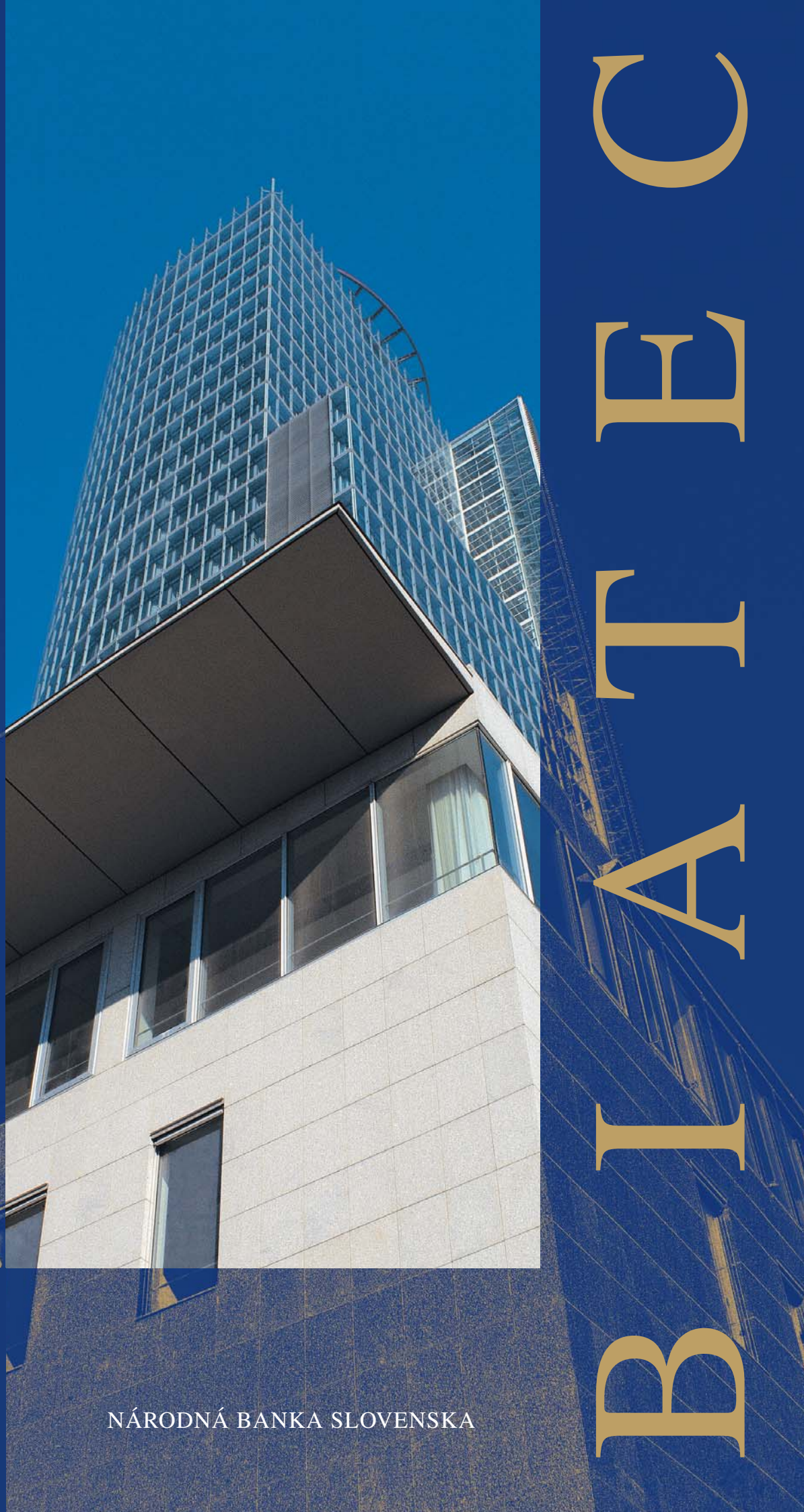


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June 2010  
Volume 18

BANKING  
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# C E T A I B



NÁRODNÁ BANKA SLOVENSKA



# ECB lays the foundation stone for its new premises

*The ECB marked the official start of construction works by laying the foundation stone for its new premises at the site of the former Grossmarkthalle in Frankfurt am Main on 19 May 2010.*



Photography: ECB.

*Národná banka Slovenska was represented at the ceremony by its Deputy Governor Mr Viliam Ostrožlík.*

"The ceremony marks the transition from planning to reality", Jean-Claude Trichet, President of the ECB, said, adding, "I am very confident that we will continue the very good cooperation between all parties that has characterised this project so far. Our common goal is to ensure that the new building complex will become reality as planned to provide the ECB with healthy and functional headquarters, while keeping the building costs within the foreseen budget. I wish our new building and all of us good luck and a smooth construction phase."

The welcome address by the ECB's President was followed by good wishes from Petra Roth, Lord Mayor of the City of Frankfurt, and Wolf D. Prix, representing COOP HIMMELB(L)AU, the firm of architects that designed the New ECB Premises. Together with the President, the members of the Executive Board, the Governing Council and the General Council of the ECB, as well as the Lord Mayor and the architect, filled the founda-

tion stone with a set of the building plans, with newspapers from all 27 EU Member States, with sets of the euro coins of all 16 euro area countries and a set of euro banknotes, as well as with a coin from the City of Frankfurt. The foundation stone was then sealed and moved into the excavation pit where the double-office tower will be erected.

Constructing the basement floor slab will be the first major works to be started for the high-rise building in June 2010. Preparatory works on the Grossmarkthalle had already commenced in late April this year.

Finalisation of the new premises is scheduled for the end of 2013, with the ECB moving in thereafter, i.e. in 2014.

Further details regarding the new ECB premises, including the texts of the speeches presented at the ceremony, can be found on the ECB's website at <http://www.ecb.europa.eu/newpremises>.

Source: The ECB's press release.





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# Residential property price forecasts within a short-sample environment

Alexander Karšay, MSc.  
Národná banka Slovenska

*This article documents a method used by the Národná banka Slovenska in the Eurosystem projection process for the purpose of creating a forecast regarding the average price level of housing in the Slovak Republic. It also describes the analytical model applied to this end. Since available quarterly data only dates back to the first quarter of 2005, the application of standard econometric procedures provides questionable values of estimated parameters. For this reason, the selected approach uses calibrated elasticities of house prices with respect to various determinants from various international sources and based on this develops a single equation error correction model. Using NBS' and other forecasts of individual explanatory variables, the model is able to yield house price forecasts for the required period. Forecast evaluation shows some encouraging results since ex-post one step ahead forecasts and to some extent also medium term dynamic ex post forecasts do not deviate from the actual price observations.*

1 Residential property prices – the Slovak average – published quarterly on the NBS website: <http://www.nbs.sk/sk/statisticke-udaje/vybrane-makroekonomicke-ukazovatele>

2 Some authors also use real volume of loans and one including this variable below the following two alternative methods of creating price forecasts: one without applying the volume of loans and one including this variable while it is expressed as the volume of loans to households divided by the gross disposable household income ( $l/y$ ). The model is thus capable of depicting to a certain extent the adequacy of loan supply relative to incomes as well some imperfection in the credit market resulting in interest rates not fully reflecting the development of demand and supply in this market.

3 The real interest rate can be calculated by subtracting the core inflation rate (the annual HICP inflation rate without unprocessed food and energy) from the nominal interest rate on new loans for property purchase in the relevant quarter.

4  $Rhp$  = real house prices, i.e. the average price per  $m^2$  expressed in constant prices of 2005 applying the core HICP. All variables except  $R$  enter the model in the form of a natural logarithm.

## 1. INTRODUCTION

In the past, models of real estate prices (also referred to for brevity as house prices) were created for a large number of countries, especially from among OECD members. They are typically based on four or five determinants which, according to economic theories, should have a significant influence on prices. The aim of this analysis is to identify an appropriate function defining the relationship between price<sup>1</sup> and individual determinants, to estimate their respective coefficients indicating the strength of their impacts on prices, and finally, to produce forecasts with a 2-3 years horizon. The result is a simple linear model, the reliability of which is at the stage of testing, and predictions of which need to be seen as orientational, theoretical, and in progress, also with regards to all the future outlooks in the attached charts.

A large number of academic studies deal with identifying the main indicators that could be used for such purposes. On the basis of their findings, a simple model based on quarterly time series was created for Slovakia, containing the following main determinants<sup>2</sup> of real house prices:

- The real gross disposable household income ( $ry$ ), seasonally adjusted;
- The real interest rate ( $R$ ) on new loans to households for housing purchases<sup>3</sup>;
- Housing supply, measured by the sum of seasonally adjusted numbers of dwellings under construction and completed ( $h$ );
- The number of inhabitants in the age band 25-40 years as an additional demand indicator ( $pop$ ).

## 2. THE THEORY OF REAL ESTATE PRICE DETERMINATION

Academic literature typically points to the theory that house prices are being driven by a fundamental relation which determines the equilibrium price. However, there are drivers which often cause deviations from this equilibrium, mainly investor expectations. For example, during an economic expansion, growing incomes cause an increase of equilibrium prices that consequently positively impact price and capital gains expectations, leading to excessive price increases. The contrary phenomenon can occur in a period of recession.

On the basis of this theory, one can assume that there exists an equilibrium price around which the actual price fluctuates and thus creates higher volatility than could be expected based on fundamental relationships only. The determinants mentioned in the introduction should affect mainly the equilibrium price. However, it also needs to be noted that currently no time series of prices exists that would be long enough to clearly indicate that under-evaluations or over-evaluations are characteristic or very significant for the Slovak market.

## 3. THE METHOD OF ESTIMATION

In order to obtain the forecast, it is first necessary to estimate the coefficients in the following equation:

$$rh\hat{p}_t = \hat{\mu}_0 + \hat{\mu}_1 y_t + \hat{\mu}_2 R_t + \hat{\mu}_3 h_t + \hat{\mu}_4 pop_t + \hat{\mu}_5 (l/y)_t \quad (1)^4$$

After substituting in for the variables on the right hand side of the equation, we obtain an esti-



mate of the equilibrium price. We could proceed in the same way when forecasting: the predicted values of the right hand side variables will be substituted in the equation and we will obtain the equilibrium house price forecast.

The actual estimation can be realised by the method of least squares (OLS)<sup>5</sup>. This method has been applied in several studies, since it captures the essence of the relationship in question: residential property prices are an endogenous variable, which is being influenced to various extent by five main exogenous determinants. Subsequently, the model can be extended by a disequilibrium component using the error correction model (ECM) described in Part 6.1. More complex models require more information on the right side of the equation, which is impossible in the case of a short sample.

Due to the above reasons, the simple OLS approach seems appropriate for estimation purposes although some potential problems will persist. The reason for this is the aforementioned short sample, and the non-standard development of the Slovak housing market in the given period (an almost uninterrupted real price growth). The estimated elasticities could therefore misleadingly attribute the price increases to the incorrect determinants and this could be avoided only with a substantially longer time series with a greater variability of the house price dynamics.

The following section will describe the OLS estimation results. Since these do not appear to be reliable, an alternative approach will also be presented, making use of the  $\mu$  coefficients from various international sources, whose methodology and countries observed would be relevant in case of Slovakia.

#### 4. ESTIMATION RESULTS

Estimation in this case is severely affected by the sample length. As a result, the parameter estimates may be very unstable and change abruptly with each new observation and with each change in the number or nature of the explanatory variables. The low number of degrees of freedom will result in parameter estimates that can be very distant from approximate true impacts of exogenous variables on house prices. These unreliable elasticity estimates can have further negative impacts on the estimation outcomes, namely non-stationary residuals and finally ECM results, whereby the sign of the error correction term might be positive and perhaps insignificant. The outputs below illustrate the nature of the problems stemming from the short data sample.

When searching for the optimal relationship, a model based on equation (1) using the OLS was estimated first, incorporating a linear time trend (in order to account for the different time trends in the individual variables) (Table 1).

The parameter magnitudes and signs are as expected, except for population. Since the time trend is also statistically insignificant, we have also

estimated an alternative equation without the trend (Table 2).

In this case, all the estimated coefficients are in line with expectations.<sup>6</sup> However, if we estimate the same model for the period from 2005Q1 through 2009Q2, the elasticities will change rather sharply ( $pop$  will increase to 4.44,  $ry$  will fall to 1.43, and  $h$  will fall to -1.54).

