NÁRODNÁ BANKA SLOVENSKA

EUROSYSTÉM

Annexes to the Analysis of the Slovak Financial Sector

for the First Half of 2010

Contents

1. Risk measurement and stress testing methodology

1.1 Estimation of Value at Risk (VaR) for market risks

VaR methodology is based on the estimation of the statistical distribution of possible protfits or losses of the current portfolio. A quantile is then chosen at a given confidence level (e. g. 99 %) which represents a loss that the portfolio should not exceed within a given time horizon and with the given probability.

For the calculation of the VaR, it is assumed that the changes of the market factors have normal distribution with a time-dependent variance-covariance matrix. It is assumed that the volatility, σ^2, of the change of market factor *i* in time *t* is affected by its volatility in time *t – 1* and by the value of the change ε of the market factor in time *t*, i. e.

$$r_t = c_1 + \varepsilon_t, \quad \varepsilon_t \sim N(0, \sigma_t^2)$$
$$\sigma_t^2 = \omega + \beta\sigma_{t-1}^2 + \alpha\varepsilon_t^2$$

This calculation can be equivalently viewed as a calculation with exponentially decreasing weights for the historical changes of market factors. Correlations were modeled analogously. Variance-covariance matrix for a given day is estimated by this model. This estimation of the variance-covariance matrix reacts rather flexibly to changes of volatility on the financial markets, which is the main advantage of the model. The estimation of VaR was then based on Monte Carlo simulations of 500 scenarios generated form multivariate normal distribution with the estimated variance-covariance matrix.

A multivariate BEKK-GARCH(1,1) model was used for the estimation of parameters α_i and β_i. In this model, the equation for the estimation of variance-covariance matrix Σ_t has the following form:

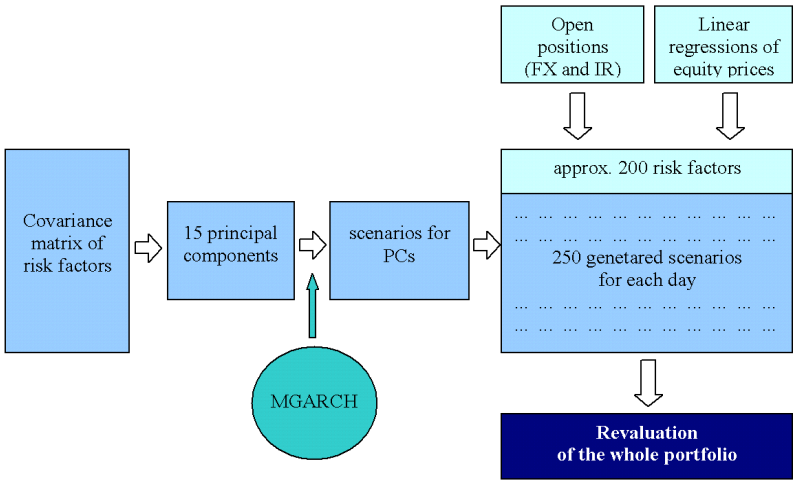
$$\Sigma_t = C^T C + A^T \Sigma_{t-1} A + B^T \varepsilon_t \varepsilon_t^T B ,$$

where *A*, *B* and *C* are square matrices of parameters, while *C* is an upper triangular matrix.

As approximately 200 market factors were used for the estimation, the dimension was reduced using the method of principal component analysis. The aforementioned GARCH model was estimated for the 15 main principal components and the obtained variance-covariance matrix was then transformed back to the original market factors. For investments into equities and unit certificates, the exposure to each market factor was estimated using linear regressions.

A comprehensive scheme of the VaR calculation of market risks is illustrated by this chart:

Scheme 1 Scheme of the VaR calculation for market risks



- Source: NBS.

1.2 Estimation of credit risk

Regarding credit risk, the models focus on the worsening of the global economy and the influence of this worsening on loans granted to corporate and households. Because of differences in characteristics and different data sources for these two types of loans, two different approaches were used for the calculations.

