies to this group; 192
- Options on equities or equity indices: ± 8%; 193
- Options on currencies or gold: ± 8%; 194*

[21] Appendix 7 defines more closely the concept of associated hedging positions and explains when it is permitted to integrate positions not classified as "associated hedging positions" into the scenario analysis.

- Options on commodities: ± 15%. 195*

Calculations based on these changes in value only take into account the general market risk, but not the specific risk. The requirements for specific risk must therefore be determined separately, based on the delta-weighted positions (cf. margin nos. 93-94.16 and 126-127). 196*

- Second dimension: changes in volatility:

Regarding the variation in the volatility, calculations must be made for at least three points: unchanged volatility and relative changes in volatility of ± 25%. 197

After calculating the matrix, each cell contains the net gain or loss on the options and the associated hedging instruments. The required capital calculated for each category of underlying instruments then corresponds to the highest losses included in the matrix. 198

The scenario analysis must be calculated on the basis of implicit volatilities. Exceptionally, other procedures may be used to determine the volatility structure for illiquid option instruments. 199

F. Credit Derivatives

a) Principles

Before credit derivatives can be used in the trading book, the bank must ensure that the associated risks have been fully recognized and understood and have been appropriately recorded in its systems used to measure, manage and monitor risks. 200

If a credit derivative and one of the deliverable claims meets the conditions of Article 5 CAO, the credit derivative may be assigned to the trading book. 201

For all credit derivatives in the trading book, the counterparty risk triggers capital adequacy requirements as per Articles 53-59 CAO as well as margin nos. 16-102 and 392-407 of the FINMA circular 08/19 "Credit Risk – Banks". 202

In order for hedging effects achieved through credit derivatives and netting opportunities pursuant to margin nos. 214-221 to be recognized, the requirements of margin nos. 204-216.1 and margin nos. 220-231 FINMA circular 08/19 "Credit Risk – Banks" must be met. 203

Every time a position in the basket of an n^{th}-to-default swap defaults, n will be lowered by one. This means, for example, that after the default of the first position in the basket of a fifth-to-default swap, it should be regarded as a fourth-to-default swap. 204

b) General Market Risk

With regard to capital adequacy for the general market risk of credit derivatives, the following principles apply: 205

A Total Return Swap (TRS) is to be treated by the protection seller as a combination of a long position in the reference claim and a short position in a government bond (and vice versa by the protection buyer). 206

A Credit-Linked Note (CLN) is to be mapped as a bond of the issuer of the CLN: for the protection seller as a long position and for the protection buyer as a short position in its own bond. 207

The market value of a Credit Default Swap (CDS) or a First-to-Default Swap (FDS) shows little if any response to changes in the general interest rate structure. For this reason, CDSs and FDSs are not subject to a capital adequacy requirement for general market risk. However, if periodic premium payments have been agreed, they must be taken into account when calculating the capital adequacy requirements for general market risk. The same applies to second-to-default swaps and n^{th}-to-default swaps. 208

c) Specific Risk

aa) Without Netting Possibilities[22]

Protection sellers must treat a TRS as a long position and protection buyers must treat it as a short position in the reference claim. 209

Protection sellers must treat a CLN as a long position both in the bond of the CLN issuer and in the reference claim. Protection buyers must treat it as a short position in the reference claim. 210*

Protection sellers should treat a CDS as a long position and protection buyers should treat it as a short position in the reference claim. 211*

The risks arising from an FDS must be presented as synthetic positions for all claims included in the basket - as long positions from the point of view of the protection seller and as short positions from the point of view of the protection buyer. 212*

For second-to-default swaps and n^{th}-to-default swaps, an analogous procedure to the one outlined in margin no. 212 applies. However, in the case of a second-to-default swap, the position with the lowest required capital for specific risk may be disregarded. Accordingly, in the case of an n^{th}-to-default swap, the n-minus-one positions with the lowest required capital for specific risk can be disregarded. 213

bb) Netting Opposite Positions in Credit Derivatives

Opposite positions in identical credit derivatives do not need to be taken into account when calculating the capital adequacy requirements for specific risk. 214

Opposite positions in non-identical credit derivatives may be netted with each other up to 80%, provided that opposite CDSs, or CLNs, or CDS components of CLN contracts and direct CDS positions have the same reference claims, are denominated in the same currency and have exactly the same residual term to maturity.[23] The remaining 20% of the reference claim is subject to capital requirements for specific risk. 215*

[22] Credit derivative positions without netting possibilities exist if there are no netting possibilities pursuant to margin no. 203 and margin nos. 219-221 and if there are no opposite positions pursuant to margin nos. 224 and 225.

[23] Differences in such credit derivatives could, for example, arise as a result of different definitions of the credit event or because of settlement terms.

cc) Netting Credit Derivatives with Spot Positions

A CDS and a spot position may be netted with each other up to 80% if the reference claim and the spot position are identical, the pay-out of the CDS and the spot position are denominated in the same currency and the CDS and the spot position have exactly the same residual terms to maturity. The remaining 20% of the reference claim is subject to capital requirements for specific risk. 216*

A TRS may be netted with a spot position in the reference claim according to margin nos. 73-80. 217

80% of the CDS component of a purchased CLN may be netted with a short position (or an issued CLN against a long spot position) in the reference claim if the spot position and the reference claim are identical and if the CLN and the spot position are denominated in the same currency and have exactly the same residual term to maturity. The remaining 20% of the reference claim is subject to capital requirements for specific risk. 218*

If a bank holds an FDS and the corresponding spot positions, the specific risk component with the lowest required capital can be netted to an extent of 80%. If, after multiplication by their specific risk weights, several positions in the basket are at the same time the smallest, the bank must choose one of these positions for netting. 219

Repealed 220*

Repealed 221*

After netting in accordance with margin nos. 219, the remaining 20% of the netted claim is subject to capital requirements for specific risk. 222*

If an institution holds an n^{th}-to-default credit derivative where n is greater than 1, netting with a corresponding spot position is not permitted for the specific risk component. 222.1*

dd) Determining Capital Required

If two credit derivatives can be netted pursuant to margin no. 215 or one credit derivative can be netted with a spot position as described in margin nos. 216 or 218-219, the remaining positions must each be added as absolute values to the absolute value of the net position of the issuer of the reference claim. 223*

In the case of opposite positions in credit derivatives which do not meet the above requirements because of maturity or currency mismatches or because of a mismatch between the reference claim and the claim to be hedged (while simultaneously complying with the restrictions of margin nos. 228-231 of FINMA circular 08/19 "Credit Risk – Banks"), a long and a short position must be calculated. The larger of these two positions must be added as absolute value to the absolute value of the net position of the issuer of the reference obligation. Notes from CLN contracts are to be treated analogously. 224

In the case of opposite positions in credit derivatives and spot positions which do not meet the above requirements because of maturity or currency mismatches or because of a mismatch between the reference claim and the claim to be hedged (while simultaneously complying with the restrictions of margin nos. 228-231 of FINMA circular 08/19 "Credit Risk – Banks"), this case must be treated analogously to margin no. 224. 225

In the absence of any netting possibilities pursuant to margin no. 203 and margin nos. 214-219 or of any opposite positions as per margin nos. 224 and 225, the relevant components of the corresponding credit derivatives should be added to the absolute value of the net position of the issuer of the reference obligation as absolute values. 226*

If the required capital for a credit derivative (securitizations are also considered to be credit derivatives) determined as described in margin nos. 223-226 exceeds the maximum possible loss[24], the corresponding synthetic positions may be reduced proportionately in such a way that the required capital from the instrument in question corresponds exactly to the maximum possible loss. 227*

For first-to-default, second-to-default and n^{th}-to-default credit derivatives with a rating, the capital required for specific risk must be calculated pursuant to margin nos. 94.1 to 94.5. For non-rated first-to-default, second-to-default and n^{th}-to-default credit derivatives, capital requirements are 100%. 227.1*

V. Model-based Approach to Calculating Capital Adequacy Requirements for Market Risk (Article 88 CAO)

On request, the FINMA may authorize a bank to calculate its capital adequacy requirements for market risk using bank-specific risk aggregation models (Article 88(1) CAO). 228

Risk aggregation models are defined as mathematical-statistical procedures for determining potential changes in portfolio values on the basis of changes in risk-determining factors. 229

The value which at a specific confidence level results in a maximum decline in value for the total position for a predefined period of time is defined as the value-at-risk (VaR). 230

The value which at a specific confidence level results in a maximum loss for interest rate products due to default or migration for a predefined period of time is defined as the Incremental Risk Charge (IRC). 230.1*

The value which at a specific confidence level results in a maximum loss in correlation trading for a predefined period of time is defined as the Comprehensive Risk Measure (CRM). 230.2*

A. Licensing Requirements and Issuing of License

If a bank wishes to use the model-based approach to calculate capital requirements for market risk, it must file an application with the FINMA and submit the required documentation. 231

When deciding on whether to allow a specific bank to use the model-based approach, the FINMA considers the results of its own audits and those of the bank's external auditors. In addition, the FINMA may take into account the audit findings of foreign regulatory bodies, of external auditors other than the bank's own external auditor, or of other specialized and independent experts. 232

[24] For a short position, this is the position's change in value if the underlying position all of a sudden were no longer to be at risk of defaulting and for a long position, this is the position's change in value if the underlying position all of a sudden were to default without recovery.

