

By the Banking Regulation and Supervision Agency:

**COMMUNIQUÉ ON THE CALCULATION OF CAPITAL ADEQUACY
ACCORDING TO STANDARD METHOD FOR MARKET RISK ARISING FROM
OPTIONS**

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SECTION ONE

Objective and Scope, Basis and Definitions

Objective and Scope

ARTICLE 1- (1) The purpose of this Communiqué is to lay down the principles and procedures concerning the calculation of capital adequacy of banks according to standard method for market risk arising from options.

Basis

ARTICLE 2- (1) This Communiqué has been prepared on the basis of Articles 43, 45, 93 of the Banking Law Nr. 5411 dated October 19, 2005 and Article 6(4) of the Regulation on Measurement and Evaluation of Capital Adequacy of Banks published in the Official Gazette dated November 01, 2006 Nr. 26333.

Definitions

ARTICLE 3- (1) The following terms and expressions used in this Communiqué shall have the meanings expressly designated to them below:

- a) Purchase option: Option giving the right to the party receiving the option to purchase the asset subject to contract with the price and amount determined in the contract within the maturity of the contract or the period until maturity,
- b) Bank(s): Bank(s) which are defined by Article 3 of the Law Nr. 5411,

- c) At par option: The position that the market price of the asset subject to contract is equal with the usage price of the option,
- ç) Delta: The sensitivity of market price of the option to the change to occur in market price of the asset subject to option contract,
- d) Interest base: Lower limit of the interest rate to be imposed on the asset subject to variable-interest contract,
- e) Interest ceiling: Upper limit of the interest rate to be imposed on the asset subject to variable-interest contract,
- f) Gama: The sensitivity of delta of the option to the change to occur in market price of the asset subject to option contract,
- g) General market risk rate: General market risk rates concerning the related position and financial instruments stipulated in Articles 7 and 10 of the Regulation,
- ğ) Option on profit: The situation, in which the usage of option right provides earning to the option owner when the market price of the asset subject to contract is compared with the usage price of the option,
- h) Short purchase option position: Position of the party selling the purchase option,
- ı) Short selling option position: Position of the party selling the selling option,
- i) Usage price: Price which may be used by purchase or sale right of the asset subject to the contract during the maturity or at the end of maturity,
- j) Agency: Banking Regulation and Supervision Agency,
- k) Option premium/option price: Payment made by the party purchasing the option to the party selling the option in exchange for its rights stipulated in the contract,
- l) Option contract: Contract which gives to the part purchasing the option the right to purchase or selling right of economic or financial indicator, money or capital market instrument commodity or FX in initially determined price, amount and quality at the end of determined maturity (European type option) or any time within a determined maturity period (American type option); and which obliges liable the party selling the option,
- m) Real value of the option: Difference between the usage price of option on profit and market price of the asset subject to contract,
- n) Ro: Sensitivity of market price of option to the change in interest rate,
- o) Selling option: Option giving the right to the party purchasing the option to sell the asset subject to contract from the price and amount determined in the contract at the maturity of the contract or within the period until maturity,

- ö) Specific risk ratio: Specific risk ratios concerning the related position and financial instruments stipulated in Articles 9 and 10 of the Regulation,
- p) Swaptions: Option type giving the right to obtain fixed interest (variable interest) in exchange for variable interest (fixed interest),
- r) Theta: Change ratio of market price of option according to time,
- s) Long purchase option position: Position of the party purchasing the purchase option
- ş) Long selling option position: Position of the party purchasing the selling option.
- t) Vega: Sensitivity of market price of the option to volatility of market price of the financial instrument subject to option contract.
- u) Volatility: Extent of size and frequency of the fluctuations in price or ratio of financial assets.
- ü) Regulation: Regulation on Measurement and Evaluation of Capital Adequacy of Banks.
- v) Option at loss: When market price of the asset subject to contract is compared to usage price of the option, using the right of option cause loss for option holder.

SECTION TWO

Calculation of Capital Requirement in Standard Method for Market Risk

General principles

ARTICLE 4- (1) Capital requirement to be calculated pursuant to the provisions of this Communiqué are included in the sum as a basis for market risk calculation according to the standard method to be obtained upon the Article 6(2) of the Regulation.

(2) Financial instruments which include option yet small enough that the influence of the option can be omitted may be exempted from the provisions of this Communiqué. Assets such as convertible bond/bill may be evaluated as bond, bill or stock in accordance to their qualifications. A financial instrument which furnishes bond or bill issuer with early payment opportunity is evaluated as an ordinary borrowing instrument and is included in the related maturity tranche as to the most possible payment time.