Corporate credit risk

The estimation of corporate credit risk for the banking sector is based on data from credit register. Time series of yearly default rates of corporate loans are constructed for 18 corporate sectors for the period 2000Q3 – 2010Q2 based on quarterly data on the number of defaulted loans and the number of total loans granted. The yearly default rate is calculated as

$$YDR_{t,i} = \frac{\sum_{j=t-3}^{t} NDL_{j,i}}{ANTL_{t-3,t;i}},$$

where $YDR_{t,i}$ is the yearly default rate for sector i in quarter t, $NDL_{t,i}$ is the number of newly defaulted loans in sector i and quarter t, and $ANTL_{t\text{-}3,t;i}$ is the average number of total loans granted in sector i in quarters from $t\text{-}3$ to t (the average number of loans granted in a yearly period which ends with quarter t). As for the relatively short period of time series it is not effective to work with 18 sectors, these sectors were divided into 3 categories based on their sensitivity to the economic cycle. The categorization is based on economic theory and on a simple linear regression of the form

$$\Delta_{-4} YDR_{t,i} = \alpha_0 + \alpha_1 \Delta GDP\_g_{t-j} + dummy + \varepsilon_t,$$

where $\Delta_{-4} YDR_{t,i} = YDR_{t,i} - YDR_{t-4,i}$ is the yearly change of the default rate, $\Delta GDP\_g_{t-j} = GDP\_g_{t-j} - GDP\_g_{t-1-j}$ is the quarterly change of the cumulative yearly GDP growth with a lag of j quarters and the dummy variable is included to capture the methodological changes of the reporting of defaulted loans during the given period. The categorization (category of non-sensitive sectors to the economic cycle, sensitive sectors and very sensitive sectors) is summarized in Table 1.

Table 1 Categorization of corporate sectors based on their sensitivity to the economic cycle

Non-sensitive sectors	Sensitive sectors	Very sensitive sectors
Forestry and logging	Chemical industry	Transport
Materials	Services	Electrotechnical industry
Mining and quarrying	Telecommunications	Real estate activities
General government	Utilities	Wholesale, retail sale
		Agriculture
		Food production
		Recreation
		Construction of buildings
		Machine industry
		Textile industry

The aggregated data[1] on the yearly default rate of each category were used for the modeling. GDP growth (GDP_g), inflation (HICP) and interbank rates (3M BRIBOR, resp. EURIBOR, IBR) were used as endogenous explanatory variables while the base rate of the NBS, resp. the ECB (BR) and GDP growth of Germany (GDP_g_{GER}) were used as exogenous explanatory variables for the modeling of the dependence of the yearly default rates on macroeconomic factors. Quarterly changes of the explanatory variables were used for the estimation.

A logit model is used for modeling, that is, it is assumed that the yearly default rate is a logistic function of the so called sector-specific index, which is dependent on the abovementioned macroeconomic variables. The model is described by the following equations:

$$YDR_{i,t} = \frac{1}{1+e^{-y_{i,t}}},\ i \in \{\text{Non-sensitive sectors}, \text{Sensitive sectors}, \text{Very sensitive sectors}\}$$

where $y_{i,t}$ is the sector-specific index for category i,

$$\Delta_{-4} y_{t,i} = \beta_0 + \beta_{i,1}\Delta_{-4} y_{t-1,i} + \sum_{j=0}^{6} B_{i,t-j} X_{t-j} + dummy + u_{i,t},$$

$$X_t = \Gamma_0 + \Gamma_1 X_{t-1} + \Gamma_2 Z_{t-1} + v_t,$$

$$X_t = [\Delta GDP\_g_t, \Delta HICP_t, \Delta IBR_t]^T,$$

$$Z_t = [\Delta BR_t, \Delta GDP\_g_{t,GER}]^T.$$

It is assumed that the residuals $u_{i,t}$, v_t are normally distributed non-autocorrelated random variables with non-zero correlation, i.e.

$$E_t = \begin{pmatrix} u_t \\ v_t \end{pmatrix} \sim N(0,\Sigma),\ \Sigma = \begin{bmatrix} \Sigma_u & \Sigma_{u,v} \\ \Sigma_{v,u} & \Sigma_v \end{bmatrix}.$$

Coefficients of the model were estimated using the seemingly unrelated regression methodology (SUR methodology).

The estimates of the yearly default rate of each category given a fixed development of the macro-variables (this development is estimated based on a given stress testing scenario using the NBS's structural macroeconomic model[2]) were used as the estimates of probabilities of default for stress testing purposes. Estimated probabilities of default of each category of corporate loans were consequently used for the calculation of the loss stemming from non-performing corporate loans by the method of bootstrapping.