The FINMA may accept the use of the model-based approach for market risk if certain conditions have been met. 233

The costs of the model audit up to the point of the approval as well as any later audits must be borne by the institution in question. 234

The FINMA will only approve a bank's use of the model-based approach for market risk if the following requirements are complied with at all times:

- The bank has an adequate number of employees capable of working with complex models not only in the front office, but also in risk control, in internal audit and in the back office. 235
- The front office, the back office and risk control dispose of an adequate information technology infrastructure. 236
- The risk aggregation model is based on a solid concept that has been implemented correctly to properly reflect the bank's specific activities (composition of the trading book and role in the individual markets: market maker, dealer, end user). 237
- The risk aggregation model's measurement accuracy is sufficient. The FINMA may require the risk aggregation model to be initially monitored and tested under real conditions for a certain period of time before it is used to calculate the capital required for market risk. 238
- The risk aggregation model must address the risk factors considered to be minimum requirements (cf. margin nos. 265-283). 239*
- The risk aggregation model meets the prescribed quantitative minimum requirements (cf. margin nos. 291-296.2). 240*
- The prescribed qualitative minimum requirements are complied with (cf. margin no. 297). 241

Following approval for the use of the model-based approach for market risk, the FINMA must be notified if

- any material changes are made to the risk-aggregation model, or 242
- any changes are made to the risk policy. 243

The FINMA will decide whether further audits are necessary, and if so which. 244

B. Determining Capital Required

The capital required for interest rate risk and equity position risk in the trading book and for currency and commodity risks in the bank as a whole is calculated using the sum of capital required for the VaR, for the stressed VaR, for the IRC and for the CRM. 245*

Capital required for the specific risk of securitization positions and n^{th}-to-default credit derivatives in a bank's trading book must be calculated using the standardized approach as per margin nos. 94.1 to 94.16. 245.1*

A bank can request FINMA's approval for using a CRM model for correlation trading securitization positions and n^{th}-to-default credit derivatives. Should the FINMA approve the model, the bank no longer needs to calculate the capital requirements for the specific risk of these positions in the standardized approach. For a definition of correlation trading, see margin nos. 94.11 to 94.16, and for the guidelines on CRM modeling see Appendix 14. 245.2*

a) VaR-based Components and Multipliers

The VaR-based capital requirements on a given day correspond to the sum of the following two amounts (Article 88 CAO): 245.3*

The larger of the VaR for the portfolio held on the previous day and the average VaR values calculated daily over the last 60 immediately preceding trading days, multiplied by a bank-specific multiplier defined by the FINMA. 246*

The larger of the last available stressed VaR and the average of the stressed VaR values calculated at least weekly over the last 12 immediately preceding weeks, multiplied by a bank-specific multiplier defined by the FINMA. 247*

The bank-specific multiplier is at least three. The FINMA may set different multipliers for the VaR and the stressed VaR. The multiplier depends among other things on 248*

- the fulfillment of the qualitative minimum requirements (margin nos. 297-361) and 249
- the forecast accuracy of the risk aggregation model, which is tested using the so-called backtesting (margin nos. 320-335). 250

b) IRC- and CRM-based components and multipliers

The capital requirements for IRC and CRM on a given day correspond to the sum of the following two amounts: 250.1*

- The larger of the last available IRC and the average of the IRCs calculated at least weekly over the last 12 immediately preceding weeks, multiplied by 1. 250.2*
- The larger of the last available CRM and the average of the CRMs calculated at least weekly over the last 12 immediately preceding weeks, multiplied by 1. This value must be at least 8% of the capital required for the specific risk of the correlation portfolio as calculated with the standardized approach (margin no. 94.16). 250.3*

Repealed 251*

Repealed 252*

Repealed 253*

Repealed 254*

Repealed 255*

Repealed 256*

Repealed 257*

Repealed 258*

Repealed 259*

Repealed 260*

c) Combining the Market Risk Model-based Approach and the Standardized Approach

In principle, institutions wishing to use their internal models must have a risk aggregation model which at least covers for general market risks all categories of risk factors (currencies, interest rates, equity prices, commodity prices). 261

During the phase when a bank is switching to the market risk model-based approach, the FINMA may allow it to combine the market risk model-based approach and the market risk standardized approach on condition that the same approach is used within the same category of risk factor, i.e. either the market risk model-based approach or the market risk standardized approach. 262

If the positions in a given category of risk factors (such as commodity risk) are insignificant in both absolute and relative terms, the FINMA may also permit a bank not to integrate them into the market risk model-based approach but to treat them separately according to the standardized approach for market risk. 263

If the market risk model-based and the market risk standardized approach are combined, the total capital required corresponds to the sum of components calculated using the market risk standardized approach and the market risk model-based approach. 264

C. Risk Factors to be Recorded

In principle, the risk aggregation model must take account of all risk factors which affect the institution's relevant positions. An exception exists for the specific risk of equity and interest rate instruments, where the capital required may also be calculated using the standardized approach for market risk. 265*

Risk factors relevant for valuing a position must also be taken into account in the VaR modeling. Examples besides equity prices and interest rate spreads include correlation and basis risks as additional relevant risks. If an institution does not take account of risk factors relevant for the valuation of a position it must adequately justify this. If approximate values are used, the bank must show that they are adequate for the positions currently held in the portfolio. 265.1*

The following minimum requirements apply to the individual categories of risk factors:

- Interest rate risks: risks relating to the structure of interest rates must be recorded in each currency in which considerable interest rate-sensitive positions are held. The following applies: 266
  - A recognized approach must be used to model the term structure of interest rates. 267
  - The number (minimum of six) and distribution of maturity bands must be appropriate to the scale and structure of the business. 268
  - The risk aggregation model must record rating-spread risks using separate risk factors. Rating-spread risk relates to the imperfect correlation of changes in the value of cash flows with the same maturity and currency, but with borrowers of different (rating) categories. 269
- Foreign exchange risks: risk factors for exchange rates between the domestic currency and each foreign currency in which the bank holds a considerable position must be recorded. 270
- Equity position risks: the risk aggregation model must record at least one risk factor (e.g. an equity market index) for each national equity market or single currency area where considerable positions are held. Risk factors based on sector or industry indices are also conceivable. 271
- Commodity risks: risk factors must be modeled for each commodity group (cf. definition of commodity groups under the market risk standardized approach, Table 4 in margin no. 151). In addition, the risk aggregation model must take account of risks in the form of unexpected changes in the so-called convenience yield, i.e. different trends in spot and forward prices not induced by interest rates. 272
- Risks of option positions: for options, in addition to the delta risks, the VaR measure must also record at least the following risks:
  - Gamma risk: risks due to non-linear relationships between changes in option prices and changes in the price of the underlying instrument; 273
  - Vega risk: risks due to the sensitivity of the option prices to changes in the volatility of the underlying instrument. Institutions with large and complex option portfolios must take adequate account of the volatility risk in their option positions taking into account different maturities. 274
- Specific risks of equity and interest rate instruments: specific risks correspond to those components of total market risk which are attributable to events relating to the issuers of the individual instruments and which cannot be directly explained by general market factors[25]. 275
  - Specific risk in the form of residual risk: residual risk refers to the part of the volatility of the price changes of equity or interest rate instruments which cannot be empirically explained by general market factors in a single or multiple factor model. 276
  - Specific risks in the form of event and default risk: specific event risk is the risk of an abrupt change in the price of a given equity or interest rate instrument owing to events relating to the 277

[25] I.e. for equity instruments by a representative market index or by the first factor or a linear combination of factors in of a factor model, or for interest rate instruments by the benchmark yield curve and the rating spread curves.

issuer, and on a scale which cannot normally be explained by the analysis of historical price changes. Apart from default risk, all abrupt price changes relating to shock-type events, such as, for instance, a takeover bid, constitute event risks.

- Adequate modeling of specific risks presupposes that the model satisfies all quantitative and qualitative minimum requirements[26], and that it
  - explains the historical change in the value of the portfolio to a large extent, 278
  - can be shown to captures concentrations, i.e. that it is sensitive to changes in the composition of the portfolio, 279
  - also proves robust in stressed market situations, 280
  - captures issue-specific basis risks, i.e. it must respond sensitively to substantial issue-based differences of similar but not identical positions, 281
  - captures event risks. For equity instruments, events that cause major price fluctuations, such as takeovers, must be modeled, taking into account the problems of survivorship bias[27]. 282*

A bank must have an approach in place which takes account of default and migration risks of interest rate instruments. The guidelines for modeling default risk and migration risk of interest rate products (IRC) are described in Appendix 13.[28] 283*

The additional guidelines for modeling correlation trading positions (CRM) are described in Appendix 14.

If a bank does not model these additional risks, the capital required for the specific interest rate risk of interest rate instruments must be determined using the standardized approach (margin nos. 93 - 94.16).

Repealed 284*

Repealed 285*

Repealed 286*

Repealed 287*

Repealed 288*

Repealed 289*

Repealed 290*

[26] For the special backtesting requirements for modeling specific risk, see margin nos. 320-335.
[27] Tendency not to include companies which have defaulted in data surveys because they no longer exist.
[28] According to „Interpretative issues with respect to the revisions to the market risk framework, November 2011", issue 2.1.5, government bonds must also be modeled in the IRC.

D. Minimum Quantitative Requirements

No particular type of risk aggregation model is prescribed for determining the capital required for market risk. Banks may determine the VaR using variance/covariance models, historical simulations, Monte-Carlo simulations, etc. In any case, the risk aggregation model must meet the following minimum quantitative requirements: 291

- Frequency of calculations: the VaR must be calculated daily on the basis of the previous day's positions. 292
- Confidence level: the VaR must be calculated for a one-tailed confidence interval of 99%. 293
- Holding period: when calculating the VaR, a change in the risk factors should be assumed that corresponds to a change over a ten-day period. It is also permissible to use VaR arrived at on the basis of, for example, a one-day holding period and then multiplied by √10 to convert it to a ten-day holding period. If a bank uses such an approach, it must periodically show that this approach is adequate for its risks. However, over time banks with significant option positions must adopt a system of recording the non-linear relationship between changes in option prices and changes in the price of the corresponding underlying instrument by means of ten-day changes in the risk factors in the risk aggregation model. 294*
- Historical observation period and update of the data series: the observation period for forecasting future changes, or the volatility of risk factors (incl. the correlations between them) which forms the basis for the VaR calculation, must be at least one year. If a weighting scheme is applied to the daily observations considered in the calculation of volatility and correlation, the weighted average observation period must be at least six months (that is, the weighted average time lag of individual observations is at least six months). A different weighting scheme may also be selected, provided the resulting capital adequacy requirements are greater than if using the weighting described above. The data series must be updated at least monthly, but immediately if market conditions so require. 295*
- Correlations: the VaR can be calculated by taking into consideration the empirical correlations within the general risk factor categories (i.e. interest rates, exchange rates, equity prices and commodity prices, including related volatilities) as well as those between the different categories of risk factors, provided the institution's correlation measuring system is based on a sound design which has been implemented correctly. The correlations must be monitored continuously and with particular care. It is especially the impact of abrupt changes of the correlations between the categories of risk factors on the VaR which must also be regularly calculated and assessed in stress tests. If the VaR is calculated without taking account of empirical correlations between the general risk factor categories, the VaR for the individual categories of risk factors must be aggregated by means of addition. 296
- In addition to the VaR, the institution must also calculate a VaR under stress conditions (stressed VaR). This stressed VaR is a VaR calculation of the current portfolio using the current VaR model[29], but using the value changes of risk factors observed during times of stress. To calibrate the risk factors, a 12-month period must be selected which represents significant stress for the current portfolio. The period selected must be approved by the FINMA and must be regularly reviewed to ensure that it continues to be appropriate. For the calculation of the stress-based VaR, no different weighting of the daily observations is permitted. 296.1*

[29] The FINMA can approve deviations from the current model.