Next, it is necessary to verify if the residuals are stationary. If results with the full sample are considered again, the outcome will be that the residuals are non-stationary  $I(1)$ . That would mean that no equilibrium relationship between the given variables exists. If, in spite of this, we estimate the full ECM model (to explain short-term movement of prices), the result will be a positive and insignificant coefficient of the error correction term, which is unsatisfactory from a modelling and forecasting perspective.<sup>7</sup>

Overall, the indicated estimation techniques reveal several shortcomings. The estimated parameters show significant instability. In order to identify the main determinants of the house price

<sup>5</sup> A more precise method that could be used in this case is the method of fully modified ordinary least squares (FMOLS) which in contrast to the standard OLS method enables correct estimation of the variance for individual estimates of the  $\mu$  coefficients and to carry out correct hypothesis testing. In our case, however, the standard and modified version of the OLS did not provide significantly different parameter estimates (hypothesis testing provided the same conclusions), therefore we provide as an approximation only the results of the OLS method. The author can provide the results of the FMOLS on request.

<sup>6</sup> The only exception is the insignificant estimate of population elasticity. Since its absolute value is comparable with other parameters, we will not ignore its influence. Another problem of the estimation is the impossibility to verify the order of integration of variables. Some seem to behave as  $I(2)$  which is relatively unusual. On the other hand, other variables are stationary. We believe this problem

Table 1

Dependent variable: LOG(RHP)		Sample: 2005Q1 2009Q3		
Method: Ordinary Least Squares		Number of included observations: 19		
	Coefficient	Standard deviation	t-statistic	p-value
C	18.039	86.273	0.209	0.8379
@TREND	0.011	0.049	0.229	0.8231
LOG(RY)	1.732	0.461	3.758	0.0027
IR_REAL	-0.057	0.012	-4.900	0.0004
LOG(H)	-1.340	0.319	-4.195	0.0012
LOG(POP)	-1.649	12.279	-0.134	0.8954
LOG(LY)	0.606	0.276	2.198	0.0483
$R_2$	0.990	Average LOG (RHP)		7.010
Corrected $R_2$	0.986	LOG (RHP) standard deviation		0.189
F-statistic	207.794	Durbin-Watson		1.332
F-statistic (p-value)	0.000			

Table 2

Dependent variable: LOG(RHP)		Sample: 2005Q1 2009Q3		
Method: Ordinary Least Squares		Number of included observations: 19		
	Coefficient	Standard deviation	t-statistic	p-value
C	-1.153	18.983	-0.061	0.9525
LOG(RY)	1.769	0.414	4.271	0.0009
IR_REAL	-0.056	0.008	-6.790	0.0000
LOG(H)	-1.343	0.307	-4.370	0.0008
LOG(POP)	1.036	3.437	0.301	0.7679
LOG(LY)	0.664	0.100	6.671	0.0000
$R_2$	0.990	Average LOG (RHP)		7.010
Corrected $R_2$	0.987	LOG (RHP) standard deviation		0.189
F-statistic	268.950	Durbin-Watson		1.314
F-statistic (p-value)	0.000			



- can be assigned to the short sample and we continue in the analysis of these results with the aim of illustrating further problematic results.
- 7 The results of the residual stationarity test and the ECM model will be indicated shortly in the full version of the article on the Internet page of the NBS.
  - 8 Similar outcomes have been achieved when omitting the alternative indicator ( $l/y$ ).
  - 9 A list of research studies on the basis of which the coefficients were selected will be provided in full on the Internet page of the NBS.
  - 10 Without the variable  $l/y$ . Chapter 7 includes this variable.
  - 11 The article makes use of the data (including the forecasts of this data) available in the 4th quarter of 2009. At the time of publication of this article, more up to date observations of individual variables and their forecasts exist.
  - 12 Data on nominal prices come from the website of the NBS. We can obtain real prices by deflating the nominal prices by the core HICP index. The model generates forecasts of real prices. Consequently, nominal forecasts may be calculated by a reverse application of the forecasts of core HICP for Slovakia for 2009 through 2011 from Eurosystem predictions.
  - 13 ry – the NBS creates its own forecasts. R – the forecast is based on the assumptions of the ECB (European Staff Macroeconomic Projections for the Euro Area, December 2009) regarding future EURIBOR rates; it is assumed that the nominal EURIBOR rates will be reflected in the nominal interest rates on housing loans. The Pop- prediction is taken from the Research Demographic Centre of Infostat ([www.infostat.sk/vdc](http://www.infostat.sk/vdc)). h – is the only variable for which no official forecasts exists. Therefore we applied the approach of a regression with lagged values of housing starts and the construction confidence indicator (Statistical Office of the Slovak Republic) and the remaining quarters were predicted using a simple ARIMA model with final expert modification.

movements in the past and in the future, we would need more stable values, which could potentially be achieved with a longer sample. Moreover, it is impossible to prove the existence of an equilibrium relationship between house prices and the individual determinants when using the ECM model and the test of residual stationarity. Due to the stated reasons, house price forecasts and statistical inference based on econometric results are not useful.<sup>8</sup>

The likely reason for these outcomes is the short sample size: house prices in the given period grew very dynamically and almost uninterruptedly, therefore there was not enough time to capture the influences of individual determinants.

## 5. AN ALTERNATIVE APPROACH – THE SELECTION OF APPROPRIATE COEFFICIENTS

Econometric estimation for the time being does not enable us to make of reliable predictions. An alternative option, however, is calibration – adopting elasticities estimated in other relevant studies investigating the relationship between real estate prices and their determinants. Each of the coefficients in Table 3 expresses the calibrated elasticity for the Slovak Republic.<sup>9</sup>

Tabuľka 3

Variable	Coefficient
ry	1
R	-0.01
pop	4.45
$l/y$	0.24
h	-0.5

## 6. THE FORECASTS<sup>10</sup>

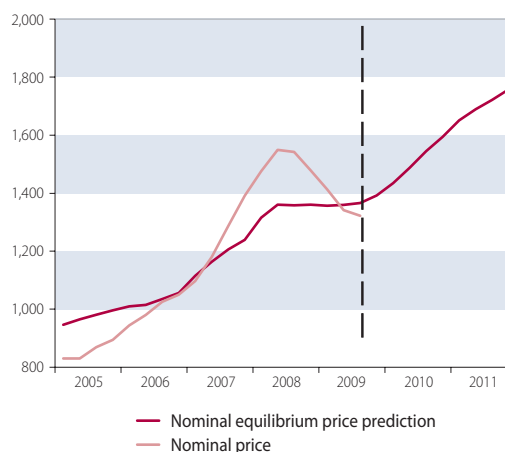
Equilibrium price was estimated for each quarter within the period from 2005Q1 to 2009Q3<sup>11</sup>. It is a period for which actual observations were available for all variables within the model. Equilibrium prices will be compared with actual prices for the given period. Forecasts of equilibrium prices for the period from 2009Q4 to 2011Q4 will also be provided.<sup>12</sup>

Up to 2009Q3, the determinants are represented by their actual values. From 2009Q4, the actual data do not exist, we will, therefore, use their forecasts<sup>13</sup>.

According to the estimated equilibrium relationship (Equation 1 and Table 3), in 2009Q3 the nominal equilibrium prices increased (EUR 1,366 per m<sup>2</sup>) after more than one year of stagnation and should subsequently increase towards EUR 1,757 per m<sup>2</sup> which is 33% higher than the actual price in 2009Q3 (EUR 1,322 per m<sup>2</sup>). The prices at present seem to be just below their equilibrium level (by 3%).

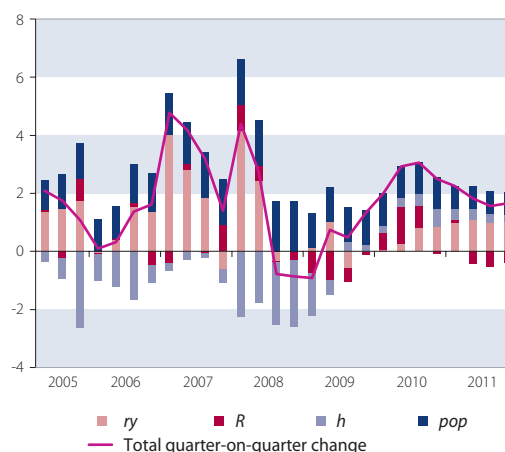
Chart 1 depicts a relatively close relationship between the equilibrium prediction and the actual price, although with visible under- and overvaluation (undervaluation of 14% in mid-2005 and over-

Chart 1 Nominal prices (in EUR per m<sup>2</sup>)



Source: Author's own calculations (applies for all charts in this article).

Chart 2 Contributions to the quarter-on-quarter growth of real equilibrium price (in %)



valuation of a similar extent in mid-2008). Quarter-on-quarter dynamics of the equilibrium prices can be decomposed according to the contributions of individual determinants. The contribution of each one of them is depicted in Chart 2.

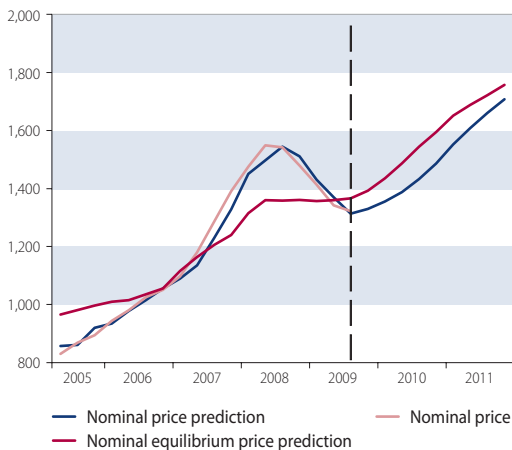
As one can see from Chart 1, a substantial gap between the estimate and reality was created in the period between 2008Q1 and Q3. According to Chart 2, the equilibrium price in the given period was negatively influenced by a significant increase in housing supply, which started to overshadow the contributions of income. The population grew more or less constantly during the whole period, thus positively affecting the price. The strongest impacts so far were stemming from income (which is considered to be an especially important price determinant). The influence of the real interest rate varied, depending on its coefficient and changing level.

### 6.1. A detailed forecast description for the period 2009Q3 – 2011Q4

Chart 2 also depicts the influence of the determinants on the equilibrium price in the coming quarters. A significant weakening of the influence



Chart 3 Prediction using the ECM (in EUR per m<sup>2</sup>)



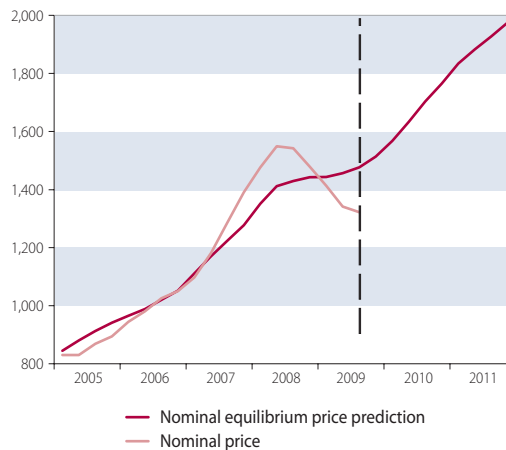
of supply on price is apparent. Supply should decline in the future as a result of the cooling real estate market, creating a slightly positive pressure on the equilibrium price. This future scenario can be foreseen by looking at the downward tendency of housing starts at present as well as extremely low levels of the construction confidence indicator. The current forecasts for  $ry$  suggest that the contribution of this variable to price growth will be visibly lower when compared to the recent past.

The current level of interest rates can also support price growth in the future. The last indicator ( $pop$ ) maintains an approximately constant growth trend, but later on, a slowdown is expected in the given category, in line with the available forecasts.

It is justified to ask how quickly the current actual price will achieve its equilibrium level, or, in the present situation, how long it will stay below this level. The ECM model is able to provide a theoretical answer.

Since the standard econometric procedure provided unreliable results, calibrated parameters will again be used. The model takes the following form:

Chart 4 Nominal prices (in EUR per m<sup>2</sup>)



$$\Delta rhp_t = a_1(rhp_{t-1} - rhp_{t-1}^e) + a_2 \Delta ry_t + a_3 \Delta rhp_{t-1} \quad (2)^{14}$$

$a_1 < 0, a_3 \in (0; 1)$

Predictions of the actual nominal price and its estimated equilibrium, as well as the complete nominal time series until 2011, are provided in Chart 3.

## 7. MODEL INCLUDING THE VOLUME OF LOANS PROVIDED

The model described in the previous part (model A) can be extended by including an additional explanatory variable ( $l/y$ )<sup>15</sup>, which serves as another indicator of demand. The estimate of equilibrium price then takes the form of equation (1), and the full ECM model will be estimated by applying equation (2).