Within this simulation it is decided in each period, if the given loan defaults in the given period or not. The probability of default of each loan entering the simulation is calculated by the model described above. In case of a default of a loan in a given period, this loan cannot default in the next period and losses stemming from the default are materialized in the given period only. Using this procedure, the potential volume of non-performing loans is simulated 10 000 times for each scenario, the estimated volume of non-performing loans for each bank is the average volume of total non-performing loans for this bank taken over all simulations. The value and the type of the collateral is also taken into account when estimating potential losses. For each scenario the value of the collateral declines to a given extent. Collaterals were divided into two categories based on expert judgement: A category were a

[1] The methodology of calculation of aggregated yearly default rates is the same as for the calculation of yearly default rate for individual corporate sectors.

[2] For the description of the macroeconomic model see: Reľovský, B., Široká, J.: A structural model of the Slovak economy, Biatec 7 / 2009, p. 9 – 13.

decline of the value is assumed (e. g. collateral in form of real estate or blank bill) and a category were it is assumed the value of collateral remains unchanged (e.g. third party guarantees).

Overall losses are obtained by multiplying the volume of non-performing loans decreased by the modified value of collaterals by coefficient LGD (loss given default), the value of which is set to 45 %. It means that the bank would be able to satisfy its claim up to (100-45) % of the uncollateralized part of the loan in case of the bankrupcy.

By this calculation, the volume of provisions is obtained in each simulation, which represent the provisions which the bank would have to create during the given stressed period due to the worsening of the macroeconomic conditions.

Household credit risk

The volume of non-performing retail loans is estimated in two steps. First, the total volume of loans granted to retail is estimated. Second, using also the estimated volume of total loans granted to retail the volume of non-performing retail loans is calculated.

Three types of retail loans are estimated: house purchase loans, consumer loans and other loans. The overall volume is divided into these categories because of different sensitivity of each category to individual macroeconomic variables. Quarterly data from 2004Q1 to 2010Q2 are used for calculations. For each of the categories an EC (error correction) equation is estimated, since it is assumed that long term relationship exists between the loans in the given category and chosen macro-variables.

In case of house purchase loans, an EC equation is estimated of the form

$$\Delta HPL_t = \alpha\left(HPL_{t-1} + \beta_0 + \beta_1 GDP_{t-1} + \beta_2 HICP_{t-1} + \beta_3 IBR_{t-1}\right) + \sum_{i=1}^{2} \Gamma_i \Delta\left(HPL, GDP, HICP, IBR\right)_{t-i}^{T} + \varepsilon_t ,$$

where *HPL* is the natural logarithm of the volume of house purchase loans, *GDP* is the natural logarithm of the seasonally adjusted nominal gross domestic product, *HICP* is the yearly HICP inflation rate and *IBR* is the EURIBOR/BRIBOR interbank rate with 3 month maturity. Γ is the vector of coefficients determining the influence of short-run dynamics of the used endogenous and exogenous variables while ε are residuals. Estimates of the coefficients are summarized in Table 2.

The EC equation estimated for consumer loans has the form

$$\Delta CL_t = \alpha\left(CL_{t-1} + \beta_0 + \beta_1 GDP\_r_{t-1} + \beta_2 UR_{t-1} + \beta_3 DUMMY\right) + \sum_{i=1}^{1} \Gamma_i \Delta\left(CL, GDP\_r, UR\right)_{t-i}^{T} + \varepsilon_t ,$$

where *CL* is the natural logarithm of the volume of consumer loans, *GDP_r* is the natural logarithm of the seasonally adjusted real gross domestic product, *MN* is the unemployment rate. The dummy variable is included to capture the effects of methodological changes in the reporting of the volume of loans during the given period.

EC equation for the other loans has the form

$$\Delta OL_t = \alpha\left(OL_{t-1} + \beta_0 + \beta_1 GDP_{t-1} + \beta_2 IBR_{t-1} + \beta_3 DUMMY\right) + \sum_{i=1}^{1} \Gamma_i \Delta\left(OL, GDP, IBR, HICP\right)_{t-i}^{T} + \varepsilon_t ,$$

where *OL* is the natural logarithm of the volume of other loans granted to retail, dummy variable is included because of the same reasons as mentioned above and other variables are identical to those described before.

Due to the allowance of non-zero correlation of residuals, the coefficients were estimated using the method of seemingly unrelated regressions (SUR methodology).