- The stressed VaR must be calculated at least weekly. 296.2*

E. Minimum Qualitative Requirements

Banks wishing to use the model-based approach must comply with the qualitative conditions described in margin nos. 298-361. 297*

a) Data Integrity

The bank must demonstrate that it has sound, documented, internally verified and approved procedures which guarantee that all transactions are recorded, assessed and prepared for risk measurement in a complete, correct and timely manner. Manual corrections of data must be documented so that the cause and the precise content of the correction can be retraced. Specifically, the following principles apply: 298

- All transactions must be reconciled with the counterparty on a daily basis. Transactions must be confirmed and reconciled by a unit which is independent from the trading department. Discrepancies must be investigated without delay. 299
- There must be procedures in place to ensure that the data used in the valuation models are adequate, consistent, continual, up-to-date and independent. 300
- All positions must be prepared in a way that they are fully captured for risk purposes. 301

b) Independent Risk Control Department

The bank must have a risk control department which is adequately staffed with qualified employees, independent of trading and which reports directly to the member of senior management responsible for risk control. 302

Risk control must fulfill the following functions, in particular:

- Design and implementation of risk monitoring systems (trading and control systems); 303
- Close control of day-to-day business (limits, P&L, etc.), taking into account the market risk measure; 304
- Daily VaR calculations, analyses, controls and reports:
  - Daily reports on the results of the risk aggregation model and an analysis of the results, including the relationship between VaR and trading limits, 305
  - Daily reports to the responsible member of senior management; 306
- Conduct a regular backtesting pursuant to margin nos. 320-335; 307
- Conduct a regular stress-testing pursuant to margin nos. 336-351; 308
- Review and approval of:

- risk-aggregation models, 309
- valuation models for the daily P&L calculation, 310
- models for generating input factors (e.g. yield curve models). 311

- Continuous verification and adaptation of the documentation of the risk monitoring system (trading and control systems). 312

c) Senior Management

For senior management, the following provisions apply for the model-based approach:

- The risk control department must inform the responsible member of senior management directly and daily in an appropriate form on the results of the risk aggregation model, who must then critically assess these; 313
- The responsible member of senior management who assesses the daily reports from the independent risk control department must have the powers to enforce both a reduction of individual traders' positions and a reduction of the bank's total risk exposure; 314
- The risk control department must periodically inform the responsible member of senior management of the results of the backtesting and stress testing who must then critically assess these. 315

d) Risk Aggregation Model, Daily Risk Management and Limit Systems

The following principles apply to the relationship between the risk aggregation model, daily risk control and limits:

- The risk aggregation model must be closely integrated into the daily risk control. In particular, results produced by the model must form an integral part of the planning, monitoring and steering of the institution's market risk profile; 316
- There must be a clear and constant relationship between the internal trading limits and the VaR (as used to determine the capital required for market risk). Both traders and senior management must be aware of this relationship; 317
- The limits must be reviewed regularly; 318
- The procedures to be initiated in the event of limit overruns must be clearly defined and documented along with any sanctions. 319

e) Backtesting

Institutions using the model-based approach for market risk must have regular, sound, constant, documented, internally verified backtesting procedures in place. As a rule, backtesting is used to obtain indications on the quality and precision of an institution's risk measurement system. 320

aa) Backtesting in General

The backtesting procedure retrospectively compares trading revenues over a defined period of time with the variation range of the trading revenue that the risk aggregation model had forecast for the same period. The aim of this procedure is to be able to state with a given probability of error whether the VaR ascertained by the risk aggregation model indeed covers 99% of the bank's trading results. To make the statements statistically reliable, the daily trading result and the daily VaR are compared over a long observation period. 321

Under the model-based approach, a standardized backtesting procedure for determining the bank-specific multiplier is required (cf. margin nos. 246-250). Its parameters are defined in margin nos. 324-335. However, independently of this, banks should also backtest at lower levels than merely at the global level of the risk aggregation model, for example for individual risk factors or product categories in order to examine risk measurement in more depth. This type of backtesting may use different parameters from those used for the standardized backtesting procedure. 322

Institutions that use a risk aggregation model to determine not only the requirements for general market risks, but also those for specific risks must also have backtesting procedures in place which provide information on the adequacy of the modeling of specific risk. Such institutions must backtest separately, in particular, for sub-portfolios (equity and interest rate portfolios) entailing specific risk, and – if so requested – report these results to the FINMA and their external auditors. 323

bb) Backtesting and Definition of the Bank-specific Multiplier

To define the bank-specific multiplier, backtesting must take into account the following requirements:

- The test must be based on the VaR, which had been calculated as per the model requirements in margin nos. 265-296. The only difference is that the assumed holding period is not ten days but just one day. 324
- The decision whether the backtesting is performed on the basis of
  - actual trading results, i.e. including the results of intraday trading as well as commission income, 325
  - trading results adjusted for these effects or 326
  - hypothetical trading results determined by reevaluating the financial instruments held by the bank the previous day using market prices 327
- is up to the individual bank, on condition that the procedure can be described as sound and that the income figures used do not systematically distort the test result. A consistent procedure must also be used over time, i.e. the bank is not at liberty to change its backtesting methods without consulting the FINMA beforehand. 328
- The sample to be used consists of 250 previously made observations. 329

The daily internal VaR reports and the trading result must be saved on the day they are calculated in a form which is irreversible and can be inspected by the FINMA and the external auditors at any time. 330

The bank compares the trading result daily with the VaR calculated for the previous day. Cases where a trading loss exceeds the corresponding VaR are considered to be exceptions. These exceptions (for the observations for the previous 250 trading days) must be reviewed and documented at least quarterly. The result of this quarterly review must be reported to the FINMA and the external auditors (cf. margin nos. 362-365). 331

The bank-specific increase in the multiplier resulting from the backtesting is based on the number of exceptions determined in 250 past trading days. However, the FINMA may choose to ignore some back-testing exceptions relevant for the increase in the multiplier if the bank can demonstrate that they are not due to a lack of accuracy (prediction quality) of the risk aggregation model. 332

Number of exceptions	Increase in the multiplier by
4 or fewer	0.00
5	0.40
6	0.50
7	0.65
8	0.75
9	0.85
10 or more	1.00

Table 5: Bank-specific multiplier

If the number of exceptions for the relevant observation period exceeds four before 250 observations have been made, this must be reported to the FINMA immediately. From this date onward, the bank must calculate the VaR with the correspondingly increased multiplier (see Table 5 in margin no. 332) until the FINMA has reached a final decision. 333

If the bank's multiplier is increased on the basis of the backtesting, the institution will be expected to determine, and if possible, remediate the reasons for the imprecise estimates produced by the risk aggregation model. An increase in the multiplier by one will require a swift and careful review of the model. Any shortcomings must be remediated immediately. Otherwise it is considered that the conditions for determining capital adequacy requirements using the model-based approach for market risk are no longer fulfilled. In case of serious problems related to the model's basic integrity, the FINMA may revoke the institution's permission to calculate capital adequacy requirements with the model-based approach. 334*

The FINMA will only reduce the multiplier once the bank demonstrates that the error has been corrected and that the revised model provides forecasts in an adequate quality. 335

f) Stress Testing

Institutions using the model-based approach for market risk must have regular, sound, constant, documented, internally verified stress-testing procedures in place. The main purpose of the stress testing is 336

to demonstrate that even under very unfavorable, but plausible, market conditions the bank would have adequate reserves in the form of economic capital. Stress tests should also provide information on possible actions on adjustments to the portfolio structure.

As a rule, banks may define their own reasonable stress scenarios. 337

However, depending on the portfolio composition, the following aspects should be considered:

- Illiquidity (lack of possibility to sell positions quickly); 338
- Concentrated positions (in proportion to market sales); 339
- Non-linear products, in particular positions which are well out of the money; 340
- Event risks which extend beyond the ten-day holding period and the 99% confidence interval, i.e. events not taken into account in the VaR which are unlikely to occur but would have a major impact; 341
- Jumps to default; 342
- Large changes in correlations; 343
- All other risks not adequately reflected in the VaR. 344

The following principles apply:

- Scenarios which would lead to extraordinary losses and/or render risk control difficult or impossible must be taken into account. 345
- Different types of stress scenarios should be used, in particular:
    - Extreme changes in market risk factors and the correlations between them (arbitrary or historical scenarios corresponding to previous periods with major market turbulences); 346
    - Bank-specific scenarios which need to be regarded as particularly serious in light of specific risk positions. 347
- In addition to extreme changes in market risk factors and their correlations, the analyses must also cover liquidity aspects in case of market disruptions. 348
- The risks of all positions must be included in the stress testing, in particular those of option positions. 349

In addition to the quantitative stress tests and their analyses, procedures must also be in place to ensure that results of the stress testing trigger the necessary counter-measures:

- The responsible member of senior management must periodically review the results of the stress testing. These results must be reflected in the policy and limits defined by senior management and the body responsible for overall management, supervision and control. 350

- If the stress testing brings to light certain weaknesses, steps must immediately be taken to adequately limit these risks (e.g. by hedging or reducing risk exposures). 351

g) Model Validation

The risk aggregation models (VaR, IRC and CRM) must be validated by staff segregated from the model development process. Risk aggregation models must not only be validated when they are developed and in the event of important changes, but also on a periodic basis, in the event of major structural changes in the market or significant changes in the composition of the portfolio. The model validation must include tests showing that all assumptions made in the model are appropriate and do not result in an underestimation of the risks. Hypothetical trading results (margin no. 327) must be used for backtesting when validating the VaR model. 352*

h) Documentation and Internal Control System

The institution's risk monitoring system (trading and control systems) must be adequately documented. This applies in particular to: 353

- the general principles; 354
- responsibilities and competencies (internal organization); 355
- organizational work-flows; and 356
- the quantitative fundamentals 357

used for the daily VaR calculations and analyses, backtesting and stress testing. In addition, the bank must have control systems in place to ensure compliance with the aforementioned principles and procedures. 358

i) Internal Audit

The internal audit department regularly verifies the risk monitoring system as a whole (trading and control systems) but at least once a year. The audits cover the activities of both the trading and risk control departments. In particular, the audits must include approval requirements for the model-based approach to calculate the capital adequacy requirements for market risk, as defined in this circular. 359

The internal and external auditors should harmonize and coordinate their risk management and risk control audits (Article 18(2) BA; Article 19 FINMA-AO). 360

The reports of the internal auditors must be presented to the FINMA on request. 361

F. Notifications to the FINMA and the External Auditor

The FINMA and the external auditors must be notified immediately if 362

- material changes are made to the risk aggregation models (cf. margin nos. 231-244),