According to Chart 4 the equilibrium price continues to grow in the 4<sup>th</sup> quarter of 2009 following a period of stagnation in the second half of 2008 and at the beginning of 2009, and it subsequently grows to the level of EUR 1,975 per m<sup>2</sup>, which is 49% higher than the price observed in the 3<sup>rd</sup> quarter of 2009. Therefore, this version of

14 Where  $\Delta$  means quarter-on-quarter growth;  $rhp_{t-1}^e$  is the equilibrium price (estimated using the described method). The  $a_3$  coefficient lies in an open interval  $(0; 1)$  and expresses the inertia of house price growth or what is referred to as the feedback mechanism, whereby the growth trend of prices leads to further growth due to optimistic expectations, and the negative trend on the other hand increases the existing pessimism. This can contribute to more realistic price dynamics. The coefficients have the following values:  $a_1 = -0.2$ ;  $a_2 = -0.5$ ;  $a_3 = 0.44$  as an average of the results of several studies (details will be published in the full version of the article). The remaining determinants were assigned zero short-term influence: population growth will probably only have a gradual influence and does not need to imply immediate growth of demand; it is also assumed that increased supply will not be immediately visible in prices since sellers probably need time to modify their requested prices. In the case of interest rates, we assume that potential buyers take a certain time until the shock in rates influences their decision to enter the market. To identify the short-term impact of the  $l/y$  variable, not enough empirical material was available. Thanks to this structure, the model maintains its simplicity and transparency.

15 ( $l/y$ ) expresses the ratio of household credit volume and gross household disposable income. We obtain future values of the variable using internal forecasts of the NBS used in Eurosystem predictions.

Chart 5 Contributions to quarter-on-quarter growth of real equilibrium price (in %)

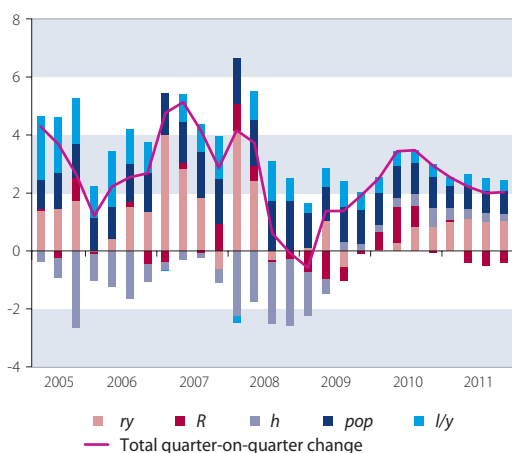


Chart 6 Prediction using the ECM (in EUR per m<sup>2</sup>)

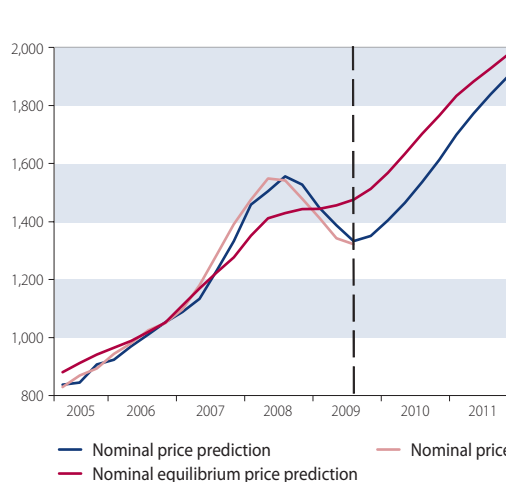






Chart 7.1. Quarter-on-quarter change of real price, model A (in %)

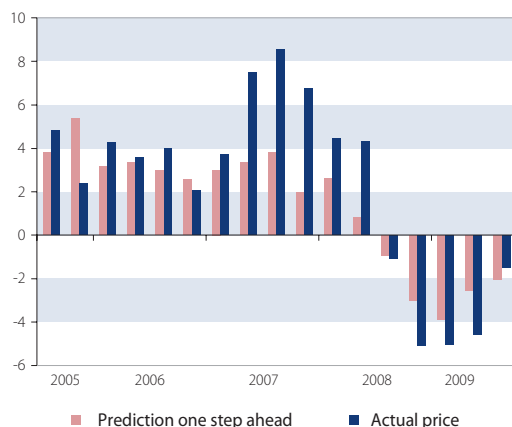
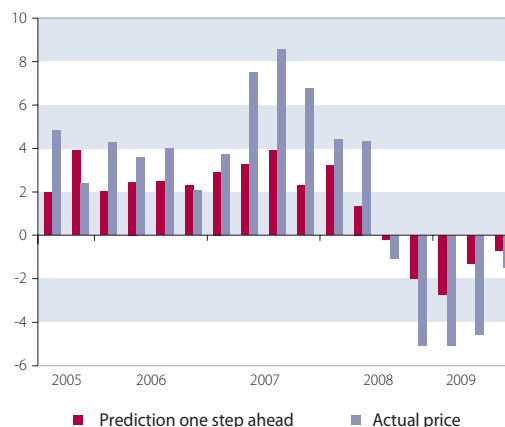


Chart 7.2. Quarter-on-quarter change of real price, model B (in %)



16 In these charts, the one step ahead forecasts for the period from 2005Q2 to 2009Q3 are expressed by the nominal price prediction curve for this period.

the model predicts a much steeper growth than model A. Moreover, the model suggests that the current observed price (in 2009Q3) is 10% lower compared to the equilibrium. The chart also shows a strong connection between equilibrium and actual prices, except for the 5 percent undervaluation in 2005 and an almost 10 percent overvaluation in mid-2008. This means that the inclusion of the credit indicator will yield estimates of equilibrium prices closer to actual prices than in the case of model A, while the capturing of under- and overvaluation is less evident.

Chart 5 explains contributions of individual determinants to the equilibrium price growth. This time, the chart includes the pro-growth influence of the credit indicator, while the other indicators maintain the same contributions as before. Based on the current medium-term predictions,  $l/y$  will be characterised by a slowing, but continually positive dynamics and the associated contribution to price growth.

Overall, adding the volume of loans to the model will lead to a steeper actual price prediction path. This is confirmed when using the ECM equation for the upcoming quarters, which predicts an immediate market recovery starting in the 4<sup>th</sup> quarter of 2009, and continuing to develop dynamically in accordance with Chart 6.

It is evident from the above that the prediction process eventually yields two sets of predictions. It is then up to the forecaster to select the one that seems to be realistic, given the current state of the economy. Currently, a high level of uncertainty persists regarding the nature of recovery from the global recession, which may be protracted, immediately making the results of model A more likely. A longer recovery could also magnify the negative feedback in real estate prices and slow down the recovery of determinants such as income and supply of loans, leading to further downward pressure on real estate prices not captured in the equations discussed. A further downside risk to prices stems from the possible larger than expected excess supply in the Slovak residential property market, since we have obser-

ved a large number of new flats coming onto the market in the recent past and official statistics and models are not capable of confirming what is the precise extent of the excess and its price impacts. Due to these reasons, there is a need to perform expert adjustments to the selected price prediction trajectory based on important current information or other analyses. This approach is used by the NBS in its forecasts of real estate prices. It is necessary to point out that the presented model predictions are not official predictions of the NBS, and the results need to be considered as orientational and entirely theoretical, while their reliability will continue to be tested.

## 8. PREDICTION EVALUATION

The available data enable the evaluation of the "one step ahead" forecast precision for a substantial part of the sample (2005Q3 – 2009Q3), and also the evaluation of the dynamic ex post forecasts for several steps ahead. The latter involves making a long term forecast at a selected point in the past (e.g. in 2005Q2 for the period 2005Q3 – 2009Q3), while disregarding actual observations of real estate prices over the forecast period. On the other hand, actual observations of determinants will be used instead of their individual forecasts.

### 8.1. One step ahead forecast

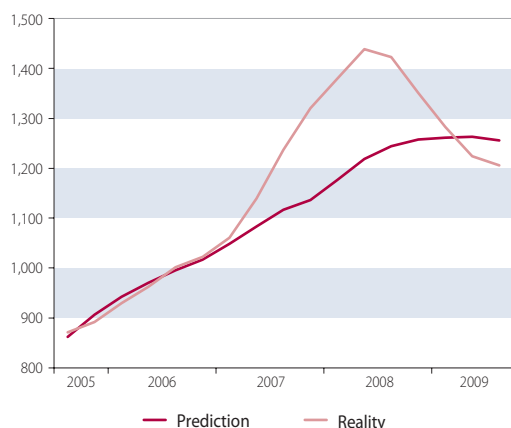
The performance of short-term predictions of models A and B is depicted in Charts 3 and 6<sup>16</sup> respectively, immediately suggesting a good level of precision regarding prices for the coming quarter. Table 4 provides some traditional accuracy statistics.

Chart 7 indicates that the predicted growth rates always have the correct sign and their magnitude is approximately correct, even though there are several exceptions. This regularity is confirmed by the accuracy statistics in Table 4. The correlation between predictions and actual values is relatively strong. MAPE shows a minor percentage deviation of actual values from their forecasts, and the Theil coefficient proves that



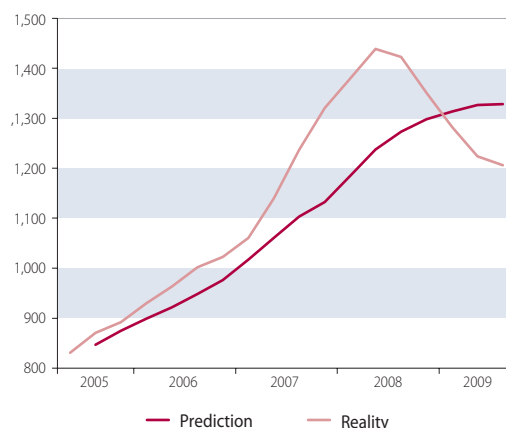


Chart 8.1. Medium-term forecast 2005Q2, real prices (in EUR per m<sup>2</sup>)



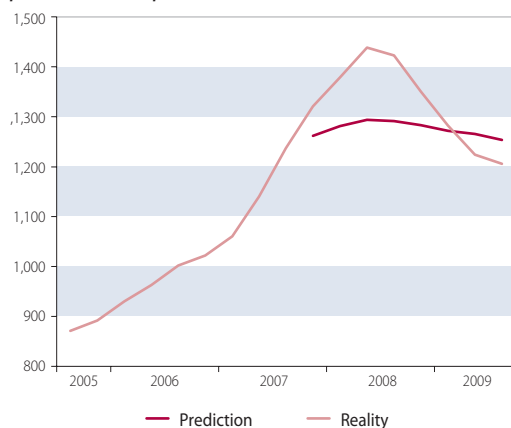
Corr	MAPE	Theil	Um	Us	Uc
0.70	5.54	0.69	0.003	0.66	0.34

Chart 9.1. Medium-term forecast 2005Q2, real prices (in EUR per m<sup>2</sup>)



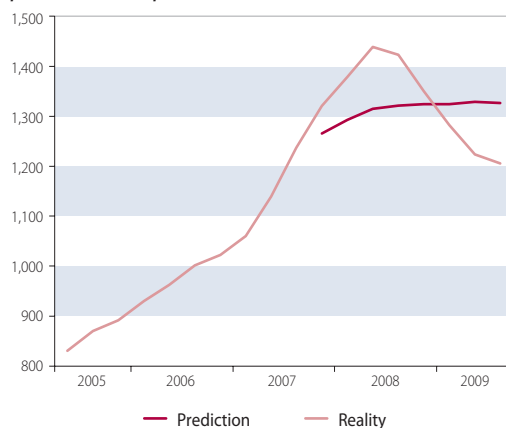
Corr	MAPE	Theil	Um	Us	Uc
0.71	7.16	0.72	0.02	0.72	0.26

Chart 8.2. Medium-term forecast 2007Q3, real prices (in EUR per m<sup>2</sup>)



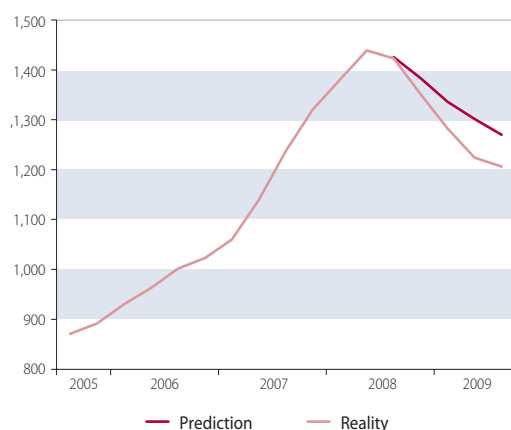
Corr	MAPE	Theil	Um	Us	Uc
0.95	5.50	0.78	0.01	0.94	0.04
0.69	6.25	0.62	0.11	0.55	0.33