For the estimation of the volume of non-performing loans, similarly as for the volume of total loans granted, an EQ equation is used. The estimation is based on quarterly data from 2000Q1 to 2010Q2. As detailed structure of the volume of non-performing loans is only available since 2005, the aggregated volume of all retail loans is estimated. The corresponding EC equation has the form

$$\Delta NPL_t = \alpha\left(NPL_{t-1} + \beta_0 + \beta_1 TRL_{t-1} + \beta_2 GDP_{t-1} + \beta_3 HICP_{t-1} + \beta_4 UR_{t-1}\right) + \sum_{i=1}^{1} \Gamma_i \Delta\left(NPL, TRL, GDP, HICP, UR\right)_{t-i}^{T} + \varepsilon_t$$

where *NPL* is the natural logarithm of the total volume of non-performing loans and *TRL* is the natural logarithm of the overall volume of retail loans. Other variables are the same as described above.

Table 2 Coefficient estimations for household credit risk models

	α	β_1	β_2	β_3	β_4	aR^2
House purchase loans	-0.239	-2.746	-0.007	0.049	-	71.2%
Consumer loans	-0.117	-0.925	-0.002	-0.598	-	61.4%
Other loans	-0.964	-2.519	0.062	0.047	-	60.2%
Non-performing loans	-0.343	-1.677	1.474	-0.113	-0.005	22.6%

Analogously to the case of the model for corporate credit risk, the volume of any particular type of retail loans are estimated using an ex-ante fixed development of macroeconomic variables which is calculated in accordance with the given scenario based on the structural macroeconomic model of NBS.

1.3 Estimation of interest rate risk

There are a few assumptions made for the modeling of interest rate risk:

- The change in the base rate of the ECB and the change in the credit spread approximated by the change in the 5 year iTraxx are considered to be the primary impulse of changes in interest rates. The model captures the lagged reaction of interbank interest rates, bond yields and client interest rates for loans and deposits to the changes in the abovementioned factors. This lagged reaction is modeled by estimating the short run and long run dynamics of interest rates using Vector Error Correction (VEC) techniques.
- The aim of this approach is to approximate the actual impact on the profitability of the banking sector, especially on the net interest income. In case of loans and deposits the impact is modeled as a gradual change of profit compared to the baseline scenario over the chosen time horizon through the estimation of interest gains and losses.

The final estimate of the interest rate risk is therefore the sum of the expected loss (or profit), stemming form the shock in form of change of the base rate of the ECB and the change of the credit margin, for the three most relevant portfolios: the portfolio of loans and deposits, the portfolio of bonds and the portfolio of interest rate derivatives.

Interbank interest rates

For this approach, the short run and long run dynamics of the transmission of changes in the base rate to the interbank interest rates has to be estimated at first (EURIBOR rates and zero coupon swap yields are estimated). The credit spread is approximated by index iTraxx.

For the estimation of the development of eurozone interbank interest rates a VEC model is used of the form

$$\Delta r_t = \alpha * CE + \delta_{1,1}\Delta r_t^{ECB\_UP} + \delta_{1,2}\Delta r_t^{ECB\_DOWN} + \sum_{i=2}^{n}\delta_i \Delta r_{t-i}^{ECB} + \sum_{i=1}^{n}\left(\gamma_i \Delta r_{t-1} + \varphi_i \Delta CDS_{t-i}\right) + \varepsilon_t ,$$

$$CE = \left(r_{t-1} + \beta_0 + \beta_1 r_{t-1}^{ECB} + \beta_2 CDS_{t-1} + \beta_3 DUMMY\right)$$

where r_t is the modeled interest rate, r_t^{ECB} is the base rate of the ECB, CDS_t is the value of iTraxx, ε_t are residuals. The dummy variable is included to capture the effects of the non-standard measures of ECB, which were the reaction to the financial crises.

Expression CE represents the long run relationship between the modeled interbank interest rate, the credit spread and the base rate of the ECB. Coefficient β_1 represents the fraction of the change of the base rate which is transmitted to the interbank interest rate in the long run. Adjustment coefficient α represents the pace of the convergence to the long run relationship in case of a deviation (i.e. if the interest rate is above its long run level, a decline is expected). To allow the interbank rate to react asymmetrically to the increase/decrease of the base rate, the time series of the changes of the base rate is divided into two series, one consisting of the decrease of the base rate ($\Delta r_t^{ECB\_DOWN}$), the other consisting of the increase of the base rate ($\Delta r_t^{ECB\_UP}$). Coefficient β_3 is expected to have a positive sign, i. e. the non-standard measures of the ECB are expected to decrease the interbank interest rate,

especially those with shorter maturities. Remaining terms reflect the short-term dynamics. Number of lags, *n*, was chosen based on statistical tests[3].