- the bank's risk policy has changed (cf. margin nos. 231-244) or 363
- the period for the stressed VaR (cf. margin no. 296.1) has changed, or 363.1*
- the number of backtesting exceptions exceeds four for the relevant observation period before 250 observations have been made (cf. margin nos. 320-335). 364

The backtesting procedure must be documented at least quarterly. The results must be reported to the FINMA and the external auditors within 15 trading days of the end of each quarter. 365

VI. Capital Required at Consolidated Level

In principle, the capital required at consolidated level for the risk-weighted positions pursuant to Article 49 CAO are determined using the method of full or quota consolidation (Article 8 CAO). 366

By contrast, however, the consolidated requirements for the market risk pursuant to Article 82 CAO cannot always be calculated by means of consolidation. Instead, an additive procedure may have to be used. 367

A. Consolidated Requirements under the Standardized Approach

a) Consolidated Determination of Capital Required

If several or all legal entities of a group use the market risk standardized approach and the procedural conditions allow a daily aggregation of all significant positions booked in these legal entities, the capital required to cover market risks of these legal entities may be determined based on a consolidated calculation using the standardized approach. This means that a consolidated balance sheet or a "consolidated trading book" is prepared first. The capital required is then calculated for each risk factor category (equities, interest rate instruments, currencies, gold and commodities) on the basis of the consolidated balance sheet and the "consolidated trading book". It is permitted to limit the preparation of a consolidated balance sheet to individual categories of risk factors. 368

b) Determination of Capital Required by Addition

If several or all legal entities of a group use the standardized approach to calculate capital required for market risk and if the conditions for a consolidated calculation pursuant to margin no. 368 are not fulfilled, the capital required at consolidated level for market risk must be determined by adding the capital required of individual legal entities. The capital required should thus be determined separately for each legal entity and for each risk factor category (equities, interest rate instruments, currencies, gold and commodities). When determining the net positions and when calculating the capital required, positions booked in different legal entities may not be netted with each other. 369*

B. Consolidated Requirements under the Model-based Approach to Market Risk

a) Consolidated Determination of Capital Required

Calculating capital required using the model-based approach to market risk in terms of a consolidation requires that the risks are measured, aggregated and monitored for the entire group on a daily basis using a consistent and integrated system. The following requirements must be met: 370

- All approval requirements for using the model-based approach to calculate the capital adequacy requirements for market risk pursuant to margin nos. 228-365 are complied with at all times at consolidated level; 371

- There are no legal or technical difficulties that prevent the timely integration of individual risk positions into the consolidated risk control system; 372

- Nothing impedes the rapid repatriation of profits of a foreign subsidiary bank. 373

If all these conditions are met, this means that there is a group-wide integrated risk monitoring system in place. Capital required for market risk at consolidated level may then be determined according to the same rules as for the individual institution, even if the positions are booked in different legal entities. 374

b) Determination of Capital Required at Consolidated Level by Addition

The capital required for market risk at consolidated level must be determined on an additive basis if the various legal entities of a group use the model-based approach to calculate capital adequacy requirements for market risk, but the conditions for the consolidated model-based calculation pursuant to margin nos. 370-374 are not or only partially fulfilled. In this case, netting or aggregating positions considering correlations, where the positions are booked in various legal entities which are not part of the same integrated risk monitoring system, is not permitted. 375

The aggregation of capital required as calculated according to the model-based approach for market risk on the one hand and according to the market risk standardized approach on the other hand always has to be additive. 376

VII. Transitional provisions

Banks making use of the transitional rules for using the SA-CH as per Article 137 CAO must apply the implementing provisions of FINMA circ. 2008/20 "Market Risks – Banks" for market risk, as valid under previous law. However, under current law, positions which according to previous law were deducted from the capital (margin no. 94.4 and 94.5) now require 100% of capital. 377*

The margin nos. 2.4, 32, 46, 94.10, 227.1, 296.1 and 334 amended as at 18 September 2013 enter into force on 1 January 2014. They are to be implemented by 30 June 2014. 378*

Appendix 1

Example for Determining Capital Required Using the Maturity Method

The long and short positions assigned to the 15 maturity bands form the basis of the calculation; these are represented here using the zone demarcations for instruments with a coupon < 3%. 1

Initially, an open net position is to be calculated for each maturity band. This position should be weighted with the factor relevant to the maturity band so as to obtain an open, weighted net position for each maturity band. All of the open, weighted net positions across all maturity bands must be added. For example, in the 6-12-month maturity band, the open, unweighted net position amounts to -200 (= 200 - 400); after weighting this with the relevant factor of 0.70%, the open weighted net position obtained is -1.40. The absolute sum of all 15 weighted open net positions equals the first component of the capital required. In the example shown, it amounts to 6.80. 2

The next step involves **vertical netting** within each maturity band. For this purpose, the closed risk-weighted position of each maturity band is subject to a charge of 10%. For example, for the maturity band 1.0-1.9 years, the closed position (the smaller of the absolute amounts of the sums of the netted long and short positions) amounts to 100. After weighting with the relevant factor of 1.25%, the closed risk-weighted position amounts to 1.25. By multiplying this by 10%, we obtain the summand of the maturity band for 1.0-1.9 years to determine the capital required for the vertical netting. In the example shown, adding all 15 summands results in 3.92. This amount represents the second component of the total capital required. 3

Horizontal netting takes place at two levels: first, within each of the three zones and then between the zones. First, the **intra-zone horizontal netting:** aggregate and net the risk-weighted open positions of the individual maturity bands within their zone to obtain a net zone position. The closed positions resulting from the netting are subject to capital requirements for each zone. These amount to 40% for zone 1, and 30% each for zones 2 and 3. For example, the net zone position obtained for zone 2 is 3.25 (= 3.75 + 1.75 – 2.25). Net the three risk-weighted open positions of the three maturity bands of this zone to obtain a closed position of 2.25. Now weight this at 30%, to receive a capital requirement of 0.675 for the intra-zone horizontal netting of zone 2. In the example, the sum of all the capital required for the intra-zone horizontal netting amounts to 8.56. This constitutes the third component of the total capital required. 4

Finally, **net the horizontal zones with each other.** Because the net zone positions of zones 1 (-1.20) and 2 (+3.25) have opposite signs (i.e. one is negative and the other positive), they can also be netted. The closed position of 1.20 (the result of the netting) is subject to a rate of 40%, i.e. the capital required is 0.48. The remaining open position (+2.05) stays in its zone, in this case, in zone 2. Because of its sign (+), it cannot be netted with the net zone position of zone 3. The fourth component of the total capital required therefore is 0.48. 5

The remaining open positions of zones 2 (2.05) and 3 (4.75) which cannot be further netted correspond to the absolute sum of the open weighted net positions of all maturity bands (6.80). 6

Adding all four components results in a sum of 19.76 (= 6.80 + 3.92 + 8.56 + 0.48), which is the total capital required. 7

Appendix 1

Example for Determining Capital Required Using the Maturity Method

Table of maturity bands as an example for determining capital required:

Zone	Maturity band	Weighting	Positions					Required capital				
			Open			Closed		net pos:	Vertical netting	Horizontal netting		
			long	short (–)	net	unweighted	weighted	open, weighted	within maturity band	Within zone	Adjacent zone	Non-adjacent zone
1	< 1 month 1 – 3 months 3 – 6 months 6 – 12 months	0.00% 0.20% 0.40% 0.70%	200 300 100 200	-100 -200 -100 -400	100 100 0 -200	100 200 100 200	0.00 0.40 0.40 1.40	0.00 0.20 0.00 -1.40	0.0000 0.0400 0.0400 0.1400	0.08	0.48	
2	1.0 – 1.9 y 1.9 – 2.8 y 2.8 – 3.6 y	1.25% 1.75% 2.25%	400 200 100	-100 -100 -200	300 100 -100	100 100 100	1.25 1.75 2.25	3.75 1.75 -2.25	0.1250 0.1750 0.2250	0.675		
3	3.6 – 4.3 y 4.3 – 5.7 y 5.7 – 7.3 y 7.3 – 9.3 y 9.3 – 10.6 y 10.6 – 12 y 12 – 20 y > 20 y	2.75% 3.25% 3.75% 4.50% 5.25% 6.00% 8.00% 12.50%	300 200 300 0 200 300 100 0	-100 0 -100 -300 -100 -200 -100 -100	200 200 200 -300 100 100 0 -100	100 0 100 0 100 200 100 0	2.75 0.00 3.75 0.00 5.25 12.00 8.00 0.00	5.50 6.50 7.50 -13.50 5.25 6.00 0.00 -12.50	0.2750 0.0000 0.3750 0.0000 0.5250 1.2000 0.8000 0.0000	7.80		
								6.80	3.9200	8.56	0.48	0.00
											Capital required:	**19.76**

Appendix 2

Example for Determining the Capital Required for Options Using the Simplified Approach

This calculation assumes a portfolio consisting of the following three positions: 1

- A long position consisting of 10 call options on Swiss stock A, price of underlying: CHF 5,100, strike price: CHF 5,300, market value of one option: CHF 158.80 2
- A long spot position consisting of 15 contracts on equity market index XY, market value of one contract: CHF 2,160 3
- A long position of 20 put options on equity index XY, price of underlying: CHF 2,160, strike price: CHF 2,200, market value of the option: CHF 63.80 4

There is no opposite spot position for the first option position. Therefore, the capital required corresponds to the lesser of either the market value of the option or the market price of the underlying multiplied by the relevant capital rate (in this case, a total of 16%, consisting of the sum of 8% for the general market risk and 8% for the specific risk). In this example, the first of the amounts is **CHF 1,588.00** (= 10 · CHF 158.80) and the second corresponds to CHF 8,160.00 (= 10 · 0.16 · CHF 5,100). As the first amount is smaller, in this case it constitutes the relevant capital required for this position. 5*

For the equity market index XY, the 15 purchased put options are faced with the same number of (long) spot positions. In addition, there is another position consisting of 5 purchased put options on the index which is not complemented by a corresponding spot position. 6

For the 15 option and spot positions on index XY, the capital required corresponds to the market value of the underlying instrument multiplied by the relevant capital rate less the intrinsic value of the option position. In this specific case, the result obtained is **CHF 4,584.00** (= 15 · 0.16 · CHF 2,160.00 - 15 · [CHF 2,200.00 - CHF 2,160.00]). For the remaining residual position on 5 put options on the index, the capital required is the lesser of either the market value of the option, **CHF 319.00** (= 5 · CHF 63.80), or the market price of the underlying instrument multiplied by the relevant capital charge, CHF 1,728 (= 5 · 0.16 · CHF 2,160). In this case, the first of the amounts is smaller and so constitutes the relevant capital adequacy requirement. 7*