(3) If option component is dominant, assets subject to contract are decomposed in accordance with the two methods stated below:

- a) Being put to an analytic discrimination as option and asset subject to contract.
- b) Composing a synthetic portfolio to be formed with risk profile, option and basic financial instruments.

Methods to be used in measuring market risk of options

ARTICLE 5- (1) Alternative methods that can be used in measuring market risk of options are carried out as stated below:

- a) Only banks which purchased option contract can use simplified method.
- b) Banks which also sell-draw up option contract must use weighting method with delta factor or scenario method.

(2) Banks of which portfolio activities are mainly based on option purchase-sale should use more developed methods.

Simplified method

ARTICLE 6- (1) Banks which only purchase a limited number and type of option contract may use the option positions presented in the table below and simplified method for asset positions subject to the related contract. Capital requirement is calculated for each individual option position which the bank owns. This figure, in accordance with the type of the asset subject to option contract, is included in the related capital requirement calculated with standard method.

Simplified Method

Position	Practice
Long position and long put option concerning the asset subject to contract <p style="text-align: center;">or</p> Short position and short call option concerning the asset subject to contract	Capital requirement is obtained by decreasing real value of option at profit from multiplication of market price of the asset subject to contract and specific and general market risk ratios total.
Long call option <p style="text-align: center;">or</p> Long put option	Capital requirement is what is smaller than those stated below: <ul style="list-style-type: none"> • Multiplication of market price of the asset subject to contract and specific and general market risk ratios total • Market price of the option

(2) In the implementation of this article,

a) In case the asset subject to contract is not identified clearly, asset to be obtained as a result of implementation of the option is considered as the asset subject to contract.

b) In cases where market value is zero such as interest ceiling, interest floor and swaptions, nominal values are used as market price of the asset subject to contract.

c) Usage price for options with maturities more than six months is compared with forward purchase/sale price instead of market price.

d) In case the market price of the option is not determined, the registered value of the option may be used instead of it.

e) In case the asset subject to contract is foreign currency or commodity, instead of total specific and general market risk ratios, eight percent for foreign currency and fifteen percent for commodity is used in calculation of capital requirement.

Delta factor and weighting method

ARTICLE 7- (1) Option writer banks shall include their option positions weighted with delta factor to the calculations within the articles concerning the calculation of capital requirements for general market risk and specific risk of the Regulation. These options take place within the calculations and reports as a position equal to the figure appeared as a result of the multiplication of market price of the asset subject to contract with the delta. Capital requirement concerning specific risk is found by multiplying the delta equivalent of each option with specific risk ratio.

(2) Due to the fact that delta sensibility is not sufficient to include all risks of option position, gama and vega sensibilities shall be used to calculate capital requirements.

(3) Gama and vega sensibilities are calculated within the framework of a model registered by the stock market in which it was operated or the option pricing model of the bank.

(4) Delta weighted positions of financial instruments depending on the debt securities or interest rate shall be placed to the related maturity trench in the table taking place within the Article 7 of the Regulation as long or short positions considering the situation of financial contract subject to transaction on the date of its exercise as well as on the date of its maturity, such as other derivative financial instruments.

(5) Financial instruments with variable interest including interest ceiling and interest rate floor shall be evaluated as the combination of financial instrument with variable interest and European style option series.

(6) If the asset subject to contract is a stock, capital requirement shall be calculated upon delta-weighted positions. For these positions, capital requirement based on specific risk and general market risk shall be calculated within the framework of principles and procedures in the Article 10 of the Regulation. The options operated in stock markets organized differently in countries shall be evaluated as different instruments in these calculations even if they have the same qualifications.

(7) If the asset subject to contract is a commodity, capital requirement shall be calculated upon the delta-weighted positions within the framework of principles and procedures in the Article 13 of the Regulation.

(8) Capital requirement for exchange rate risk concerning FX and gold positions shall be calculated within the framework of principles and procedures in the Article 11 of the Regulation. Net delta equivalent of options based on FX and gold shall be included to the measurement of risk concerning the related position of FX and or gold.

(9) The agency may demand from banks using hot options to use scenario method or internal models considering their adequacies of internal control, internal audit and risk management systems. The Agency may use this authority also on option types without depending on the time left to maturity, within the framework of same principles.