Loans and deposits

Regarding the estimation of the impact of the initial shock on the reported profit/loss from the portfolio of loans and deposits, it is taken into consideration that these products are not revalued by banks to fair value (as they are held to maturity). This impact materializes only gradually in the accounting profit or loss through the long-term impact on the net interest income. When assessing the impact of the interest rate shock, the following process is used:

- Short-term and long-term dynamics of the transmission of changes of the base rate into the development of interbank rates (EURIBOR and zero coupon swap yields) and consequently into the development of interest rates of client loans and deposits classified based on their contractual maturity is estimated using VEC techniques
- The development of each type of client interest rate is than estimated for the chosen scenario of the development of the base rate of the ECB and iTraxx index based on this model
- The volume of loans and deposits is modeled by simple autoregressive processes with a trend and/or an intercept (the estimation of loans granted to households is described in section 1.2)
- The impact of the interest rate shock on net interest income can be then calculated for the chosen horizon (e. g. 1 year) based on the estimated interest rates and volume of client loans and deposits

The modeling of the interest rates on deposits and loans was based on the assumption that a change of the base interest rate of the ECB influences the yield curve first and the interest rates on deposits and loans are influenced only subsequently. In every VEC model, we chose an interest rate which influences the long-term equilibrium of a particular interest rate on loans or deposits, based on tests of cointegration.

In case of loans, a liquidity margin (*LM*) is included in the cointegrating relationship, which proved to be significant (after the sharp decrease of interbank rates with shorter maturity), however with only a small impact on the client rates. Dummy variable is included to capture the historically low level of interbank interest rates, mainly those with shorter maturity, because of the non-standard measures of the ECB. The EC equation for the interest rates of loans has the form:

$$\Delta r_t = \alpha\left(r_{t-1} + \beta_0 + \beta_1 r^K_{t-1} + \beta_2 LM_t + \beta_3 DUMMY\right) + \sum_{i=1}^{n}\left(\delta_i \Delta r_{t-i} + \gamma_i \Delta r^K_{t-i} + \varphi_i \Delta LM_{t-i}\right) + \varepsilon_t ,$$

if cointegration tests confirmed the long-run relationship with one of the interbank rates (r^K).

In case of deposits, the relevant interbank interest rate and a dummy variable is included into the cointegrating relationship. The dummy variable is included because of the same reasons as mentioned before. The EC equation for the interest rates of deposits has the form:

$$\Delta r_t = \alpha\left(r_{t-1} + \beta_0 + \beta_1 r^K_{t-1} + \beta_2 DUMMY\right) + \sum_{i=1}^{n}\left(\delta_i \Delta r_{t-i} + \gamma_i \Delta r^K_{t-i}\right) + \varepsilon_t$$

The interpretation of the respective coefficients is the same as in case of interbank rates.

- Generally, changes of the base rate are transmitted by banks gradually, first into interbank rates and only then into client interest rates on loans and deposits. The changes are not transmitted fully, the speed of adjustment is slower for client rates than for interbank rates.

[3] The value of *n* was chosen using Schwarz information criteria and testing for the autocorrelation of the residuals.

- Interest rates for corporate loans and deposits adjust faster and the changes of the base rate are transmitted to a higher degree than in case of interest rates for loans and deposits of households. This can be partially explained by higher competition in the market of corporate loans and deposits.

Table 3 Types of loans and deposits the interest rates are estimated for

Loans	Deposits
Non-financial corporates	
Overdrafts	Sight deposits
Real estate loans with fixation up to 1 year	Overnight deposits
Real estate loans with fixation from 1 to 5 years	Term deposits with maturity up to 7 days
Real estate loans with fixation more than 5 years	Term deposits with maturity up to 1 year
Other loans with fixation up to 1 year	Term deposits with maturity up to 2 years
Other loans with fixation from 1 to 5 years	Term deposits with maturity up to 5 years
Other loans with fixation more than 5 years	Term deposits with maturity more than 5 years
	Saving deposits
Households	
Credit cards	Sight deposits
Overdrafts	Overnight deposits
House purchase loans with fixation up to 1 year	Term deposits with maturity up to 7 days
House purchase loans with fixation from 1 to 5 years	Term deposits with maturity up to 1 year
House purchase loans with fixation more than 5 years	Term deposits with maturity up to 2 years
Consumer loans with fixation up to 1 year	Term deposits with maturity up to 5 years
Consumer loans with fixation from 1 to 5 years	Term deposits with maturity more than 5 years
Consumer loans with fixation more than 5 years	Saving deposits
Other loans with fixation up to 1 year	
Other loans with fixation from 1 to 5 years	
Other loans with fixation more than 5 years	