In total, the resulting capital required for the present portfolio is CHF 6,491.00 (= **CHF 1,588.00** + **CHF 4,584.00** + **CHF 319.00**). 8*

Appendix 3

Example for Determining the Capital Required for Options Using the Delta-Plus Approach

The calculation assumes an options portfolio comprising the following four positions:[30] 1

Position Quantity	I – 10 (short)	II 20 (long)	III 15 (long)	IV 100'000(long)
Underlying	Swiss share A	Swiss share B	Foreign stk mkt index[31]	USD/CHF
Price of underlying	13,490	1,940	3,790	1.4385
Type of option	Call	Call	Put	Call
Strike Price Residual maturity Volatility Value of position Delta	14,000 6 months 25.5% – 7,802 0.4649	1,900 4 months 20.5% 2,310 0.6038	3,900 3 months 22.0% 3,350 2 – 0.5724	1.4500 2 months 12.0% 2'388 0.4585
Gamma	0.000163	0.001678	0.000941	5.630375
Vega	3'790.73	431.62	743.51	0.2330
Delta equivalent	– 62,717	23,428	32,541	65,957
Equity (delta equiv.) Gamma effect	– 10,035 – 951	3,748 404	3,254 649	6'596 5'825
Vega effect	– 2,417	442	613	699

First, calculate the **delta equivalents** of the individual positions. These are obtained by multiplying the number of securities belonging to the position with the price of the relevant underlying instrument and the associated position delta. The delta equivalents should subsequently be included in the calculation of the net positions for general market risk and specific risk (in the case of equities). For example, the delta equivalent of position I amounts to CHF -62,717 (= -10 · CHF +13,490 · 0.4649). It is subject to a rate of 16% (8% for the general market risk plus 8% for the specific risk). Therefore, if the position were considered in isolation, this would result in a total capital required amounting to the absolute value of CHF -10,035 (= 0.16 · CHF - 62,717). Calculate the other three positions in exactly the same way. 2*

In a next stage, determine the **gamma effects** of the individual positions. For this, multiply the number of securities belonging to the position with 0.5, the gamma relevant to the position and the square of the prescribed amount for the assumed change in the value of the underlying instrument. For position II, for 3

[30] Assumptions for the calculation: European options, risk-free interest rates: 1% for CHF, 0% for USD, no dividends.
[31] all figures in CHF

example, the resulting capital required for the gamma effect is CHF 404 (= 20 · 0.5 · 0.001678 · [0.08 · CHF 1,940]2). Because positions I and II both consist of options on Swiss equities and hence belong to the same category of underlying instrument (according to margin nos. 177-182), their gamma effects may be netted with each other. For the Swiss equities category, this results in a net gamma effect of CHF -547 (= CHF 404 - CHF 951). As this net gamma effect is negative, it is relevant for calculating the capital required, unlike that of positions III and IV. Its absolute amount is one of the components of the capital required.

Finally, calculate the **vega effects** for each position and category of underlying instruments (as per margin nos. 177-182). Multiply the number of securities belonging to the position by a factor of 0.25, the associated option vega and the relevant volatility. For position III, for example, the result is CHF 613 (= 15 · 0.25 · 743.51 · 0.22). The net vega effect for the Swiss component of the equity portfolio amounts to CHF -1,975 (= CHF - 2,417 + CHF 442). Analogous to the gamma effect calculations, this absolute amount is also a component of the capital required. 4

For the gamma effect, the capital required therefore comes to a total of CHF 547 (absolute amount of CHF 404 - CHF 951) and, for the vega effect, to a total of CHF 3,287 (= CHF 1,975 + CHF 613 + CHF 699). 5

Appendix 4

Example of How to Apply the De Minimis Test

The following illustrates how to calculate the size of the trading book relevant for the de-minimis test using a simple sample portfolio.[32] The trading book in this example comprises six positions: 1

Position I: Bond A 2

Nominal value:	CHF 5,000,000
Coupon:	5%
Residual maturity:	3 years
Value of position:	CHF 5,087,500

Position II: Index certificates on the SMI equity market index 3

Quantity	1,000
SMI price:	CHF 6,700
Value of position:	CHF 6,700,000

Position III: Call options on the SMI equity market index 4

Quantity	-5,000 (short position, 1:1 exercise ratio)
Type of option:	European
Price of underlying:	CHF 6,700
Strike price:	CHF 7,000
Residual maturity:	6 months
Volatility:	30% p.a.
Risk-free interest rate:	1% p.a.
Delta:	0.46877
Value of position:	CHF -2,258,433
Delta equivalent:	CHF -15,703,880

Position IV: Currency call options for the purchase of USD against CHF 5

Quantity	1m (1:1 exercise ratio)
Type of option:	European
Exchange rate:	1.3670
Strike price:	1.3000
Residual maturity:	2 months
Volatility:	15% p.a.
Risk-free CHF interest rate:	1%
Risk-free USD interest rate:	5%
Delta:	0.76540
Value of position:	CHF 69,412
Delta equivalent:	CHF 1,046,297

[32] Note on the method of calculation: in the example the calculation of the remaining term is based on effective calendar dates.

Position V: Crude oil futures 6

Quantity	1,000 contracts to buy 1,000 barrels crude oil each
Term:	in 3 months
Agreed forward price:	USD 14.70/barrel
Current exchange rate:	1.3670 (CHF/USD)
Current 3-mth forward price:	12.50 USD/barrel
3-month USD interest rate:	5.00% p.a.
Value of position:	CHF -2,970,939
Value of long component:	CHF 16,880,341
Value of short component:	CHF -19,851,280

Position VI: Crude oil futures 7

Quantity	300 contracts to sell 1,000 barrels crude oil each
Term:	in 3 months and 5 days
Agreed forward price:	USD 11.30/barrel
Current exchange rate:	1.3670 (CHF/USD)
Current (3m + 5d) forward price:	USD 12.55/barrel
(3m+5d)-USD interest rate:	5.02% p.a.
Value of position:	CHF -506,042
Value of long component:	CHF 4,574,617
Value of short component:	CHF -5,080,659

To calculate the decisive value of the trading book, determine the individual values for each position in accordance with margin nos. 53-60. Offsetting positions pursuant to margin nos. 73-80 may initially be disregarded. For the example presented, the positions V and VI can therefore be partially netted with each other: 8

Position	**1st component**		**2nd component**	9
V	1,000,000	barrels of crude oil	USD -14,700,000	
VI	-300,000	barrels of crude oil	USD 3,390,000	
V/VI: after netting	700,000	barrels of crude oil	USD -11,310,000	

For the first component, the netting results in CHF 11,816,238 (= 700,000 · USD 12.50 / $1.05^{0.25}$ · 1.3670 CHF/USD); for the second component the resulting figure is CHF -15,273,332 (= USD -11,310,000 / $1.05^{0.25}$ · 1.3670 CHF/USD). As the absolute value of the second component is greater than that of the first, it is taken as the pertinent amount for positions V and VI when calculating the relevant size of the trading book. 10

Position I:	CHF 5,087,500	11
Position II:	CHF 6,700,000	
Position III:	CHF 15,703,880	short
Position IV:	CHF 1,046,297	
Positionen V/VI:	CHF 15,273,332	

Moreover, in the present example, positions II and III are offsetting positions as per margin no. 123, which means that they too can be netted with each other.

Hence, the relevant size of the trading book for the de minimis test is the sum of the following position values: 12

Position I:	CHF	5,087,500
Positionen II/III:	CHF	9,003,880
Position IV:	CHF	1,046,297
Positionen V/VI:	CHF	15,273,332
Summe:	CHF	30,411,009

13

As the value calculated in this way exceeds CHF 30 million, the example does not qualify for de-minimis treatment – regardless of whether or not it exceeds 6% of the balance sheet and off-balance sheet positions. 14

Appendix 5

Netting Option for Cross-currency Relationships

The term "offsetting positions in derivatives" (margin nos. 74-80) refers basically only to derivatives relating to the same underlying instruments that are denominated in the same currency. However, cross-currency relationships can also be broken down into their component parts and included in the netting procedure, provided the restrictions referred to in margin no. 75 or margin nos. 77-80, respectively, are complied with. 1

This is explained by the following example: three foreign exchange forward transactions with different completion dates but identical maturity dates are assumed: 2

1. Purchase of USD 20 million for EUR 17 million
2. Sale of USD 20 million for CHF 28 million
3. Purchase of EUR 17 million for CHF 27 million

Because of the existing cross-relationship, the first position can be broken down into the following transactions: 3

1a. Purchase of USD 20 million for CHF (at the corresponding exchange rate)
1b. Purchase of CHF for EUR 17 million (at the corresponding exchange rate)

According to margin nos. 77-80, positions 1a and 1b may be netted with positions 2 and 3, provided that the breakdown of the cross-relationship is documented in detail. 4

Breaking down such cross-relationships is only permitted for foreign exchange forward transactions. 5

Appendix 6

Categorization of Equity Instruments

The national market or currency area of an internationally listed issuer of equity instruments is deemed to be the issuer's domestic market. Thus, for example, for purposes of calculating general market risk, an equity instrument of a Japanese issuer is to be assigned to the Japanese equity market, even if the equity was acquired in Switzerland for CHF. 1

Likewise, for American Depository Receipts (ADRs) the domestic market of the issuer of the equity is deemed to be the relevant allocation criterion. This means that ADRs may not be netted with equity instruments assigned to the US equity market. 2

Equity positions contained in various national indices should be assigned to the relevant national market or currency area, depending on how they are managed. For example, equity positions in ABB equities, which are included in both the Swiss Market Index (SMI) and the Swedish OMX-Stockholm-30 index, may be assigned to both the Swiss and the Swedish equity market, depending on how they are managed. This means that in such special cases it could be possible for an equity position to be assigned proportionately to different national markets or currency areas. However, it is explicitly not permitted to change the assignment solely for opportunistic purposes rather than management. 3

If equity positions are affected by foreign exchange risk in addition to equity position risk, the former must be recorded in accordance with the corresponding provisions (cf. margin no. 119). An equity is deemed to carry a foreign exchange risk if the currency in the issuer's domestic market is a foreign currency. 4

Appendix 7

"Associated Hedging Positions" as per Margin Number 189

In principle, the scenario analysis approach is designed to determine the capital required for options positions and any associated hedging positions. A position is deemed to be an "associated hedging position" as per margin no. 189 if it belongs to the same category as the positions it is meant to hedge pursuant to margin nos. 177-182 and if its delta equivalent does not exceed that of those positions. 1