Chart 9.2. Medium-term forecast 2007Q3, real prices (in EUR per m<sup>2</sup>)



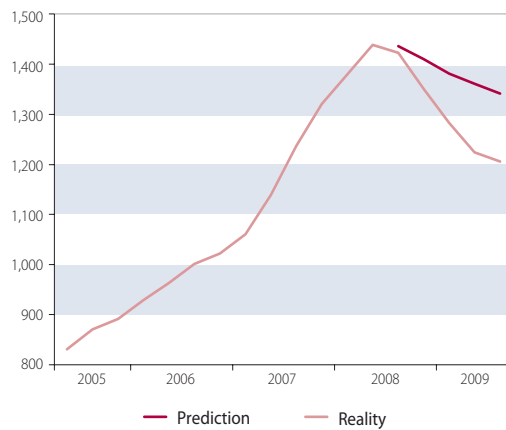
Corr	MAPE	Theil	Um	Us	Uc
0.93	6.25	0.84	0.09	0.87	0.04
0.59	4.68	0.62	0.08	0.60	0.32

Chart 8.3. Medium-term forecast 2008Q2, real prices (in EUR per m<sup>2</sup>)



Corr	MAPE	Theil	Um	Us	Uc
0.84	3.66	0.40	0.41	0.38	0.21
0.80	4.62	0.57	0.16	0.40	0.44

Chart 9.3. Medium-term forecast 2008Q2, real prices (in EUR per m<sup>2</sup>)



Corr	MAPE	Theil	Um	Us	Uc
0.80	7.08	0.63	0.71	0.22	0.08
0.84	5.10	0.58	0.10	0.63	0.26



**Table 4**

	Model A	Model B
Correlation coefficient <sup>17</sup> (Corr)	0.86	0.90
Mean absolute percentage error (MAPE) <sup>18</sup>	1.84	2.18
Theil inequality coefficient (Theil) <sup>19</sup>	0.51	0.55
Bias proportion (Um)	0.13	0.10
Variance proportion (Us)	0.34	0.67
Covariance proportion (Uc)	0.54	0.23

17 Correlation between predicted and actual quarter-on-quarter growth rates.

18 For example Pindyck, Rubinfeld (1991). Calculated from price levels.

19 For example Watson, Teelucksingh (2002). The value of the coefficient greater than 1 means that the prediction is worse than a "naive" forecast with zero future growth, while values declining from 1 to zero signal movement from a naive forecast to a forecast with perfect precision.

20 Instead of this point, it would be possible to select also 2007Q2 or 2007Q1. The results are very similar, however.

21 Tables adjacent to the second and third chart in Chart 8 contain two types of information. The first row in each table evaluates the forecast for the period shown in the chart above the table. The second row for the purposes of creating the statistics groups together all *n*-step ahead forecasts starting at points 2005q3 – 2007q4 (and for the third table 2005Q3 – 2008Q2), where *n* is the number of forecast steps in the respective graph above the table.

22 Due to the clarity of Charts 8 and 9, the equilibrium price curve was removed. The distinction between nominal and real quantities in this case is not substantial.

the models dominate a naive prediction of zero change. It is positive that the Um is close to zero in both cases. However, the Us is relatively high, especially in the case of model B. However, the results are satisfactory overall.

## 8.2. Medium-term forecasts

A further step will be to compare the forecasts for several quarters with actual prices. Three important points in the previous cycle were selected for this purpose (2005Q2 – 1<sup>st</sup> case: bottom of the previous cycle, 2007Q3<sup>20</sup> – 2<sup>nd</sup> case: strengthening of the residential boom and 2008Q2 – 3<sup>rd</sup> case: peak of the cycle) and in each case, prediction for the following period until 2009Q3 was created. The results of model A are described in Chart 8.<sup>21</sup>

These three evaluations in general provide a satisfactory view of the future direction of the market, even with longer forecast horizons, as visible especially in the first chart in which the forecasts follows the actual values for almost two years, but also in the third chart, which depicts the future adjustment of the disequilibrium, even though at a somewhat slower rate. The level of correlation confirms that the growth rates are moving together visibly and that Theil coeffi-

cient again shows improvement compared with the "naive" forecast. On the other hand, however, some shortcomings are also evident, especially the inability of the forecast to capture the price explosion from the beginning of the second half of 2007 in the 1<sup>st</sup> and 2<sup>nd</sup> case. That is also the reason for the less favourable results for MAPE in the 1<sup>st</sup> and 2<sup>nd</sup> case, Um in the 3<sup>rd</sup> case, and Uc in all cases. The forecast more or less tracks the estimated equilibrium price or, in the period from 2005 to 2006 (the 1<sup>st</sup> case) and 2008-2009 (the 3<sup>rd</sup> case) converges towards the equilibrium at a realistic pace.<sup>22</sup> The B model is examined in Chart 9.

Overall, model B achieved at first glance somewhat less precise forecasts, even though the comparison of the evaluation statistics is not capable of identifying clearly if it is true in all cases. In spite of the fact that the 1<sup>st</sup> case is comparable with model A, in the 2<sup>nd</sup> and 3<sup>rd</sup> case a pro-growth influence of the credit indicator is visible. At this moment it can thus be observed that model B achieved slightly weaker results, but the success rate of the models can change in the future.

## 9. CONCLUSION

The ECM model described in this article can indicate likely overvaluation and undervaluation, establish current and future equilibrium prices and on the basis of this information, identify the anticipated direction and extent of the future movement of real estate prices. The applied approach could more suitably depict the impact of individual determinants when compared to traditional econometric analysis. However, possible uncertainty and randomness regarding the selected parameters, future determinant values and the model structure also require expert as-

**Table 5 Summary results of the model forecast**

MODEL A	Nominal price	Change (%) y-o-y	Change (%) q-o-q	MODEL B	Nominal price	Change (%) y-o-y	Change (%) q-o-q
2009Q4	1330	-10.1	0.6	2009Q4	1350	-8.7	2.2
2009 average	1352	-10.5	-2.6	2009 average	1357	-10.1	-2.2
2010Q1	1356	-4.0	2.0	2010Q1	1404	-0.6	4.0
2010Q2	1388	3.4	2.4	2010Q2	1465	9.2	4.3
2010Q3	1433	8.4	3.3	2010Q3	1537	16.2	4.9
2010Q4	1486	11.7	3.7	2010Q4	1612	19.4	4.9
2010 average	1416	4.9	2.8	2010 average	1505	11.0	4.5
2011Q1	1553	14.5	4.5	2011Q1	1700	21.0	5.4
2011Q2	1609	15.9	3.6	2011Q2	1772	21.0	4.3
2011Q3	1660	15.8	3.2	2011Q3	1839	19.6	3.7
2011Q4	1708	14.9	2.9	2011Q4	1899	17.8	3.3
2011 average	1632	15.3	3.5	2011 average	1802	19.9	4.2
Change of average 2009 (%)	-	-10.6	-	Change of average 2009 (%)	-	-10.2	-
Change of average 2010 (%)	-	4.7	-	Change of average 2010 (%)	-	10.9	-
Change of average 2011 (%)	-	15.3	-	Change of average 2011 (%)	-	19.8	-



assessment of market developments and further testing of the given model, which is currently being used as additional work aid. When it comes to the evaluation of model forecasts, it is evident that the "one step ahead" forecasts do not differ substantially from actual observations. Longer-

term forecasts in general capture the future price trend. However they are not able to predict some important fluctuations. In the future it will be important to monitor the forecast precision, and to apply new forecasting methods as the number of observations increases.



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# Slovak residential property market in the European context

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1 One of these sources is, for example, web portal Global PropertyGuide, which is a useful database of information and data on the global residential property market on the basis of the national data of proprietary created characteristics.

2 For more details see: Technical Manual on Owner-Occupied Housing. Draft version 1.9, Eurostat, February 2010.

## INTRODUCTION

The relatively small Slovak residential property market is often characterised by analysts with various further attributes, such as being young, dynamic, non-standard, not yet crystallized out, but also as interesting. For all of the mentioned attributes, there is a whole series of reasons.

For the purpose of creating one more plastic image of the national residential property market it is appropriate to introduce it from the point of view of several aspects. So far as comparable data exist, it is very practical to show the residential property market in question also in the international context. International comparability is still

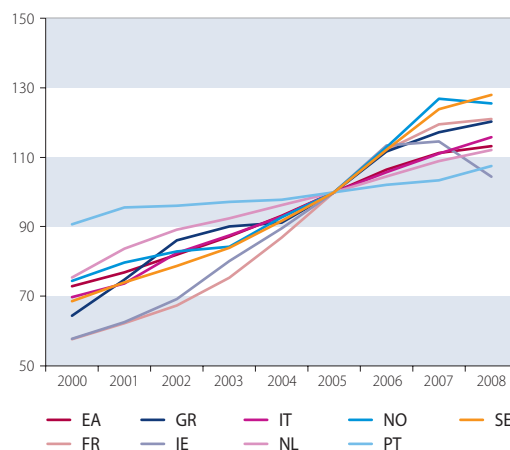
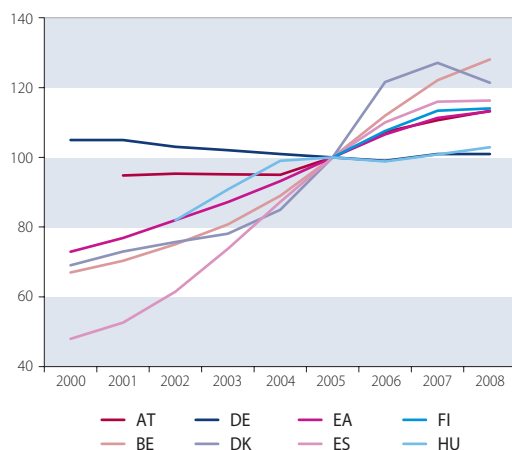
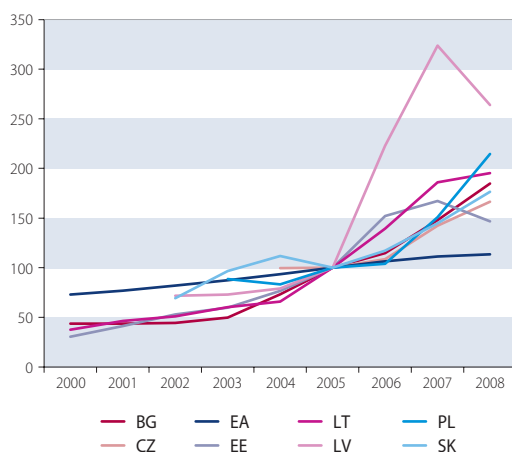
the relatively weak side of the data on the residential property market not only in Slovakia, but also in the majority of European countries.

One of the important sources of data on residential property prices is the database of the Bank for International Settlements – BIS, which comprises probably the longest time series concerning this issue. In recent years there have been certain attempts by specialised institutions that came up with inspiring proposals as well as practical solutions in the form of quasi comparable characteristics from the field of the residential property market<sup>1</sup>. Even though these sources offer very useful information, their orientation and unofficial character should be kept in mind when using them.

Within Eurostat there is a methodology of a relatively high level of elaboration, which characterises potential sources of data and possible procedures at the construction of partial as well as aggregated indices of the prices for the acquisition, reconstruction and maintenance of houses and flats<sup>2</sup>. Actively engaged in the mentioned activity of Eurostat are also national statistical offices, which is why the perspective of practical usage of internationally comparable data on the development of residential property prices is slowly approaching.

Because of considerable diversification of sources and procedures, with the help of which the data on residential property prices in individual countries are collected, it is relatively problematic to create a reliable basis of identical coefficients for international comparison. Even though we are

**Chart 1 Development of residential property prices in selected European countries (2005=100) (in %)**



Source: BIS, the NBS charts.

Note: The data for the euro area (EA) is quoted in each chart for comparison.



aware of certain inaccuracies, we will try to create a more plastic image of the Slovak residential property market from the available sources, by putting it into the broader European context.