Debt securities

The calculation is based on detailed data on the portfolio of securities of the banks, including also their classification into the respective type of portfolio (revaluated to fair value - FV, available for sale - AFS, held to maturity - HTM, trading portfolio - TRD). The revaluation of bonds is based on the discount curve that is estimated by EC techniques, similarly to interest rates on client loans and deposits. As the revaluation of bonds in the AFS and HTM portfolio does not affect the reported profit/loss during the holding period of the security, only the securities revaluated against the profit and loss account or against own equity are taken into consideration.

Interest rate derivatives

In case of the calculation of the impact of interest rate risk on the interest rate derivatives, it is assumed, that all derivatives are revaluated to fair value. This assumption reflects the fact, that in case of a crisis situation the bank can sell also derivatives held in the banking book.

In case of the revaluation of swaps two approaches can be used: the first is based on the estimation of cash flows with fixed and variables interest rates and the consequent calculation of the net present value of these cash flows. The second approach is based on the assumption, that both part of the swap

can be viewed as coupon payments of the respective bonds (one with variable and the other with fixed coupon payments). The fair value of the swap can be then calculated as the difference of the fair values of these two bonds. The exchange of the principals at maturity, which is assumed in this approach, does not mostly occur in reality, but as the principals would be identical, this does not affect the calculated fair value of the swap. As the second approach is closer to the way of reporting swaps in report Bd (HUC) 53-04 (because the nominal values of the swaps are reported in this report), this approach is used for the revaluation of swaps in case of interest rate shock. The calculation of fair values of these bonds is analogous to those described in the previous section.

However, several simplifications need to be done in addition to the abovementioned assumptions. As regards the reported swaps, the only information we have is the rate fixation period concerning the fixed and the variable part of the swap, which is in the aggregate form only. There is no information about the agreed value of the fixed rate or the periodicity of cash flows. Hence, the estimation was based on the following assumptions:

- the value of the fixed rate is 5 % (it seems that although the exact value of the fixed rate has relatively significant impact on fair value of the swap, it is less important when estimating the impact of interest rate shock on change in the fair value)
- the periodicity of payments in fixed and variable part of the swap is annual
- interest rate fixation of the variable part of each swap is less than 3 months

The last assumption is necessary for the distinction of which data in the report Bd (HUC) 53-04 refers to the variable and which to the fixed part of the swap. Based on this assumption, it is assumed that all data reported in “time zone” up to 3 months refer to the variable part of the swaps and all data reported in “time zone” above 3 months refer to the fixed part of the swaps. In each time zone the difference between claims and liabilities is calculated and this difference is revaluated to fair value. As this approach is consistent with that used for the estimation of the impact of the interest rate shock on the portfolio of securities, any hedging of the interest rate risk in the portfolio of debt securities by interest rate derivatives is fully taken into consideration.

2. Methodology of data gathering and calculation of indicators

B 1 Banks and branches of foreign banks

B 1.1 Structure of assets and liabilities of banks and branches of foreign banks

All assets are reported in their gross value, i.e. they are not adjusted by provisions.

Category "Interbank market transactions" consists not only of deposits and loans granted to central banks and other banks, but also of acquired bills of NBS, treasury bills and bills.

Sources of data:

Description	Source report from STATUS
Loans to clients	V (NBS) 33 – 12
Interbank market transactions	Bil (NBS) 1 – 12
Securities	V (NBS) 8 – 12, (NBS) Bil 1 – 12
Deposits and loans received	V (NBS) 5 – 12
Funds from banks	Bil (NBS) 1 – 12
Issued securities	Bil (NBS) 1 – 12
Risk-weighted assets	BD (PVZ) 20 – 12
Own funds	BD (HVZ) 19 – 12

Comments on concentration indices calculation:

CR3 index – the share of three banks with the largest volume of the given item on the total volume of the given item in the banking sector, while the calculation includes only institutions in which the value of the given item is positive

CR5 index – the share of five banks with the largest volume of the given item on the total volume of the given item in the banking sector, while the calculation includes only institutions in which the value of the given item is positive

Herfindahl index (*HHI*) – defined as the sum of squares of the individual banks' shares on the total volume of the given item expressed in percentage, while the calculation includes only institutions in which the value of the given item is positive

As regards the possible interpretation of the value HHI, it can be said that concentration in the given item is the same as if there would be in the sector 10 000/HHI institutions, each of them having the same volume in the given item. According to the definition of the US Department of Justice, the market is considered highly concentrated if HHI exceeds the value of 1 800 and non-concentrated if HHI is less than 1 000.