For example, this means that, using the classifications listed in margin nos. 177-182, it is in principle permitted to regard a long spot position in Swiss equity X as a hedging position (i.e. an "associated hedging position") on a short position of a call option on Swiss equity Y in the context of scenario analysis. 2

Depending on the risk factor category, different rules are used to integrate instruments not deemed to be hedging positions into the scenario analysis matrices. 3

Equity Instruments, Currencies, Gold and Commodities

Provided this does not result in a lower capital requirement than if they had been treated separately and according to the conventional procedure, linear positions in equity instruments, currencies, gold and commodities not deemed to be hedging positions can also be integrated into the relevant scenario analysis matrices. 4

Interest rate instruments

In terms of the netting possibilities, the scenario analysis approach for options on interest rate instruments differs significantly from the procedures used for interest rate instruments without option features (maturity method and duration method). Contrary to the procedures used for options on interest rate instruments, margin no. 189 provides for the possibility of grouping together up to three maturity bands, provided at least six such maturity band groups can be formed. Due to the resulting extended netting possibilities and depending on the composition of the portfolio, the required capital for interest rate instruments without option features could turn out lower by using the scenario analysis approach than if the conventional procedures were applied correctly. 5

It is therefore not permitted to integrate into the scenario analysis matrices interest rate instruments which do not qualify as hedging positions as per margin no. 189. 6

Appendix 8

Cross-currency Relationships in the Scenario Analysis Approach

For certain currency portfolios, it may be impossible that the relevant individual exchange rates develop independently of each other due to cross-currency interdependencies. In such cases, the change scenarios do not necessarily need to be simulated for all exchange rates contained in the portfolio. If, for example, a portfolio contains currency options on the CHF/USD, USD/EUR and CHF/EUR exchange rates, it may suffice to simulate the exchange rate developments of two currencies if the simulation adequately takes into account the third currency involved due to the cross-currency relationships. 1

For example: a bank holds options on three exchange rates: CHF/USD, USD/EUR and CHF/EUR. For each of these, it sets up a 3x7 matrix (3 changes in volatility: +25%, 0%, -25%; and 7 exchange rate changes: +10%, +6.67%, +3.33%, 0%, –3.33%, –6.67%, –10%): 2

In matrix A (CHF/USD), for example, the maximum position loss arises in the field that assumes a change in volatility of -25% and a 3.33% depreciation in the value of the USD against the CHF. 3

Further, it is assumed that in matrix B (USD/EUR), the largest position loss arises in the field that assumes a change in volatility of +25% and a 3.33% depreciation in the value of the EUR against the USD.

Finally, in matrix C (CHF/EUR) the largest position loss arises in the field that assumes a change in volatility of -25% and a 10.00% appreciation in the value of the EUR against the CHF.

The changes in the three exchange rates thus implied cannot occur simultaneously. A 3.33% deprecation in the value of the USD against the CHF and a 3.33% depreciation in the value of the EUR against the USD imply a depreciation in the value of the EUR against the CHF of the order of 6.67%[33] which rules out an appreciation in the value of the EUR against the CHF - as assumed in matrix C. 4

However, exclusively simulating the CHF/EUR exchange rate with the 6.67% depreciation in the value of the EUR against the CHF implied by the cross-currency relationship only makes sense if the positions of this currency pair captured in this matrix are quantitatively smaller in relation to their risk exposure than those of matrices A and B. For this reason, the volumes of the individual positions should be taken into account on the basis of their absolute delta equivalents. 5

If D_A, D_B and D_C denote the absolute delta equivalents denominated in CHF of each matrix, the relevant position in matrix C, due to the cross-currency relationships, may be calculated up to a maximum of the smaller percentage arising from the relation D_A / D_C or D_B / D_C according to the simulation field in that column in matrix C which assumes a EUR/CHF depreciation of 6.67% and results in the largest position loss within this column, thus implying the least favorable change in volatility. Any remainder of the position should be calculated according to convention under consideration of the field with the largest position loss in matrix C. In the example, this would be in the field which assumes a change in volatility of –25% and a 10.00% appreciation in the value of the EUR against the CHF. 6

[33] The implied depreciation in value is 6.56%. In relation to the exchange rate changes relevant for the matrix, this is closest to the assumed 6.67% depreciation in the value of the EUR against the CHF.

It should be borne in mind that the exchange rate notation is not irrelevant to the calculation of the scenario analysis matrices. For example, if EUR 1 is equivalent to USD 1.10, the exchange rate can either be expressed as USD/EUR (1.1000) or as EUR/USD (0.9091).[34] Because of this, the change simulations do not result in the same values. If the notation is USD/EUR, the simulated exchange rate fluctuations of ±10% results in 0.9900 (i.e. a change of -10%) or in 1.2100 (i.e. a change of +10%). If, on the other hand, the notation EUR/USD is used in the matrix, the same simulation produces exchange rates of 0.8182 (change of -10%) and of 1.0000 (change of +10%), which would correspond to 1.0000 and 1.2222 respectively in the notation USD/EUR. These values differ from those calculated for the notation USD/EUR (0.9900 and 1.2100, respectively). 7

For the scenario analysis, a given notation must be used for each currency pair. It may not be changed due to opportunistic considerations. 8

[34] The format used here are the "mathematical" notations. Both in practice and in other sections of this Circular, notations may differ from these. Thus the exchange rate between USD and CHF is normally recorded mathematically as CHF/USD, but is conventionally referred to as the USD/CHF exchange rate.

Appendix 9

Example on how to calculate the capital adequacy for foreign exchange forward contracts

Assumption: the trading book contains 2 currency positions: 1

Market data: USD/CHF exchange rate 1.45, USD interest rate 5%, CHF interest rate 2%

Spot: USD 1 million short position

Forward: purchase of USD 1 million one year forward, USD/CHF forward rate 1.41

To calculate the net position for determining the foreign exchange risk, the USD forward long position must be discounted by the USD interest rate, netted with the corresponding USD short spot position and subsequently converted to CHF at the spot exchange rate. In the above example the resulting figure is CHF -69,048 (= USD -47,619 · CHF/USD 1.45). 2

In addition, in order to cover the interest rate risk arising from the forward transaction, a long position in a USD government bond of USD 1 million must be entered in the corresponding maturity band of the USD maturity ladder at its discounted value of USD 952,381 and a short position in a CHF government bond of CHF 1.41 million must be entered in the corresponding maturity band of the CHF maturity ladder at its discounted value of CHF 1,382,353. 3

Appendix 10

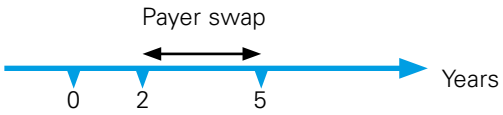
Calculation of Gamma and Vega Effects Arising from Swaptions

In principle, it must be distinguished whether the maturity or duration method is used. In the following, the topic is explained using a long position in a swaption on a payer swap: 1

In order to determine the gamma and the vega effects of a swaption, the swap underlying the option must be replicated if the duration method and the delta plus method are used simultaneously. This replication results in two fictional underlying instruments with differing maturities. The longer of the two maturities determines the assumed change in yield[35] used to calculate the gamma and vega effects. 2

The following example illustrates this:

A long position in a payer swaption is due in 2 years' time and has a swap term of 3 years from the maturity of the option. The swap rate is 6%. 3



The option's underlying instrument is mapped as a long payer swap (or as a short receiver swap) pursuant to margin nos. 85-87 by two positions in fictional government bonds: 4

A. Long position in a 6% government bond with a residual maturity of 2 years

B. Short position in a 6% government bond with a residual maturity of 5 years

To calculate the capital required for the swaption, positions A and B should each be delta-weighted and allocated to their maturity bands pursuant to Table 1 in margin no. 101 (first maturity band of zone 2 and first maturity band of zone 3, respectively). 5

In addition, a gamma effect must be calculated for the swap position using the assumed change in yield for the 5-year maturity band (second maturity band of zone 3) as per Table 3 in margin no. 112 which must be allocated to this gamma effect maturity band[36].[37] 6

[35] According to Table 3 in margin no. 112.

[36] The positions of the gamma effect maturity bands are not allowed to be netted with delta positions.

[37] As an alternative, it is also permitted to perform the assignment to a maturity band analogously to the provisions for capital required for the delta equivalent. In our example, this would mean that the first (and not the second) maturity band of zone 3 would be relevant. The assumed change in yield, Δr would then result in 0.75% (instead of 0.70%). If a bank decides for this alternative procedure, it must consistently apply this procedure to all positions. It is forbidden to change this procedure for opportunistic reasons.

Gamma effect = 7

$$0.5 \cdot \Gamma \cdot VB^2 = 0.5 \cdot \Gamma \cdot \left(N \cdot \Delta r \cdot \sum d\right)^2$$

The following applies:

N =	notional value of swap
Δr =	assumed change in yield, according to Tab. 3 in margin no. 112
$\sum d$ = =	sum of discount factors resulting from the swap's streams of payment

According to margin no. 183, only the negative net gamma effects are included in the calculation of the capital adequacy requirements for each category of underlying instruments listed in margin nos. 177-182. If the positive gamma effect shown in the example is the only one in its maturity band, it would thus be irrelevant for the calculation of the capital required. 8

The vega effect, defined as 0.25 υ volatility [cf. margin nos. 185-186], is assigned to the same maturity band as the gamma effect. It is not permitted to net the two effects with each other. 9

If the duration method is used instead of the maturity method, this will not result in any significant differences in the example presented above. The only point to observe is that positions A and B, as well as the gamma and vega effect, must not be assigned on the basis of their residual terms to maturity, but on the basis of their (Macaulay) duration pursuant to Table 3 in margin no. 112. 10

Appendix 11

Options with Strike Price Denominated in a Foreign Currency

According to Article 51 CAO in conjunction with margin nos. 132-136, the net position of a bank in a certain currency is obtained from various components. These include the delta equivalents of option positions. 1

In addition to any capital required for the foreign exchange exposure implied by the option's underlying instrument, capital required - in application of margin nos. 131-136 - must also be calculated for the foreign exchange exposure resulting from the strike price of the option. Thereby, the corresponding foreign exchange exposure must be regarded as the product of the option delta and the strike price; the capital required amounts to 10% of this. 2

The following example assumes a long position in a call option on the SMI with an EUR-denominated strike price: 3

Quantity	10 (1:1 exercise ratio)
Type of option:	European
Price of underlying:	CHF 7,200
Strike price:	EUR 4,400
Exchange rate EUR/CHF:	1.60
Residual maturity:	12 months
SMI volatility:	25% p.a.
Risk-free CHF interest rate:	1% p.a.
Delta:	0.60052
Gamma:	0.00021
Vega:	2,780.72
Option price:	CHF 825.54