Calculation of gama and vega risks

ARTICLE 8- (1) In addition to capital requirements emanated from delta risk and which are explained in the Article 7, capital requirement shall be also calculated for gama and vega risks. These risks shall be calculated separately for each position by banks using delta weighting method. For these risks, capital requirement shall be calculated as specified below:

a) Gama effect for each single option;

1) GE: Gama Effect

2) PV: Price Variation (Variation of the price of asset subject to option contract) is found with following formula:

$$\text{Gama Effect} = \frac{1}{2} \times \text{Gama} \times (\text{PV})^2$$

b) Price variation is calculated as follows:

1) For interest rate options, if the instrument subject to contract is a bill/bond, market value of the instrument subject to contract shall be multiplied by the risk weighted belonging to maturities taking place in the Article 7 of the Regulation. If the asset subject to contract is an instrument of which return is associated with interest rate, an equivalent calculation shall

be made considering the assumed return variations within the table in the Article 7 of the Regulation.

2) For stock and stock index options, the market value of asset subject to contract shall be multiplied by eight percent.

3) For FX and gold options, the market value of asset subject to contract shall be multiplied by eight percent.

4) For options based on commodity, the market value of commodity subject to contract shall be multiplied by fifteen percent.

c) Positions concerning following items shall be evaluated as assets subject to the same contract with each other in this calculation:

1) For interest rates, each maturity trench determined in the table within Article 7 of the Regulation,

2) For stocks and stock indexes, each country market,

3) For foreign currency and gold, each foreign currency pair and gold,

4) For commodity, each commodity type.

ç) Each option dependent on the same asset has a gamma effect, positive or negative. For each financial instrument, positive or negative net gamma effect is found by adding individual gamma effects. Only the negative net gamma effect from them is included to capital calculation. As a total gamma capital liability, absolute value total of net negative gamma effects is taken.

d) For the volatility risk, banks calculate capital liability by multiplying total vega belonging to options dependent to the same asset with proportional slip amounting to 25% \pm of volatility.

e) As a total capital liability for vega risk, absolute value total of individual capital liability calculated for vega is taken.

Scenario Method

ARTICLE 9-(1) Banks using option techniques and/or having complex option portfolio can use scenario matrix analysis within the scope of scenario method while calculating capital amount required for setting aside in return for market risks for options. According to this method, banks make re-evaluation of their option portfolio by using matrix for simultaneous changes in risk factors as price/rate of asset subject to contract to which the option is dependent and their volatility. This transaction is realized by determining stable range relating to risk factors in option portfolio and following that, by taking into account of changes in portfolio value in various points included in matrix.

(2) A separate matrix is created for each instrument subject to individual contract. Banks having intensive option purchase and sale, as an alternative, in their calculation to be made for interest rate options, take basis as minimum six different maturity segments. While implementing this method, maximum 3 of the maturity segments, found in the statement included in the Article 7 of the Regulation, is placed in the same group.

(3) The option positions are evaluated within a definite band under or over of the market price of the asset subject to the contract. This transaction comprises the first step of matrix preparation. This band has to be coherent, for the interest rate, with income change assumed in the statement included in the Article 7 of the Regulation. Banks using the above mentioned alternative method for interest rate options use the biggest of income changes assumed belonging to each maturity segment included to the same group, in calculating. The change interval for stocks, foreign currencies and golden \pm is 8% and is \pm 15% for commodity. For all risk categories, there used at least seven equal monitor intervals.

(4) The second step of matrix preparation is relating to the change in price of asset volatility subject to contract. It is adequate to take into account of slipping amounting to \pm 25% of volatility in the price of asset subject to contract. On the other hand, the Agency, when deemed necessary, can demand to use a different change or a rate in volatility and/or making calculation in points to be determined in intermediate levels in matrix.

(5) Each cell includes net profit/loss of protection instrument subject to option and contract following the calculation of matrix. Capital liability for asset subject to each contract is taken into account as the biggest loss which the matrix includes.

(6) Capital liability relating to specific risk is found by multiplying the each options' delta equivalent with specific risk weight concerned included in the Article 9 and 10 of the Regulation.

(7) Bank's using scenario method is dependent to deeming appropriate of the Agency, to availability of respects and principles to be requested in analysis relating especially to this method, and to be found adequate by the Agency. In this respect, the banks' using scenario method as a part of the standard method is subject to the permission of the Agency and in calculating amount subject to market risk with risk measurement model, is subject to evaluation within the scope of quantity and quality required for risk measurement model.

(8) Besides the above mentioned risks options include risks such as theta and rho risks. Even the said risks are not included in valuation models and risk management systems, the banks having a significant amount of option portfolio have to monitor these risks closely and declare how they monitor them to the Agency.

SECTION THREE

Final Provisions

Entry into Force

ARTICLE 10- (1) This communiqué enters into force on the date of its publication

Enforcement

ARTICLE 11- (1) The provisions of this Communiqué are enforced by the Chairman of the Banking Regulation and Supervision Agency.