B 1.2 Revenues and expenditures of banks and branches of foreign banks

Comments on some items:

Net income from trading includes net income from transactions involving securities (except for interest income), net income from FX transactions, and net income from transactions involving derivatives.

Other net operating income includes net income from assigned receivables, from transfer of tangible and intangible assets, from the share in profit generated on shares and deposits in equivalence, from transfer of shares and deposits, from other operations, and other net operating income.

The source of data is report Bil (NBS) 2 – 12.

B 1.3 Profitability ratios of banks and foreign banks and their distribution in the banking sector

Calculation of respective indices:

- *ROA* = return on assets, cumulative net profit to average net assets ratio (Source: Bil (NBS) 2 – 12, Bil (NBS) 1 – 12)
- *ROE* = return on equity, cumulative net profit to average own funds ratio; the calculation does not include branches (Source: Bil (NBS) 2 – 12, BD (HVZ) 19 – 12)
- *Cost-to-income ratio* = cumulative operating costs to cumulative total of net interest and non-interest income ratio (Source: Bil (NBS) 2 –12)
- *Relative significance of interest income* = cumulative net interest income to cumulative total of net interest and non-interest income ratio (Source: Bil (NBS) 2 –12)
- *Net interest spread* = the difference between the share of the cumulative value of revenues (interest and non-interest) other than interest revenues from defaulted assets on the average volume of loans provided to a given counterparty and the share of the cumulative value of costs on the average volume of deposits provided to a given counterparty (Source: V (NBS) 13 – 04)
- *Net interest margin* = the share of net interest incomes reduced by interest incomes from the defaulted assets, on the average value of net assets (Source: Bil (NBS) 2 – 12, Bil (NBS) 1 – 12)

The values of the minimum, lower quartile, median, upper quartile, and the maximum represent the distribution of the values of the given ratio in the banking sector. The value of the lower quartile here expresses that value of the given indicator that 25% of all banks (expressed by number) have a value of the given indicator equal to at most the value of the lower quartile (or lower). Analogously, the value of the median expresses that value of the indicator that 50% of all banks have a value of the given indicator equal to at most the value of the median. Finally, the value of the upper quartile expresses that value of the indicator that 75% of all banks have a value of the given indicator equal to at most the value of the upper quartile. As the given distribution disregards the size of the individual banks, this size is factored in percentage shares given in brackets. For example, the number below the first quartile represents the share of the banks (measured by the volume of assets) whose value of the given ratio lies in a closed interval between the minimum value and the lower quartile value. Similarly, the value below the median represents the share of the banks whose value of the given ratio lies in the interval (closed from the right) between the lower quartile value and the median value.

B 1.4 Risk and capital adequacy ratios of banks and branches of foreign banks and their distribution in the banking sector

Calculation of respective indices:

- *Share of non-performing loans on the total volume of loans to customers* = the share of the gross value of defaulted loans to customers on the total gross value of loans provided (Source: V (NBS) 33 – 12)
- *Share of provisions on the volume of defaulted loans* = the share of provisions created on the gross value of non-standard, doubtful and loss-making loans (Source: BD (ZPZ) 1 – 04)
- *Large asset exposure (weighted) / own funds* = share of weighted large asset exposure to own funds; according to the Banks Act this share may not exceed 800% (Act No 483/2001 Coll. 39(2); does not concern branches of foreign banks, (Source: BD (HMA) 8 – 12, part BazilejII_C).