### DEVELOPMENT TREND OF RESIDENTIAL PROPERTY PRICES POST-2000

In consideration of the differentiated factual as well as temporal development of residential property markets in particular European countries, it is appropriate to use indices with an identical comparable base for the mutual comparison of the dynamics of residential property prices development. As in the BIS database there are data for particular countries quoted with different bases, we made their calculation for the basis year 2005 (2005 = 100). Such standardization of data on residential property prices development enables us a relatively reliable comparison of development among countries within Europe subsequent to 2000.

Data on the development of residential property prices have been accessible for some European countries including Slovakia only since the year 2002; that is why evaluative considerations begin from this year.

With respect to the general knowledge of dynamic growth of house and flat prices after 2000, the value of basic indices (2005 = 100) in 2002 should be less than 100 in particular countries. This assumption, however, does not apply to Germany where the average square meter price of residential area was 3% higher in 2002 compared to 2005. This is related to the generally known very low variability of changes in average residential property prices in Germany, with oscillation around the zero value in both directions in the relatively long-term.

From 2002 up to 2005 residential property prices grew most dynamically in Bulgaria (by 55.8%), Lithuania (by 55.8%), Estonia (by 47.1 %), Spain (by 38.5%), in France (by 32.6%), and Ireland and Slovakia (both by 30.8%). In contrast, over this period the average prices of houses and flats grew least in Portugal (by 3.9 %) and Austria (by 4.7 %).

After 2005 the residential property prices grew markedly over the average in Latvia, when they rose in 2007 more three-fold against the basis year, and in 2008 even after the slowdown they considerably surpassed the growth dynamics of prices for houses and flats in other countries. More than a two-fold increase after 2005 also had average residential property prices in Poland, and almost two-fold in Lithuania. By more than one half against the basis year the average prices of houses and flats grew also in another four new EU member countries, among which is also Slovakia (by 76.6%). Contrary to this, even after 2005 average residential property prices grew only minimally in Germany (by 1.0 %), Hungary (by 2.9%), and Portugal (by 7.5%) experienced only a moderate rise.

Slovakia closes the quartet of countries (LV, LT, NG, SK)<sup>3</sup> where in 2008 growth of average residential property prices more than doubled against

2002. On the opposite pole are countries where only minimal growth (less than by 20 percentage points in PT and AT) or even a decrease (by 2 percentage points in DE) of the average prices of houses and flats in the evaluated period took place.

From the graphical analysis unequivocally follows a considerably higher variability of changes of average residential property prices from 2002 up to 2008 in the new EU member countries (with the exception of Hungary) compared to the old EU member countries. The variation span between the lowest basic index value (44.2% in Bulgaria in 2002) and the highest basic index value (323.8% in Latvia in 2007) represents the value of almost 280 percentage points in the framework of the new member countries, while within the majority of old member countries only fewer than 70 percentage points (the lowest growth by 61.5% in Spain in 2002 and the highest growth by 128% in Belgium in 2008). A relatively independent group is composed by the Nordic states (DK, NO and SE) in which residential property prices increased from 2002 more markedly than in the majority of old EU member states, but less markedly than the majority of new EU member states. Average residential property prices in Denmark and Norway grew after reaching a climax in 2007 yet more slowly in the next year, but in Sweden the prices of houses and flats grew dynamically even in 2008.

Within the euro area the average residential property prices grew from 2002 up to 2005 relatively evenly, and then increased annually by almost 7% on average. After 2005 annual growth started to alleviate to fewer than two per cent in 2008. Contrary to this, in Slovakia but also the majority of new EU member states (with the exception of Hungary where the prices of houses and flats have been stagnating in recent years) residential property prices started to grow considerably after 2005, which started to widen the gap against the dynamics of growth of prices in the euro area. The development of prices of houses and flats for the euro area as a whole was resembled most of all by development in Italy and from 2004 also Austria.

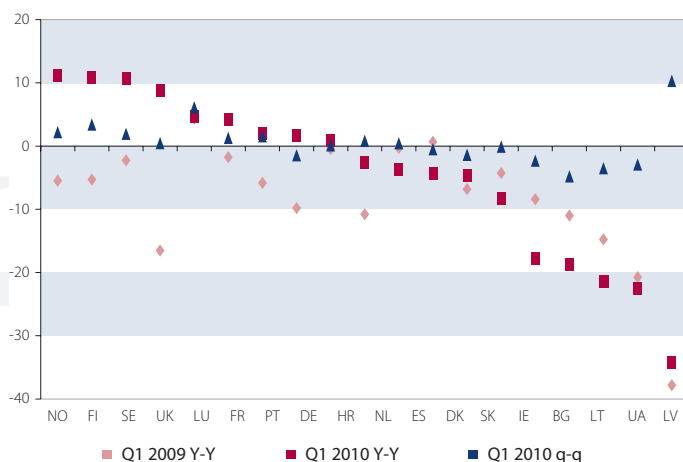
### CURRENT DEVELOPMENT OF RESIDENTIAL PROPERTY PRICES

According to the evaluations of the Národná banka Slovenska from the data of the National Association of Residential property Agencies of Slovakia (which are also part of the portal Global Property Guide), the average prices of houses and flats started to decrease gradually in Slovakia from the 3<sup>rd</sup> quarter of 2008, and in the 1<sup>st</sup> quarter of 2010 they almost stagnated in comparison with the previous quarter. The average price of one square meter of residential property reached EUR 1,296/m<sup>2</sup>, which meant a quarterly yearly decrease of 0.1% and a decrease on an annual basis of 8.3% (in the 4<sup>th</sup> quarter of the year 2009 it was EUR 1,297/m<sup>2</sup>, -1.9% and -12.3%).

<sup>3</sup> Used abbreviations of the states are in accordance with statistical abbreviations of names of states in the Annex to the Legal Order of Statistical Office of SR No. 303/2007 Coll. More in detail see, e.g. [http://portal.statistics.sk/files/Sekcie/sek\\_200/Klasifikacie/ciskraj.rtf](http://portal.statistics.sk/files/Sekcie/sek_200/Klasifikacie/ciskraj.rtf).



Chart 2 Development of residential property prices in selected countries (in %)



Source: Global Property Guide, the NBS chart.

Based on currently available comparable data, Slovakia in the 1<sup>st</sup> quarter of 2010 was one of the European countries in which last year annual decrease of average residential property prices persisted (DK, NL, ES, SK, BG, IE, UA, LT and LV). The second group was represented by countries which moved during last year from annual decrease of average residential property prices to annual growth (FI, NO, SE, UK, LU, PT, FR and DE). In almost all of the countries from this group in the 1<sup>st</sup> quarter of 2010 inter quarterly growth also contributed to the annual growth of average prices of houses and flats. This can be considered as a certain signal of gradual recovery of the residential property market in these countries. Austria finds itself in a special position, in which the average residential property prices also rose annually one year ago.

The above indicated typology of countries according to the current development of average residential property prices signalizes also certain features through which the residential property markets distinguish themselves in the old and new EU member states. Processes taking place in the residential property markets including the price development of houses and flats in the new EU member and candidate countries react as if having a certain time lag to various – first of all outward – stimuli compared to old EU member countries.

A simple comparison of available data signals a certain variability of the annual development of average prices of houses and flats not only in old EU member countries, but also in new EU members, perhaps even candidate countries. It can be deduced from this that even though the residential property markets in old EU member countries have been established for a longer time, the impacts of the global economic recession rocked them in a similar manner as in new EU member states. As a certain exception stand Germany and Austria with a relatively small variation span of

annual dynamics of average residential property prices in the first quarters of 2009 and 2010.

According to available data on the current development of average prices of houses and flats, Slovakia finds itself on the imaginary border between the old and new EU member countries. While in the majority of old member countries the average residential property prices already increased inter quarterly as well as annually during the 1<sup>st</sup> quarter of 2010, they decreased in Slovakia but not so markedly as in other new EU member countries. In the case of Latvia, the relatively massive inter quarterly growth of the average residential property prices in the 1<sup>st</sup> quarter of 2010 caused only a moderate deceleration of the annual decrease in comparison with the 1<sup>st</sup> quarter of 2009. Soon the overall development of average residential property prices in the old member countries will probably have a moderately growing trend, and in new member countries the annual decrease of average prices of houses and flats should decelerate.

#### SELECTED CHARACTERISTICS OF THE RESIDENTIAL PROPERTY MARKET

Participants of the residential property market within the framework of one country pay attention primarily to the domestic price relations of houses and flats, or to prices just across the nearest national border. The issues of various factors that decisively influence the very price level of residential property and their development are as a rule only inferior to potential sellers and buyers.

For the simple international comparison of a concrete residential property market and to determine possible trends of further development it is necessary to use, if possible, data on characteristics such as Buying Price, Price/Income Ratio, Gross Rental Yield, Roundtrip Costs, and eventually Rental Income Tax and Capital Gains Tax. There is more information on these characteristics in the following box.

Available data on the average buying price of existing flats in the centres of important cities of particular countries in €/m<sup>2</sup> are continually updated and provide the opportunity to have an informative view on the relations of house prices within a broader territory. Even though the point is that values are higher than average residential property prices as quoted for the concerned country as a whole, such can be used for informative comparison of house price levels because transactions with houses and flats in capital cities of countries and their surroundings represent the decisive weight in the residential property market within the concerned country. For the requirements of an analysis, it is not the exact values of average prices of flats in the centres of capital cities which is so important, but rather their mutual relations.

The price of housing (average buying price for 1 m<sup>2</sup> of the flat) in Slovakia can according to available data be compared informatively to house prices in another approximately ten European





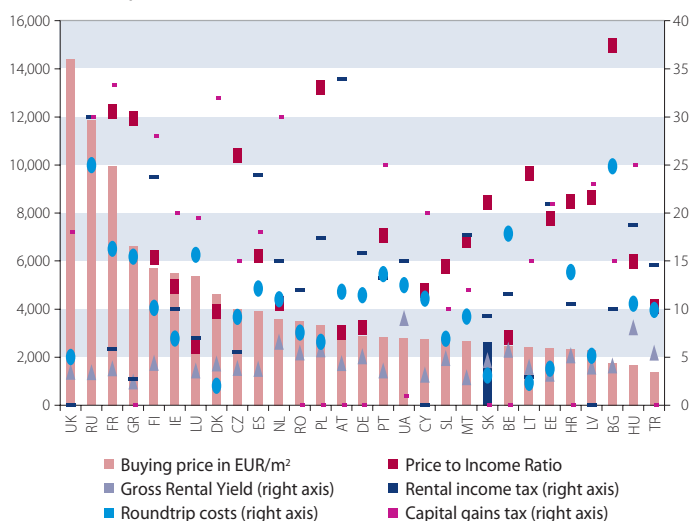
countries (in Chart 3 informatively from Portugal up to Latvia). Housing relatively cheaper than in Slovakia is in Bulgaria, Hungary and Turkey. By approximately 10% up to 15% more expensive housing compared to Slovakia is signalled through the data to be in Germany and Austria, approximately 30% more expensive in Poland and Romania, and almost 40% more expensive in the Netherlands. Informatively by more than half higher are prices for housing in Spain and the Czech Republic, and the most expensive housing is signalled to be in United Kingdom. For sure, one can discuss the accuracy and informative capability of a list of average prices for housing in particular countries compiled in this way, but what is important from the point of view of Slovakia is the finding that within the given arrangement we are in roughly the first third of European countries with relatively lower average housing prices. It means that current residential property prices in Slovakia have the potential to converge gradually in the future towards prices in old EU member countries. Of course, it depends on a whole array of factors, where the decisive factor will be the efficiency growth of the Slovak economy as a whole, as well as the rate of retaining appropriate economic growth.

Closely connected with the procurement of housing are also roundtrip costs that buyers expend besides purchase price of houses and flats when acquiring housing and assigning official ownership. Roundtrip costs are relatively differentiated in particular European countries and usually fluctuate from roughly 2% (Denmark) to an extreme 25% in Bulgaria and Russia. Approximately in half of the 33 compared countries do roundtrip costs not exceed 10% of the value of mediated residential property. Slovakia according to the used data is one of the countries with a relatively low rate of roundtrip costs (3.1%). This is probably connected with the fact that the substantial part of transactions with residential property in Slovakia is at the expense of sellers, i.e. the services of professional residential property intermediaries are less used than the majority of European countries.

The ratio of average residential property prices to GDP value per nation inhabitant provides orientation information about housing accessibility. Based on available data this relation ranks Slovakia (with a level of more than 20%) to countries with relatively average housing accessibility. The best housing accessibility is – according to this coefficient – in Luxembourg and Belgium (at the level of approximately 6% to 7%), and the worst in Russia and Ukraine where roughly one hundred yearly incomes are needed to procure housing. In the group with relatively worse housing accessibility are besides Bulgaria (around 38%) and Poland (around 33%), also Greece and France (around 30%).