According to the delta-plus approach [cf. margin nos. 167-188] the capital required for the risks arising from the option's underlying instrument is obtained from the sum of three components: 4*

1. Delta effect:	CHF 6,918 = 10 · 0.16 · 0.60052 · CHF 7,200
2. Gamma effect:	CHF 0 = min [0 CHF, 10 · 0.5 · 0.00021 · 1/CHF · (0.08·CHF 7,200)^2]
3. Vega effect:	CHF 1,738 = 10 · 0.25 · CHF 2,780.72 · 0.25

Specifically, the capital required is CHF 8,656. If the scenario analysis approach [cf. margin nos. 189-199] were used instead of the delta-plus approach, the matrix (matrix field determined by an 8% reduction in the price of the underlying instrument and a 25% reduction in volatility) would result in a capital requirement of CHF 4,724 [= 10 · (CHF 825.54 - CHF 353.12)]. In addition to this, a separate requirement for the specific risk amounting to CHF 3,459 (= 10 · 0.08 · 0.60052 · CHF 7,200) would have to be calculated outside the scenario analysis matrix, resulting in a total capital adequacy requirement of CHF 8,183 (= CHF 4,724 + CHF 3,459) for the position according to the scenario analysis approach. 5*

Moreover, the foreign exchange exposure implied by the EUR-denominated exercise price results in an additional capital requirement amounting to 8% of its delta-weighted strike price for each option; for the option position as a whole this corresponds to the sum of CHF 3,382: 6*

Delta effect: CHF -3,382 = EUR -2,113.83 = 10 · 0.08 · 0.60052 · EUR -4,400

If the underlying instrument and the strike price of an option are denominated in one and the same currency - e.g. in the case of a call option on a foreign stock - then for the purposes of adequately recording the foreign exchange risk in economic terms, the delta equivalent does not necessarily need to be factored in as a component for calculating the net position in the corresponding foreign currency. For the purposes of an adequate economic capture, it is permissible to factor in the option price instead of the delta equivalent.[38] 7

The following example assumes a long position in a call option on a foreign equity index. The position has the following characteristics: 8

Quantity	1,000 (1:1 exercise ratio)
Type of option:	European
Price of underlying:	JPY 15,500
Strike price:	JPY 13,000
Exchange rate JPY/CHF:	1.20
Residual maturity:	12 months
Volatility:	25% p.a.
Risk-free interest rate:	1% p.a.
Delta:	0.80740249
Gamma:	$7.062 \cdot 10^{-5}$
Vega:	4,241.3155
Option price:	JPY 3095.1144

If the capital required for the position is determined according to the delta-plus approach [cf. margin nos. 167-188], the risks resulting directly from the option are determined by the sum of three components: 9*

1. Delta effect:	JPY 2,002,352 = 1,000 · 0.16 · 0.80740 · JPY 15,500
2. Gamma effect:	0 = min JPY [0, 1,000 · 0.5 · 0.00007 · 1/JPY · . (0.08 · JPY 15,500)^2]
3. Vega effect:	JPY 265,082 = 1,000 · 0.25 · JPY 4,241.32 · 0.25

The specific result is a capital requirement of CHF 27,209 (= JPY 2,267,434 = JPY 2,002,352 + JPY 0 + JPY 265,082). If the scenario analysis approach (see margin nos. 189-199) were used instead of the delta plus approach, the matrix (matrix field determined by an 8% reduction in the price of the underlying instrument and a 25% reduction in volatility) would result in a capital requirement of CHF 14,886 [JPY 1,240,474 = 1,000 · (JPY 3,095.1144 - JPY 1,854.6406)]. In addition to this, there would be a separate requirement for the specific risk amounting to CHF 12,014 (= JPY 1,001,176 = 1,000 · 0.08 · 0.80740 · JPY 15,500) to be calculated outside the scenario analysis matrix, which would result in a total capital requirement of CHF 26,900 (= CHF 14,886 + CHF 12,014) for the position using the scenario analysis approach. 10*

[38] However, an institution must commit itself to one procedure for all options. It is explicitly forbidden to change this procedure for opportunistic reasons.

In addition to these risks directly related to the option, the foreign currency exposure is also subject to capital requirements. A calculation as described in margin nos. 132 - 136 and Article 51 CAO, and based on the delta equivalent would result in required capital of CHF 1,938 (= JPY 161,480 = JPY 1,001,176 - JPY 839,696 = 1,000 · 0.08 · 0.80740 · JPY 15,500 - 1,000 · 0,08 · 0.80740 · JPY 13,000). 11*

However, as the actual foreign currency exposure does not consist of the delta equivalent but of the position value, it is also permitted to calculate the capital required for the foreign exchange risk using the option price instead of the delta equivalent. 12

In this specific case, the capital required would amount to CHF 2,971 (= JPY 247,609 = 1,000 · 0.08 · JPY 3,095.1144) as implied by the JPY long position. 13*

Appendix 12

FAQ on Miscellaneous

Since the market risk regulation has entered into force, the FINMA has been queried on a number of issues presented below: 1

Netting the Interest Rate Risk Positions

Margin no. 93 / margin nos. 98-115: it is not permitted to net different issues by the same issuer when calculating the capital required for the general market risk and specific risk. Only positions originating from identical issues may be netted with each other and be incorporated as net positions in the maturity or duration method. 2*

Note on Tables 1 and 3:

Owing to an error in the typesetting of Tables 1 (cf. margin no. 101) and 3 (cf. margin no. 112) in the version of SFBC Circular 97/1 "REM-EBK" published in SFBC Bulletin no. 34 reflecting the status as of 31 December 1997, the delimitation between various maturity bands is incorrect. Therefore, please use the relevant tables in the various circulars. 3

Categorization into Coupons ≥ 3% and <3% for the Maturity Method

Do not prepare two separate maturity band tables (maturity ladders) for positions with coupons ≥ 3% and <3% but only one for each currency (cf. margin no. 99). However, the allocation of the values to the individual maturity bands in this table is based on various maturity-related criteria, depending on the coupon (cf. margin no. 100). 4

Terminological Definition of the Concept of "Market Value"

In this circular (cf. in particular margin nos. 100 and 111), the term "market value" always refers to the economic value of a position and hence also includes accrued interest. For interest rate instruments, "market value" is therefore not usually identical with the value quoted on the market or the listed value. 5

Treatment of Equity Futures

The interest rate risk of equity futures is to be taken into account in accordance with margin no. 124. In order to take account of any foreign exchange risk, the net forward position is subject to capital adequacy requirements on the basis of margin nos. 132-136 as the present value of the net positions discounted with the current foreign currency interest rates and converted into CHF at the spot exchange rate. 6

Interest Rate Risk in Relation to Options on Equity Futures

In the case of options on equity futures or equity index futures, the interest rate risk of the underlying instrument may be disregarded when calculating the capital required. 7

Such options on equity futures transactions do not give rise to any interest rate risk which differs substantially from that of an option position on an equity instrument spot position.

Interest Rate Risk of Banking Book Positions

With regard to the recording of interest rate risk, the present circular restricts itself to trading book positions (cf. margin no. 1). Of course, this restriction also applies to interest rate risk arising from gold, foreign currency or commodity positions in the banking book. 8

Consequently, the synthetic government bonds that need to be taken into account for forward transactions in the trading book do not constitute market risk positions for forward transactions in the banking book as per Article 68(1). The present circular therefore does not prescribe any capital required for these. 9

For interest rate risk in the banking book, please refer to the provisions of FINMA circular 08/6 "Interest Rate Risk – Banks". 10

Concept of "Interest rate instruments" pursuant to Article 60(1) CAO

In principle, the term "interest rate instruments" as stated in Article 60(1) CAO covers instruments for which interest rate risk is a prominent risk factor and which entail risks specific to the issuer. For example, while interest rate swaps and fixed-rate mortgages are generally referred to as interest rate instruments, they are not implied in Article 60(1) CAO for the purposes of capital adequacy requirements. Like caps, floors or interest rate futures, an interest rate swap also does not harbor any issuer-specific risk since there is no issuer which is why they can be weighted at 0%. 11

A fixed-rate mortgage does not involve any issuer-specific risk either, however, for the purpose of capital adequacy, it must be included in credit risk (Article 72 and Appendix 3 CAO). 12

Appendix 13

Guidelines for Calculating the Capital Required for Incremental Risks in the Trading Book: Incremental Risk Charge (IRC)

The numbering of the individual paragraphs is the same as in the paper "Guidelines for computing capital for incremental risk in the trading book," July 2009, of the Basel Committee on Banking Supervision.

References in square brackets refer to the Basel minimum standards.

VIII. Principles for Calculating the Additional Capital Required

II. Positions and risks covered in the IRC model

According to margin no. 283, IRC modeling is mandatory for all positions subject to capital requirements for specific interest rate risk calculated using the model-based approach. This excludes the positions listed in margin no. 245.1. 8

The FINMA may authorize the inclusion of all listed equities and equity derivatives of a trading unit in the IRC model if this approach is consistent with the bank's internal risk management of such positions. If equities are included when calculating the IRC, a default will be deemed to have occurred if the related interest rate positions are in default (as defined in [§452] and [§453]). 9

Securitization positions are not allowed be included in the IRC calculation even if these are held to hedge other interest rate positions in the trading book. 10

The IRC model covers default risk and migration risk. The former relate to direct and indirect losses as a result of borrowers' default, while the latter relate to potential losses due to an internal or external ratings downgrade or upgrade. 11

III. Key Regulatory Parameters for Computing the IRC model

a) Standards Comparable to the IRB Approach

One objective of these guidelines is to achieve an approximately equal capital adequacy treatment for similar positions (adjusted according to illiquidity) in the banking book and the trading book. As the Basel minimum standards for the IRB approach are based on a 99.9% confidence level over a period of one year, the same parameters were chosen for the IRC model. 12

The capital adequacy requirements correspond to the estimate of the IRC model for losses due to default and migration within one year with a confidence level of 99.9%.[39] Losses caused by major market-wide events affecting multiple issuers are included. 13

[39] This refers to the 99.9% quantile of the estimated loss distribution.

