



Internal model requested to be applied for foreign exchange risk calculation (Version 3)

According to the Supervisory Authority, at present the economic capital requirement is reflected properly in the VaR-based calculation, therefore we consider that in the ICAAP process each bank should use a (supervisory) model containing consistent formulae, calculated with the data of the same period to identify the capital requirement of its foreign exchange risk and that the result of the calculation performed according to the model should be the additional capital requirement for the banks, calculated under SREP depending on the calculation method chosen by the institution.

The expectation to establish the capital requirement applies only to the foreign exchange risk, but it does not apply to the position or commodity risk, or any other (e.g., default) risks of securities denominated in foreign exchange. Pursuant to Article 39 (3) of the 244/2000. (XII. 24.) Government Decree (hereinafter Decree) if a credit institution's open currency position¹ calculated according to the Decree is lower than 2% of the own funds of the institution before the deduction of any overrun, then the foreign exchange risk does not generate any capital requirement under Pillar 2 either.

The procedure is not mandatory for cooperative credit institutions, because at the moment they do not have significant risks in this field.

The calculation method requested to be applied by the Supervisory Authority is based on the internal model described in the Decree but for the purpose of simplification and consistency, it is also different from the provisions of the Decree at certain points, which will be described later. Obviously, the conditions specified as prerequisites of the authorisation of the internal model by the Supervisory Authority should not be assessed.

As in our opinion the technical implementation of the model is relatively feasible, we request even those institutions which use a significantly different internal model (for their own purposes) to apply the calculation method described below.

The Supervisory Authority does not intend to reject the method selected by the institutions, but wishes to define a limit for the related portfolio segment with regard to the foreign exchange risk during the economic capital calculation.

Concerning the practical implementation of the model, within the framework of the ICAAP-SREP dialogue the Supervisory Authority expects each institution to have² a capital

¹ Based on economic considerations, the HFSA allows institutions to disregard FIEII investments when calculating open positions in the ICAAP. We must point out, however, that in case the institution chooses to disregard foreign currency FIEII investments when calculating open positions in its ICAAP, the risks of these positions cannot be considered marginal. If this approach is followed, we require the institution to present in detail in its ICAAP (under investment risks) how the exposures of these positions are measured and managed. (FIEI [Hungarian acronym: PIBB] stands for financial institutions [credit institutions and financial enterprises], investment enterprises and insurance corporations.)

² The reference date of the ICAAP calculation.

requirement calculated both with the selected method (if such a method exists) and with the foreign exchange risk model described below for each trading day of at least 60 trading days prior to the target date and to present to the Supervisory Authority the time series of the results of the two models if requested.

It is expected that the capital requirement of the foreign exchange rate under ICAAP should not be lower than the highest capital requirements calculated according to the supervisory model on 60 trading days prior to the target date.

The model

The NBH official exchange rate data should be used as foreign exchange rate data. We request each institution to store its daily foreign exchange positions and (apart from the NBH official foreign exchange data) all other data that are required for the reconstruction of calculations for at least two years, for subsequent control purposes. (Thus institutions must ensure that the model calculations may be controlled/reconstructed at least for two calendar years retrospectively.)

The model requested to be applied is the variance-covariance model, which assumes normal distribution of yields with 0 expected value (drift). Of the technical parameters specified in Article 43 (5) of the Decree, the 10-day holding period and the 99% one-sided confidence interval are used in the method, and thus the capital requirement is the one-day standard deviation of the portfolio of the currency positions multiplied by 2,326, sqrt(10) and – also in line with Decree – 3.

Thus the capital requirement should be calculated somewhat differently to what is described in the Decree, because the Decree states the following:

$$\text{Capital requirement}_t = \max (\text{VaR}_{t-1} , k \times \text{VaR}_{\text{average of the previous 60 days}}),$$

where k is a constant which equals at least 3, but it may increase to not more than 4 in the model depending on the errors made in the specified period of the past (1 year), yet the Supervisory Authority requests the following formula

$$\text{Capital requirement}_t = 3 \times \text{VaR}_{t-1} ,$$

to be used.

Technical steps

The technical/calculation steps described below have been prepared primarily for those users who did not calculate VaR on the various portfolios/risks of their institutions before.

The capital requirement of the foreign exchange risk for individual business days may be calculated as follows:

- The daily aggregated portfolio is calculated for each currency; this is a figure (with a prefix) which is identical with the figure in D01 table. The position (in HUF) in currency i. is indicated with w_i .
- The covariance matrix is updated. The co-variance matrix can be calculated by using the exchange rate of the currencies expressed in HUF as a random variable, where we propose calculating the one-day covariance of the various currency pairs (i, j) with the following formulae:

$$\sigma_{ij,t} = \lambda \cdot \sigma_{ij,t-1} + (1 - \lambda) \cdot r_{i,t} \cdot r_{j,t}$$

where the λ , i.e., decay factor, should be 0.94, and the $r_{i,t}$ yield should be defined as the logarithmic yield. (This calculation of co-variances is only a proposal; if the institution has its own different co-variance calculation method, it may use its results here.)

- The covariance matrix should be multiplied from the left with the serial vector of w_i figures and then the resulting serial vector should be multiplied from the right with the column vector of the w_i figures. The square root of the result of multiplication is called 1-day spread of the (current-day) portfolio.
- The 1-day spread should be multiplied by 2.326 and $\sqrt{10}$; this figure is considered the risked value of the portfolio for 10 days with 99% reliable one-sided confidence interval. The daily capital requirement of the foreign exchange risk equals 3 times this value at risk.

If you have any technical questions concerning the calculations, please contact Lóránt Baracsi at the following email address: baracsi.lorant@pszaf.hu.