The mechanism of letting houses and flats and the effectiveness thereof forms an inseparable part of the residential property market in every country. Within Europe are considerable differ-

**Chart 3 Selected reality market characteristics (in %) in the countries of Europe (in EUR/m<sup>2</sup>)**



Source: Global Property Guide, the NBS chart.

ences between countries as far as housing in own or rented houses or flats is concerned. While in Germany for example are rented tenements for more than half of households, in Spain it is only around one quarter, and in Slovakia even smaller (around 11%)<sup>4</sup>. This fact must be born in mind when evaluating rented housing, but the rate of interest for rented housing is mainly given by the accessibility of ownership housing for individuals as well as multiple-person households. Because the substantial part of ownership housing procurement is presently carried out with loans, the decision-making on whether to procure one's own house or flat, or whether to obtain housing in a rented tenement consists in comparing the average annual percentage rate of costs to the eventual housing credit with average annual rental yield.

The gross rental yield span is relatively small in the framework of Europe according to the data being used. The cheapest sub-tenancy can be found in Greece (2.5%) and the most expensive in the Ukraine (9.1%). Slovakia ranks with its percentage ratio of the value of annual rental yield to the buying price of the rented flat (4.7%) to the end of the first third of compared European countries. More expensive tenancies in Slovakia, but also other countries in Central and Eastern Europe, are probably related to the lesser rate of housing satisfaction in this part of Europe in comparison with the countries of Southern, Western, and Northern Europe. It is generally known, that in several new member countries including Slovakia, the number of flats available per thousands of inhabitants is still substantially lower than the average usually quoted for the euro area (roughly 450 flats per thousand inhabitants). Various national particularities notwithstanding, outlined unsatisfied ownership housing, also in the conditions of Slovakia, represents a certain potential for individuals and households who consider solving

4 See e.g.: [http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/Housing\\_statistics](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Housing_statistics)



## Description of selected characteristics of the residential property market

On the residential property web portal Global Property Guide, which was used to supply data for this analysis, the quoted characteristics are defined as follows:

- Data on *Buying Price* represent the average price of existing quality flats with an area of 120 m<sup>2</sup> in the centres of important cities in particular countries (in €/m<sup>2</sup>). In Bratislava the data are collected in the city districts of Staré mesto, Ružinov, Nové mesto and Rača.
- The *Price/income ratio* is a proprietary construction of the Global Property Guide based on data from the database of IMF. It represents the ratio between the residential property prices and the value of GDP per inhabitant in a particular country (in %) and it signals informatively housing accessibility given the effectiveness of the economy.
- Under *Gross Rental Yield* is the percentage ratio of yearly income from quality existing flats with an area of 120 m<sup>2</sup> in the centre of important cities of particular countries adjusted for tax, maintenance costs, as well as other costs in relation to the buying price of the flat being rented. As a matter of fact, this is an

inverse coefficient against the ratio of price to rent, i.e. a ratio between the value of the price of corresponding residential property and the value of yearly rent of this residential property as expressed in years.

- *Roundtrip Costs* are expressed by a ratio of overall costs connected with the mediation of purchase, or more precisely, the repeated sales of residential property for housing (commission to the reality agent, administrative charges and taxes etc.) to the residential property being mediated in per cents.
- *Rental Income Tax* is the percentage ratio of tax paid plus possible insurance premium for the flat from the average yearly rental income of the flat in a particular country. In the case of Slovakia the possibility is being considered that residential property is in the undivided co-ownership of spouses and the income from rent may also be taxed separately from one half of the rental income for each one of the married couple.
- *Capital Gains Tax* represents the tax paid from the increased value of the residential property between the time of its buying and selling.

their housing needs either by buying or tenancy. The decision to procure ownership housing is determined mainly by current possibilities to secure the necessary financial means. In the case of the failure of this possibility, there is a standby solution in the form of tenement housing. Persisting potential demand for housing is therefore one of the important factors that also influences the prices and yields of rents.

Rental Yield is subject to taxation and its rate greatly varies in particular countries, as well as the taxation of capital gains. All of the quoted characteristics are functioning in the residential property market and together create an environment more or less advantageous for sellers, buyers, lessors, and lessees. On the basis of overall assessments of selected characteristics of the residential property market, in Slovakia in recent years has been one of the relatively attractive countries as far as possibilities for appreciation of purchased real estates are concerned.

The methodology of construction of evaluated coefficients in this part of the contribution is based on data acquired in selected parts in broader centres mainly in capital cities in particular countries, which is why (for example) we worked with higher values when evaluating average prices for housing than the average values of prices of houses and flats for concerned countries as a whole. Because in particular countries there are significant regional differences, we consider the findings acquired by means of coefficients such as buying price, price/earning ratio, roundtrip costs or gross

rental yield to be the orientation characteristics of national residential property markets.

## CONCLUSION

Accessibility of official internationally comparable data on the state and development of residential property markets for particular European countries is still relatively problematic. A relatively extensive data base of data regarding prices of residential property for housing is held by the Bank for International Settlements (BIS), and some specialised institutions also have interesting proposals and practical constructions of selected, relatively comparable characteristics from the field of the residential property market in recent years. The analysis in question comes from BIS data and from the data of web real estate portal Global Property Guide; by combining these data certain image on the state and development of the residential property market in Slovakia in the European context was created.

Prices of houses and flats recorded in Slovakia in recent years experienced much more significant growth than old EU member countries and Nordic countries, but with the exception of Hungary and Czech Republic, such prices rose more moderately as the majority of new EU member countries. Price growth of residential property culminated in Slovakia in the 2<sup>nd</sup> quarter of 2008, and subsequently inter-quarterly declines have taken place.

In comparison with the majority of old EU member countries, the development of the resi-



dential property market in Slovakia and in new EU member countries is time-shifted. The residential property prices growth in old member countries culminated in 2005 and then a moderate deceleration of growth took place, and in some countries a more significant decline (mainly in Ireland and Spain) of average prices of houses and flats took place. At the beginning of 2010 the prices of houses and flats started to increase again in the majority of old EU member states, while in new EU member states they declined. In the near future one can expect a moderately growing trend of average prices of residential property for housing in old EU member countries, while in new EU member countries the annual decrease of aver-

age prices of houses and flats will probably start to decelerate.

Current prices of residential property for housing are lower in Slovakia than in two thirds of European countries, which represents a potential for possible faster future growth in connection with the gradual convergence towards prices in old EU member states. This process is (besides the current level of house and flat prices in Slovakia) to a considerable degree influenced by the accessibility of housing which is closely connected with the efficiency of the economy, sustaining appropriate economic growth and income possibilities, as well as the expectations of individuals and households.

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# Are residential property prices in the Czech Republic overvalued?

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1 See ČNB (2010).

2 The rise of residential property prices in the Czech Republic rather lagged behind in 2004 to 2006 compared with other countries.

3 Also in 2007, when a record number of apartments had been completed, the number of completed apartments to estimated number of total housing stock ratio was just 1%. There are considerable regional differences in the rate of house building (more intense construction in Prague and Středočeský region, where the number of completed apartments per 1,000 inhabitants is approximately 2.5 times in comparison with the rest of the Czech Republic). However, even in the regions with largest house building the numbers of completed apartments do not exceed 2% of housing stock.

## INTRODUCTION

Real estate bubbles are a popular term for the situation where residential property prices moves far from its fundamentally-based value. Empirical research confirms the economic intuition that more serious impacts on the real economy stem from the bursting of real estate market bubbles than that of stock market bubbles (see for example Helbling and Terrones (2003), or Bordo and Jeanne (2002)). The effects stemming from the sudden bursting of real estate market bubbles generate higher output losses and last longer on average (about 4 years) than in the case of stock market bubbles (around 1.5 year). The bursting of real estate market bubbles also poses a greater threat to the financial stability of a country (region) if the banking sector is more exposed through loans secured by real estate (which is the situation in most European countries).

The basic practical techniques for identifying bubbles include: (a) trend curves and statistical filters, (b) ratios, (c) empirical models and specification tests, (d) structurally rich theoretical models<sup>1</sup>.

The motivation to study the equilibrium of the residential property prices in the Czech Republic, may be, for example, a comparison with their dynamics in other countries. In this respect, the rise in residential property prices in the Czech Republic, especially that in 2008, seemed to be fast in comparison with countries in which a significant rise in prices also arose in the recent past and in which the global financial crisis also emerged, inter alia, by a relatively quick fall in residential property prices in 2008 and 2009 (Chart 1). For example, residential property prices in the USA fell by

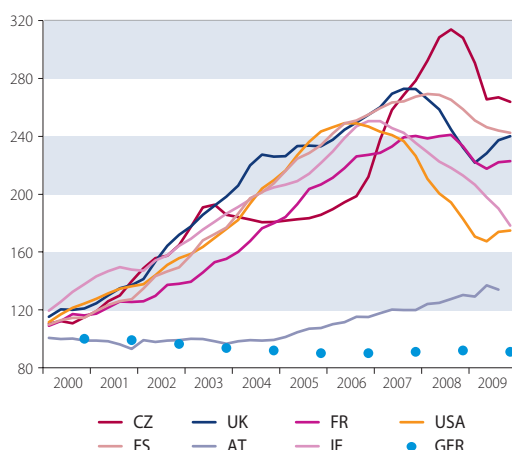
as much as 33% compared to the peak observed in 2006, those in the UK were down by as much as 19% in 2009 compared to their record levels, and those in Spain and France declined by about 10%. While the rate of price growth of residential properties in these countries was, up to 2007, approximately the same as in the Czech Republic<sup>2</sup>, the development of prices in 2008 was considerably different. The decline in residential property prices in the Czech Republic in 2009 (around 14% year-on-year) followed declines in residential property prices abroad, while the overall increase in residential property price in the Czech Republic in the last decade was higher than abroad. Despite this, comparison with the abovementioned countries raises certain problems, since the price increase in 2006 – 2008 can be attributed partly to the converging nature of the Czech economy and the effect of price convergence towards those prevalent abroad. On the other hand, in comparison with neighbouring advanced economies (Germany and Austria), where residential property prices were broadly flat in the last decade, the price growth in the Czech Republic seems rather high, particularly relative to average wage.

## DATA SOURCES ON RESIDENTIAL PROPERTY PRICES AND THEIR DEVELOPMENT IN THE CZECH REPUBLIC

The residential property market is specific enough compared with standard markets, since residential property are heterogeneous goods in the larger extent. Thus, the price of specific residential property depends on a set of characteristics, such as type of residential property (apartment versus family house), its size (larger apartments are, of course, more expensive, but at price per m<sup>2</sup> the dependence of price on size is often non-linear), age and quality of residential property (brick house versus panel house), its equipment, the floor on which the apartment is located, window view, and similar characteristics which are often hardly quantifiable. The specific feature of the residential property market is the impossibility to move residential property from one place to another, along with the very non-elastic offer of new residential property (numbers of new apartments create only a small part of the total number of apartments)<sup>3</sup>. Residential property prices are often set regionally, and the location of residential property in a region (city centre versus periphery) also plays a role.

This considerable heterogeneity of the residential property market makes the compilation of an aggregate index of residential property price more difficult. There are several sources of time

Chart 1 Prices of residential property in international comparison (absolute index), 1Q1999 = 100



Source: BIS, ČSÚ, Case-Shiller (US), Nation Wide (UK).

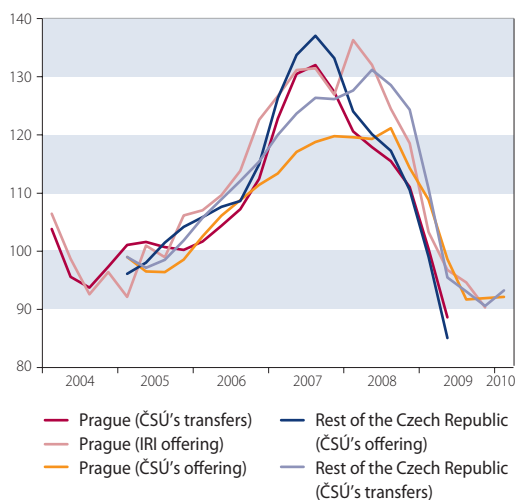


series of residential property prices in the Czech Republic, and we will pay attention to some of them in more detail.