The IRC model is based on the assumption of a constant risk level over a period of one year[40]: for all positions it is assumed that a position will be reinvested in the same type of position at the end of the liquidity period so as to achieve a constant risk level over a period of one year. The IRC model can consider correlation effects between the risk factors, if the validation standards described in Section 2 are complied with. Otherwise, it is assumed that the risk factors are correlated in such a manner to create a maximum loss. 14

b) Constant Risk Level Over a One-Year Period

The concept of the constant risk level implies that an institution manages its positions in such a way that the initial risk level (as measured by the VaR or the exposure profile using risk ratings and concentrations) is maintained over a period of one year. If positions have a liquidity horizon of less than one year, it must be assumed that they will be reinvested in a position of the same category and with the same risk level until the period of one year is reached (constant level of risk concept). If a position's risk profile has changed by the end of the liquidity horizon, it must be replaced by a position that has the risk characteristics equivalent to those of the original position. The frequency of reinvestment depends on the liquidity horizon of a given position. 16

In contrast to the IRB approach, it is not assumed that with these reinvestments a position remains in the books for an entire year. Accordingly, with the constant level of risk concept, the capital adequacy requirements for liquid positions with good ratings, in particular, are lower than with the IRB approach. However, an institution may elect to use a one-year liquidity horizon provided it does so for the whole IRC-relevant portfolio (constant position concept). 17

c) Liquidity Horizon

Liquidity horizon denotes the time required to sell a position under difficult market conditions, or to hedge all material risks of the position replicated in the IRC model. Conservative assumptions must be used to estimate the liquidity horizon, which should be sufficiently long to ensure that the sale or hedging of the positions does not materially affect market prices. 19

The minimum liquidity horizon is three months. 20

It is generally assumed that a qualified interest rate instrument has a shorter liquidity horizon than other interest rate instruments. Due to the lack of knowledge of the market liquidity during crisis situations, conservative assumptions have to be used to estimate the liquidity horizon for other interest rate instruments. The liquidity horizon of products with limited liquidity in the secondary market needs to be estimated particularly conservative, regardless of the rating. The same applies to new product classes which have not yet been tested in a crisis. 21

The liquidity horizon can be estimated for each position or on an aggregated basis. The grouping should be selected in a way that meaningfully reflects differences in liquidity. 22

[40] This assumption is consistent with the capital adequacy calculations in the Basel minimum standards. In all cases (loans, derivatives and securities repurchase agreements (or repos) the Basel minimum standards define EAD in such way that it is assumed that the existing risk positions will be re-issued upon maturity. The intention is to ensure that banks have sufficient capital to remain able to assume risks even in times of crisis.

The liquidity horizon of concentrated positions is expected to be greater, as it will take longer to liquidate such positions. This longer liquidity horizon must take due account of market concentration and issuer concentration. 23

d) Correlation and Diversification

Economic and financial dependencies between borrowers will cause the clustering of default and migration events. IRC models therefore need to take into account the correlation between default and rating migrations of various borrowers. 24

Diversification effects between the risks modeled in the IRC and the market risks modeled in the VaR are not currently well understood and may therefore not be reflected. Accordingly, the IRC-based and VaR-based capital adequacy requirements are added together. 25

e) Concentrations

Market and issuer concentrations must be taken into account. A concentrated portfolio will cause a higher capital requirement than a granular portfolio (see also margin no. 23). Concentrations that could either arise within a single product class or across several product classes due to difficult market conditions must also be reflected. 26

f) Risk mitigation and diversification effects

Netting long and short positions is permitted only if the positions refer to the same financial instrument of the same borrower. Otherwise, the IRC model must capture the long and short positions involving different financial instruments of the same borrower separately in order to take any basis risks into account. 27

The IRC model must reflect material basis risks stemming from differences in product type, seniority in the capital structure, ratings, terms to maturity and vintage of positions and differences in payout triggers and procedures. 28

If an instrument has a shorter term to maturity than the liquidity horizon or if a term to maturity extending beyond the liquidity horizon is not contractually guaranteed, then any material risks which could occur during the interval between the maturity of the instrument and the liquidity horizon must be included. 29

For positions hedged by dynamic hedging strategies, an adjustment of the hedge within the liquidity horizon can be recognized. 30

However, this is only admissible if the bank (i) chooses to consistently apply the modelling of the dynamic hedging strategies across the entire sub-portfolio in question; (ii) can demonstrate that the inclusion of dynamic hedging strategies results in better risk management; and (iii) can demonstrate that the market for the instruments serving as the hedge are liquid enough for these hedging strategies to be implemented even during periods of stress. All residual risks resulting from the dynamic hedging strategies must be captured in the IRC model.

g) Optionality

The IRC model must reflect the non-linear nature of options and other positions in regard to price changes. The institution must also pay sufficient attention to the inherent model risk in the context of the valuation of such positions. 31

h) Validation

Banks must apply the validation principles described in the Basel minimum standards when developing, testing and maintaining the IRC models. This involves evaluating the conceptual soundness of the IRC model, its ongoing monitoring (including process verification and benchmarking) and an analysis of the results. The validation process should consider the following factors among others: 32

The liquidity horizons should consider current practice and experience during periods of systematic and idiosyncratic stress.

If dynamic hedging strategies are modeled, the IRC model should use objective data on the relevant horizon and enable a comparison between the risks of a portfolio with fixed positions and the risks of a portfolio with a constant risk level.

Assumptions about correlations must be supported by the analysis of objective data in a conceptually solid framework. If an institution uses a multi-period model (constant level of risk, liquidity periods shorter than one year) to calculate the IRC, it must ensure that the implied annual correlations are reasonable and in line with observed annual correlations. An institution must be able to show that its correlation modeling and the choice and weighting of risk factors are appropriate for its portfolio. The modeling must be documented in such a way that the correlation and model assumptions are transparent to the FINMA.

Because of the high confidence level of 99.9% and the long capital horizon of one year, it is not possible to directly validate the IRC model through backtesting. Validation must therefore rely more heavily on indirect methods such as stress testing, sensitivity analyses, scenario analyses and other methods. Such tests must not be limited to past observations. Validation is seen as an ongoing process where the FINMA and the bank jointly determine which validation procedures should be used.

Institutions should develop relevant internal modeling benchmarks to test the reliability of their IRC modeling.

IV. Use of Internal Risk Models to Calculate the IRC

No specific approach for modeling the IRC is prescribed. 33

The approach chosen by the bank should be consistent with its internal risk management methods for identifying, measuring and managing trading risks (use test). 34

Ideally, the internal risk models will meet the guidelines for capturing the IRC described here. If the bank's internal approach is not compatible with these guidelines, the bank must demonstrate that its internal model generates capital requirements at least as high as those produced by an approach complying with these guidelines. 35

Appendix 14

Additional guidelines for Modeling Positions in Correlation Trading, Comprehensive Risk Measure (CRM)

References in square brackets refer to the Basel minimum standards.

For a definition of correlation trading positions, see margin nos. 94.11 to 94.15 of the circular on market risk. 1

All requirements for IRC modeling set out in Appendix 13 must also be met. 2

[718(xciv)] For correlation trading positions, all price risks must be modeled in addition to default risk and migration risk. The value of such positions depends on the following risk factors which must be recorded adequately: 3

- The cumulative risk arising from several defaults; in the case of tranched products, the sequence of the defaults should also be considered.
- Credit spread risks, including the gamma and cross-gamma effects.
- The volatility of the implied correlation, including the cross effects between spreads and correlations.
- Basis risks; both the basis between the spread of an index and the spreads of its constituents, as well as the basis between the implied correlation of an index and the implied correlation of bespoke portfolios.
- The volatility of recovery rates to the extent that they affect the tranche prices.
- If capital savings from dynamic hedging are incorporated in the CRM model, the risk of hedge slippage must be taken into account, as must any costs arising from the renewal of such hedges.

[718(xcivi)] For its CRM modeling to be approved, an institution must demonstrate that: 4

- It has sufficient market data to ensure that it fully captures the above-mentioned risks of these positions.
- The model used adequately reflects historical price changes.
- A clear separation can be made between positions for which CRM modeling is permitted and positions for which modeling is not permitted at all (either in the IRC model or in the CRM model) and for which the capital requirements are therefore calculated using the standardized approach for specific risk.

[718(xcivii)] In addition to CRM modeling, an institution must apply the predefined stress scenarios to the portfolio at least once a week. At least once a quarter, the results of the stress scenarios must be compared with the capital required according to the CRM model and must be reported to the auditors and the FINMA. If the comparison indicates that the capital adequacy requirements under the CRM model fall 5

significantly short of the results of the stress scenarios, this must be reported without delay. The FINMA reserves the right to impose additional capital requirements based on the results of the stress scenarios.

The stress scenarios are described in the annex to the "Revisions to the Basel II market risk framework" updated on 31 December 2010 (Basel market risk changes). 6*

List of amendments

The circular is amended as follows:

These amendments were passed on 17 November 2010 and enter into force on 1 January 2011.

Newly inserted margin nos.	2.1 – 2.3, 31.1, 36.1, 47.1, 94.1 – 94.16, 221.1, 227.1, 230.1, 230.2, 245.1, 245.2, 250.1 – 250.3, 265.1, 296.1, 296.2, 363.1
Amended margin nos.	2, 29, 30, 32, 34, 37, 38, 46, 47, 48, 63, 196, 210 – 212, 215, 216, 218, 222, 223, 226, 227, 239, 240, 245, 245.3 (adjusted on 22.12.2010), 246 – 248, 265, 282, 283, 294, 295, 297, 334, 352, 369
Repealed margin nos.	95-97, 128, 129, 220, 221, 251 - 260, 284-290

These amendments were passed on 1 June 2012 and enter into force on 1 January 2013.

Newly inserted margin nos.	2.4, 150.1, 155.1 – 155.3, 377
Amended margin nos.	2.2, 26, 30, 68, 93, 94, 94.2, 94.4, 94.5, 94.9, before 143, 152, 156, 175, 176, 182, 194, 195, 227

In addition, the references to the Capital Adequacy Ordinance (CAO; SR 952.03) have been adapted to the version entering into force on 1 January 2013.

These amendments were passed on 18 September 2013 and enter into force on 1 January 2014.

Amended:	2.4, 32, 46, 94.10, 227.1, 296.1, 334, 378

The appendices to the circular were amended as follows:

These amendments were passed on 17 November 2010 and enter into force on 1 January 2011.

Amended	Appendix 2:	margin nos. 7, 8
	Appendix 3:	margin no. 2
	Appendix 11:	margin nos. 4 – 6, 9, 10
Newly inserted:	Appendices 13 and 14	

These amendments were passed on 1 June 2012 and enter into force on 1 January 2013.

Newly inserted	Appendix 14:	margin no. 6
Amended	Appendix 11:	margin nos. 6, 11, 13
	Appendix 12:	margin no. 2

In addition, the references to the Capital Adequacy Ordinance (CAO; SR 952.03) have been adapted to the version entering into force on 1 January 2013.

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