- *Large asset exposure within groups* – monitors the number of breaches of limits set by the Banks Act (§39(1)) as at the end of individual months, does not concern branches of foreign banks, (Source: BD (HMA) 8 – 12, part BazilejII_A and BazilejII_B).
- *Share of the claimable value of quarantees on the total volume of non-performing loans to customers* – the indicator does not include banks that pursuant to Decree of the NBS No 6/2009 have not classed receivables into individual groups due to the creation of provisions on a portfolio basis according to International Accounting Standards, (Source: BD (ZPZ) 1 – 04).
- *Forex open balance-sheet position/own funds* = share of the difference between assets and liabilities held in a foreign currency on own funds (Source: Bil (NBS) 1 – 12)
- *Forex open off-balance-sheet position/own funds* = share of the difference between off-balance-sheet assets and liabilities (with the exception of redistribution and registration accounts and receivables/payables in entrusted funds) held in a foreign currency on own funds (Source: Bil (NBS) 1 – 12)
- *Total open forex position/own funds* = share of the sum of balance-sheet and off-balance-sheet forex position on own funds; a positive value for the forex position means a risk of loss from an appreciation of the domestic currency (Source: Bil (NBS) 1 – 12)
- Change of economic value of trading book/balance sheet without/including interest rate derivatives / Own Funds (without branches) – change of economic value of trading book/balance sheet (without/including interest rate derivatives) in case of an immediate parallel upward shift of all interest rates by 100 basis points as a share of own funs. 'Economic value' means the difference between the fair value of interest rate-sensitive assets and the fair value of interest rate-sensitive liabilities; interest rate sensitive assets and interest rate-sensitive liabilities are assets and liabilities whose fair value varies according to changes in market interest rates.
- *Total open interest-rate position/own funds* = share of the difference between assets and liabilities and net positions calculated from underlying instruments from derivative transactions with interest rate fixation or with a residual maturity shorter than the given time period (1 month, 1 year, 5 years) on the total volume of own funds (Source: BD (HUC) 53 – 04, BD (HVZ) 19 – 12)
- Indicator of liquid assets = the share of liquid assets on the volume of volatile funds. according to Article 13 of Decree of the NBS No 18/2008 as amended, the value of this indicator may not be below 1.
- *Share of immediately liquid assets on highly volatile funds:* Immediately liquid assets include funds in cash and purchased NBS bills and Treasury bills other than Treasury bills held to maturity and current-account balances at central and other banks. Highly volatile funds include current accounts of central and other banks, current accounts and other sight deposits of customers and all general government deposits (Source: Bil (NBS) 1 – 12)
- *Share of liquid assets (including collateral from reverse repo trades) on volatile funds:* Liquid assets other than immediately liquid assets include securities received from reverse repo trades, Treasury bills held to maturity and all purchased government bonds; their value however is reduced by pledged securities and collaterals provided in repo trades. Volatile funds include also customers' term deposits (Source: Bil (NBS) 1 – 12, V (NBS) 8 –12)
- *Fixed and illiquid assets indicator* = the share of fixed and illiquid assets on selected liability items; according to Article 13 of Decree of the NBS No 18/2008 as amended, this indicator may not exceed the value 1 (does not concern branches of foreign banks) (Source: BD (LIK) 3 – 12)
- *Share of loans on deposits and issued securities* (Source: Bil (NBS) 1 – 12)
- *Total liquidity position/assets* = share of the difference between assets and liabilities in a given time period (up to 7 days, or up to 3 months) on the balance sheet total. The calculation of the indicator does not include balance-sheet items on which a right of lien is established. In addition,

the calculation does not include off-balance-sheet items other than commitments to accept/provide credit and the values of underlying instruments in the spot and futures operations (but only those in which the underlying instrument is a financial asset that is exchanged for this underlying instrument) (Source: BD (LIK) 3 – 12)

- *Capital adequacy* = the share of own funds on risk-weighted assets (may not fall below the 8% limit) (Source: BD (PVZ) 20 – 12, BD (HVZ) 19 – 12)
- *Tier I to own funds* = the share of registered capital less the respective part of items reducing the value of registered and additional capital on the total volume of own funds (Source: BD (HVZ) 19 – 12)
- *Share of own funds on the balance-sheet total,* (Source: BD (HVZ) 19 – 12)
- *Share of the possible loss on own funds in reaching 8% capital adequacy* = the share of the loss caused by a fall in the value of the capital adequacy indicator to 8%, on the total volume of own funds (Source: BD (PVZ) 20 – 12, BD (HVZ) 19 – 12)

B 5 Security dealers

Abbreviations used:

IS-1 – acceptance of a client's instruction to buy, sell or otherwise use investment instruments, and to subsequent forwarding of the client's instruction for the purpose of its execution..

IS-2 – acceptance of a client's instruction to buy or sell an investment instrument and its execution for an account other than the service provider's account.

IS-3 – acceptance of a client's instruction to buy or sell an investment instrument and its execution for their own account.

B 6 Stock exchange

The source of data is the monthly statistics of the Stock Exchange.