Generally, two basic types of residential property prices are recognized, namely transfer prices and supply prices. Methodically, transfer prices should be nearest to existent market prices for which residential properties are purchased and sold. The only available source of transfer prices in the Czech Republic is the data of the Czech Statistical Office (ČSÚ) utilising the statistics of residential property tax returns of the Ministry of Finance of the Czech Republic. The advantage of this source is its completeness (the object of the tax should be any transfers of used residential property against payment), since it covers all regions and contains classification by size of municipality and age of residential property. The advantage also consists in the relatively wide scale of monitored types of residential property (apartments, family houses, apartment blocks, building plots and garages) in comparable methodology and structure. A disadvantage of this data source is the large delay of publication (almost a year<sup>4</sup>) as well as the possibility of tax optimization from the part of respondents that could influence the prices stated. Another disadvantage is also the fact that it only contains information on transfers of existing apartments, while information on transfers of completely new apartments are not included since these transfers are not the subject of residential property tax.

The second source of information regarding the development of residential property prices is compiled from various types of supply prices of residential property, which usually result from quotations of sale of residential property in a residential property office. Supply prices as such should be higher than transfer prices. The ad-

**Chart 2 Prices of apartments, transfer prices and supply prices (year-on-year indices)**



Source: ČSÚ, IRI.

vantage of supply prices is their publication with minimum delay, and on the other hand, an observed development of supply prices might reflect the changes in margins of residential property agencies<sup>5</sup>, or such prices could be deformed by older advertisements with an unrealistic high price, which "survive" in the list of advertisements longer than advertisements with prices for which the residential property is really sold. The longest time series of supply prices of residential property for the Czech Republic has been published by the Institute of Regional Information (IRI) since 2000 (to 2007 with annual periodicity only, later quarterly). IRI uses the standard of the so-called standard apartment, it thus assesses the price development of apartments of the 1<sup>st</sup> category only in cooperative and personal ownerships with floor

4 Despite this, ČSÚ releases updated estimates of index prices of apartments and family houses continually with a delay of approximately a quarter. However, these changes are often significant.

5 It is not always clear from specific advertisements whether the advertised price includes remuneration for the residential property office or not, a factor that influences the resulting price. The margin of the residential property office might have an important cyclic component, and the final price might be considerably different from that advertised due to various discounts and so on.

**Table 1 Residential property-price data sources in the Czech Republic**

	Time coverage to 6/09	Periodicity	Regional coverage	Data source	Additional information
Transfer prices (CZSO)	1998 – Q2 1998	quarterly	Regions	Publication, Prices of monitored types of residential property* <a href="http://www.czso.cz/csu/2008edicniplan.nsf/p/7009-08">http://www.czso.cz/csu/2008edicniplan.nsf/p/7009-08</a>	Prices of family houses, building plots, housing blocks and garages
Offer prices (CZSO)	2004 – Q1 2009	quarterly	Prague versus rest of the Czech Republic	<a href="http://www.czso.cz/csu/re-dakce.nsf/i/ceny_bytu">http://www.czso.cz/csu/re-dakce.nsf/i/ceny_bytu</a>	
Supply prices according to the Institute of Regional Information (IRI)	2000 – 5/2009	annual by 2006, thereafter quarterly; Prague – monthly as of 3/2004	Regional capitals + other (77 towns in total)	Non-public database, actual prices available at <a href="http://bydleni.idnes.cz/IRI">http://bydleni.idnes.cz/IRI</a> ( <a href="http://www.iri.name/">http://www.iri.name/</a> )	Open market rent and regulated rent
Supply prices of Prof. Dolanský	2002 – 4/2009	monthly	Selected towns (22)	Realit Magazine (ISSN 1210 – 8308)	Prices of land, family houses, open market rent (as of 07)
Supply prices (King Sturge)	2005 – 4/2009	monthly	Selected towns + Prague in detail	Czech Residential Market report ( <a href="http://www.kingsturge.cz">www.kingsturge.cz</a> ) published annually	Prices of family houses, differences between new and used apartments, includes price prediction



<sup>6</sup> See [http://www.kiseb.cz/zrcadlo/def\\_standard.asp](http://www.kiseb.cz/zrcadlo/def_standard.asp).

<sup>7</sup> It is not possible to completely use fact that transfer prices precede supply prices for an analysis of the actual development of apartment prices, since these prices are published with a large delay and used to be relatively significantly reviewed.

area of 68 m<sup>2</sup> and wear of approximately 40% with common, but not peripheral location<sup>6</sup>. On the one hand, it enables to avoid the problem of a change of housing fund structure and the necessity of weights modification and on the other hand, information about price developments outside this relatively small market segment are disappearing, thus this index often states different dynamics than other indices (Chart 2). The advantage of supply prices (according to IRI) is also the fact that IRI publishes offered open market rental from the beginning, in addition to apartment prices, in comparable methodology, which enables the compilation of indicators of rental revenues or the indicator of price-to-rent ratio (see below for details). However, there is a disadvantage that even if it is possible to acquire data about these prices from various sources (e.g. the press), IRI database is officially non-public, while archive data from the main webpage data source <http://cenybytu.idnes.cz/> are continually overwritten by current data.

Another important primary source of residential property supply prices are the indices of Professor Dolanský, which have been published monthly in the Realit journal since 2007. This source covers the prices of apartments, family houses and building plots, and open market rental from 2007. Data on apartment prices are classified in detail for Prague, apartment prices out of Prague are not complete, some regional capitals are missing. Data from this source supplies the basic source for supply prices of apartments published by the ČSÚ in specification to Prague versus the rest of the Czech Republic.

Taking into account the need for relative "homogeneity" of the analyzed real-estate market segment, we have paid particular attention to apartment prices in our analysis for which it is possible to assume a higher rate of standardization than, for example, for family houses and which offer the widest coverage by available sources. The dynamics of apartment prices (according to various sources) during the last 5 years is shown in Chart 2. It shows an actual stagnation of residential property prices in 2004 to 2005 (according to some sources, up to mid-2006), followed by an accelerating rise in residential property prices up to the end of 2007. At the same time, the maximum year-on-year rise in apartment prices ranged from 21% to 37%. During 2008, the dynamics of apartment price rises slowed successively, with a year-on-year decrease connected with the impacts of the economic slow-down and the tightening housing loans credit conditions observed from the beginning of 2009. Based on various sources, the increase in supply prices and transfer prices show similar tendencies (correlation coefficients range from 0.85 to 0.99) while the response of transfer prices seems to be slightly faster. It seems from a comparison of offer price growth for Prague according to IRI and ČSÚ (or Prof. Dolanský) that, according to IRI, the increase in prices was more considerable in 2006 to 2008, and then the subsequent decrease

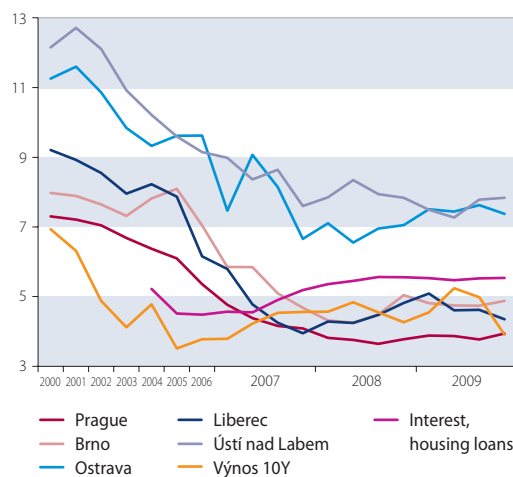
of price dynamics was sharper. This may be caused by the fact that IRI only deals with a relatively small group of apartments with relatively lower prices. Transfer prices showed the fastest growth in 2007 Q3, then year-on-year growth slowed, whereas supply prices peaked around mid-2008.

Transfer prices recorded a subsequent year-on-year decline again rather earlier than supply prices, and in the case of supply prices a partial stabilisation of the situation can be observed at the end of 2009 with annual declines of just above -10%. Recently then, the changes in transfer prices have been preceding those in offer price and have also usually been more pronounced.<sup>7</sup> This suggests some anti-cyclicality in the difference between these prices, with a decline in demand on the residential property market leading first of all to a decline in the actually pursued prices. Together with a turnaround in residential property prices, there were also changes in the cross-regional price growth structure. During the period of fast growth in apartment prices these prices rose faster in regions other than Prague, but the opposite is now true. The largest year-on-year declines are being recorded in regions, which saw the largest decreases in prices (year-on-year price declines of around 20% in the Moravia-Silesia and Hradec Králové regions, for example). Small price declines have been recorded in the Karlovy Vary and Ústí regions for example.

### TREND CURVES AND STATISTICAL FILTERS

The trend can be calculated using standard linear or non-linear fitting methods or using one-dimensional filters. It is usually HP filter with a suitable (depending on time series periodicity) or arbitrarily selected smoothing coefficient. The main drawback of HP filter is that it generates unreliable results for the beginning and end of the data set (so-called "end-point-bias"). The estimate of a bubble for the Czech residential property market using the HP filter is shown in Chart 5. The

**Chart 3 Rental revenues (averages for the period in %; comparison with revenues of 10-year government bond and rates of housing loans)**

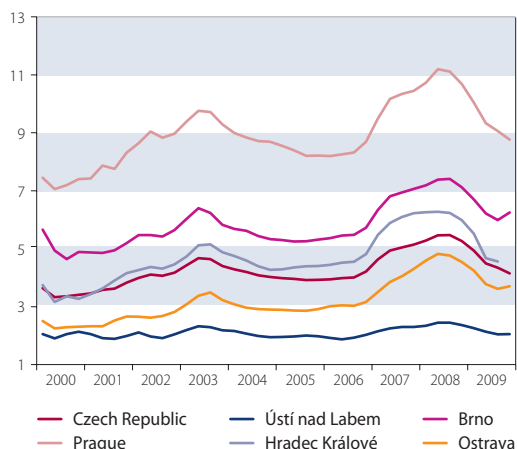


Source: IRI, ČNB.





**Chart 4 Price-to-income ratio (ratio of 68 m<sup>2</sup> apartment to wage for last four quarters)**



Source: CZSO, quantifications of the ČNB.

Note: Data for 2009 is preliminary data, or an additional calculation from supply prices.

chart shows the abovementioned problem of low reliability of results for the end of the data set, when a decline of apartment prices in 2009 became evident in the strongly undervalued assessment of prices at the end of this year. However, this conclusion completely ignores the common macroeconomic environment of the economic crisis in which the decline of prices occurred. An application of the HP filter is given in Adalid and Detken (2009), who define a residential property market boom as a persistent deviation of actual residential property prices from the HP trend with a relatively high smoothing parameter ( $\lambda = 100,000$ ), while a positive deviation of at least 5% for at least 12 quarters is regarded as a boom.

### RATIO INDICATORS

Ratio indicators include indicators of price-to-income type and rental revenues<sup>8</sup> (Charts 3 and 4) which can also be used to get an initial idea of the possible emergence of bubbles (sometimes also by fitting to, for example, the HP trend). These ratios, like the aforementioned one-dimensional filters, suffer from several drawbacks, for instance: (i) they produce high variability in the indication of non-equilibrium states; (ii) they do not directly take movements in interest rates and fundamentals into consideration; and (iii) their time series still have short histories, particularly in the case of transition economy residential property markets. They are particularly popular with financial market practitioners, Himmelberg, Mayer and Sinai (2005) provide an application to the US residential property market.

The continued rise in apartment prices in the Czech Republic in 2008 resulted in a quite significant deterioration in the indicator of the sustainability of these prices to their worst-ever values, whereas in 2009 both indicators showed a slight improvement. Rental incomes in the three largest cities (Prague, Brno, Ostrava) increased by 0.3–0.8 percentage point at the end of 2009, compared

to the record low levels observed in mid-2008 (Chart 3). Rental income also mostly improved in other regions compared to 2008, with the largest increase being recorded in Olomouc by 1 percentage point and a pronounced decline in rental income being recorded only in Karlovy Vary (–0.8 percentage point on a year-on-year basis). Rental income increased even though interest rates on house purchase loans were generally flat, and long-term market interest rates were falling, thus residential property investment became relatively more advantageous.

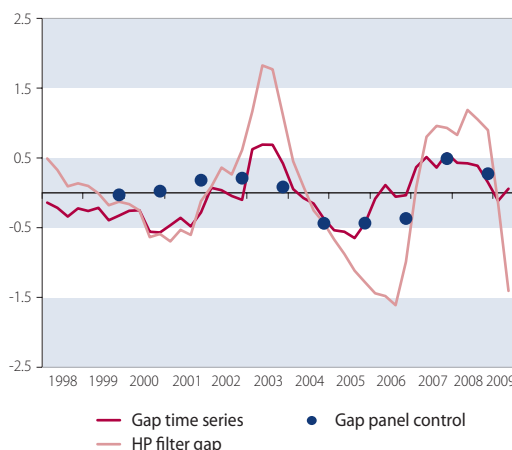
The estimate of price-to-income ratio (Chart 4) has improved considerably for all Czech regions (declines of 10–20% from the peaks observed in 2008 Q2 and Q3). However, on average it is slightly below the levels observed in mid-2003, when a bubble associated with the Czech Republic's accession to the EU emerged on the residential property market. According to both indicators, Prague seems to be the riskiest region, although it has much better values for other relevant indicators and has so far been less affected by the economic recession than other Czech regions.

### EMPIRIC MODELS

An advanced bubble identification technique is one that uses an econometric model to reveal the determinants of asset price with fundamental factors. Fundamental factors determining residential property prices in the Czech Republic, on which empirical estimations can be made, are traditionally divided into supply and demand factors<sup>9</sup>.

Supply factors may include most of cost factors, such as development of building plots prices, development of average purchase price of apartments, and costs of construction operations (index of prices of construction works). As an approximation of all these cost types and the acquisition value of apartments, an aggregation of total expected investment costs for construction could

**Chart 5 Apartment price gaps in the Czech Republic – deviations of actual prices from estimates (in thousands of CZK per m<sup>2</sup>; positive values mean overvaluation, negative values mean undervaluation)**

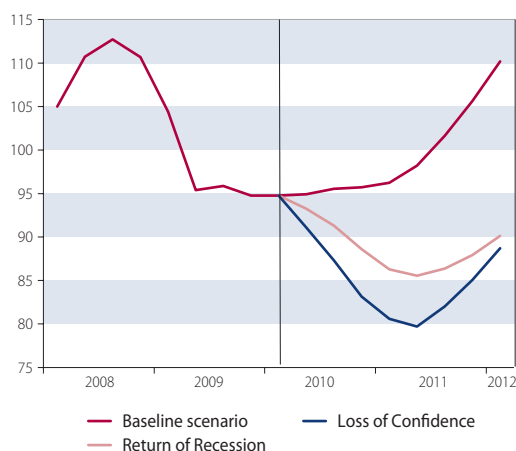


Source: ČSÚ, quantifications of the ČNB (WP 12/2009).

- 8 In addition to indicator of rental income, also the indicator of price-to-rent ratio being the reciprocal value of the latter is also used. The advantage of the rental income indicator is the fact that it is possible to compare it directly with the interest rates and revenues of alternative assets.
- 9 See more detail in HM Treasury (2003), Égert and Mihaljek (2008) or Hlaváček and Komárek (2009).



Chart 6 Residential property price scenarios  
(absolute index, 2007 Q4 = 100)



Source: ČSÚ, quantifications of the ČNB.

10 Price gap is quantified in this paper, as well as Chart 4, by three alternative methods. In addition to the mentioned HP filter, there is an analysis of time series for quarterly data for the Czech Republic as a whole, as well as the utilization of panel regression in particular regions of the Czech Republic for annual data.

11 A detailed description of these scenarios you can find in the Report on the financial stability of the ČNB (ČNB 2010).

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be used. At the same time, the increased purchase costs of a new apartment would become evident by the increased value of pre-existing apartments at given demand. Supply factors are usually included in residential property price with relatively large delay, which is connected with a period of preparation of construction and the construction itself. Other offer factors include the rate of saturation of housing needs (e.g. the number of flats per 1,000 inhabitants) or its growth rate (number of newly finished apartments). Higher saturation of housing needs should, under otherwise unchanged conditions, result in lower pressures on increasing apartment prices.

Demand for residential property is especially determined by disposable household income, the main component of which is paid wage. Other factors on the labour market influencing residential property price may include unemployment rate, rate of economic activity of population, and the number of job vacancies. These factors influence, in most cases directly, household disposable income (lower unemployment and a higher rate of economic activity of the population means higher disposable household income at the given wage), or indirectly by labour mobility (moving for work). Demand for residential property may also be influenced by the development of open market rental, an increase in which usually results in an increase in apartment prices. This influence reflects a substitution between rental and owner occupied housing, when an increase in rent stimulates households to instead procure their own apartment. The amount of rental also influences investment into residential property for speculative reasons, when a rise in rent *ceteris paribus* increases the rate of return on these investment and results in an increase in demand for apartments. Apartment prices may also be influenced by various demographic factors – aforementioned factors of the labour market are connected with a rise in population caused by moving, and a natural rise in population should act similarly as well. Increased residential property prices should also

be contributed to by a higher divorce rate, when one household is mostly divided into two and the need for new housing arises. In addition, the marriage rate could act similarly, when often a completely new household is established. Demand for housing may also be influenced by the age demographic of the population, which is also reflected in the economic activity of the population.

The estimates of a difference between real and equilibrium prices of apartments have been estimated in the work of Hlaváček, Komárek (2009), as shown in Chart 5<sup>10</sup>. This analysis enables to substantiate the decline in residential property prices in 2009 mainly by the worse overall economic situation. According to this analysis, residential property prices were previously largely driven by demand, in particular demographic factors (natural population growth and net migration) and market factors (unemployment rate, number of vacancies and wage growth). Most of these factors showed a significant year-on-year deterioration in 2009. Natural population growth decreased by one-quarter from its high 2008 levels, while net migration dropped by two-thirds compared to the record levels observed in 2007, reaching a five-year low. The registered unemployment rate increased by 3.3 percentage points year-on-year, coming close to the 10% level, while a number of vacancies fell by two-thirds year on year at year end. Such a rapid deterioration in the labour market situation is historically unprecedented. The deterioration in these demand-side factors explains most of the observed decline in apartment prices, while only a small part corresponds to the bubble bursting in 2007 and 2008 (about 15% of the price decline).

It is also clear from Chart 5 that, according to the econometric model, apartment prices are currently close to their equilibrium fundamental values. Hence, if the aforementioned fundamental factors do not show any further significant deterioration, residential property prices should tend to remain flat in the near future. The most probable Baseline Scenario should see renewed price growth in mid-2011 (Chart 6). In the not very likely stress scenarios of Return of Recession and Loss of Confidence, apartment prices may decrease further by about 8% and 16% respectively at over one-year in response to the worsening macroeconomic fundamentals.

#### CONCLUSION

To sum up, the approximate identification of residential property market bubbles is possible ex post, but necessary conditions are: (i) continuous monitoring of residential property prices based on different data sources, (ii) utilization of the entire range of methods and models available, from the simplest (trend curves and filters) to comprehensive approaches (models taking into consideration offer and demand factors and other theoretical models), (iii) creation of structurally rich models (facilitating examination of the effects of residential property market bubbles), (iv) respecting specifics across countries and markets.



# Business cycles in the housing market in Poland – the case of Warsaw

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Poland*

## 1. INTRODUCTION

Real estate markets, including housing markets are affected by business cycles, and cumulating tensions may cause the cycle to evolve into a real estate crisis. Historical analysis shows that although there are many factors which overlap and trigger cycles and crises, the well-known problem affecting the real estate market, namely the tight short-term supply and changing demand are of fundamental importance. Changing demand amidst tight supply translate into price increases which lead to rising supply. This rise is often excessive and occurs when demand factors weaken. Another important factor is the banking sector which is capable of mobilizing considerable volume of funds in a short time and, in consequence, finance considerable price increases. The third factor is speculation based on common expectation of further price increases which makes them incompatible with the reality and leads to the so-called price bubbles or, in other words, excessive tensions in the sector. When finally the market shifts to the balance and real estate prices go down, the quality of bank mortgage assets usually severely deteriorates. This, in turn, causes different kinds of problems in the banking sector, whose scale and character depend on the specific situation. As the banking sector is highly leveraged and mutually related, the domino effect may occur, making the total economic losses far outreach the losses resulting from a simple calculation. The discussed factors have already caused numerous real estate crises, including the last one; the Polish market has also experienced crises brought about by banking corporations and investment funds.

The discussed facts are of considerable importance for central banks which are generally responsible for the financial sector stability and demand control under policy mix. Their main tool – interest rate – strongly impacts the real estate sector, and, as a result, the whole economy. When the banking supervision operates within the central bank this impact is twice as strong.

Despite the fact that the systemic transformation in Poland began relatively early, namely in 1990, and involved radical and fast changes, market-driven real estate sector emerged only in the first years of this decade of the present millennium. It was at that time that mortgage lending in major cities became the basic demand factor

and real estate developers became main house suppliers; the impact of regulatory authorities and institutions, which had marked the previous system, was reduced.

Despite weak market growth in the years 1997-2002, several major markets observed classical business cycles being the result of the discussed supply and demand delays and fiscal policy impact. Yet, they did not have any considerable macroeconomic importance.

Poland's entry into the EU caused rapid lending expansion based on foreign funds, and, as a result, fast price growth. This was followed by a delayed, excessive response of supply and an increase in the cost of both building sites and construction and assembly production. Considerable tensions also affected the banking sector which refinanced long-term loans with short-term facilities obtained in international markets. Additionally, growing competition forced the use of low margins on loan contracts.

As a result of the slump in the American market and its further consequences combined with rather poorly developed structure of the housing market in Poland, the scale of the discussed tensions, despite its significant size in the local market, did not become important enough to significantly affect the economy. As further development of the housing market in Poland seems to be highly probable and the discussed problems occur in cycles, the analysis of mechanism of their growing tendency may be a valuable experience for the future.

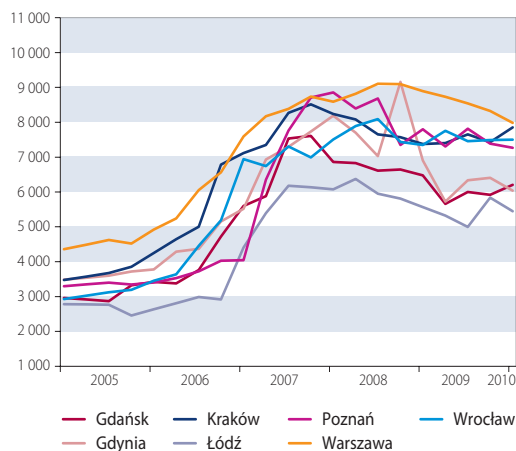
## 2. BUSINESS CYCLES IN THE WARSAW HOUSING MARKET – MECHANISM-BASED APPROACH

Price bubble mechanism may be well studied on the example of the Warsaw real estate market. In the years 2004-2007, a considerable, exceeding 100%, growth in house prices was noted. In-depth analysis of the situation points to the occurrence of the price bubble. Similar developments were observed in other housing markets of major Polish cities, yet their growth rate and the scale of the phenomenon varied between cities.

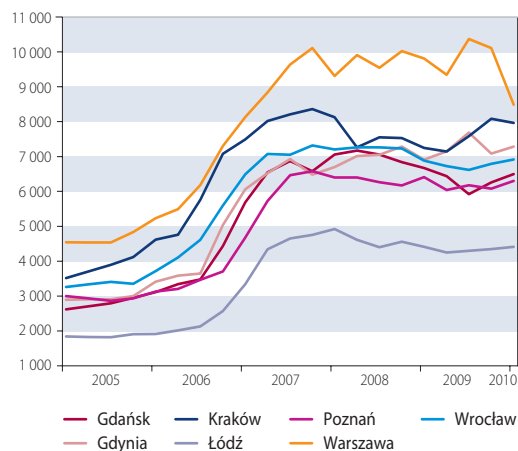
At the starting point of the described process and analysis, which in Poland falls for the years 2003-2004, there was a combination of factors, both internal and external to the sector, usually



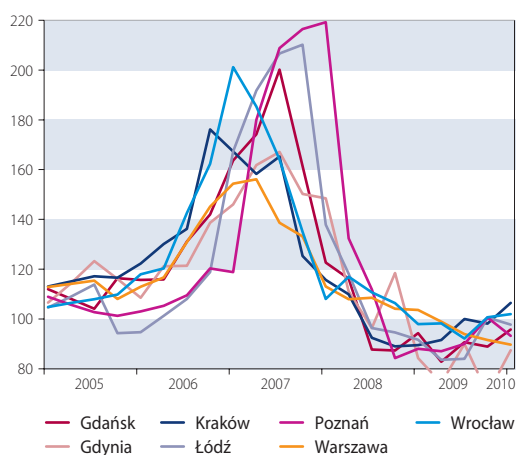
**Chart 1 Average House Price in the Primary Market (PLN/m<sup>2</sup>)**



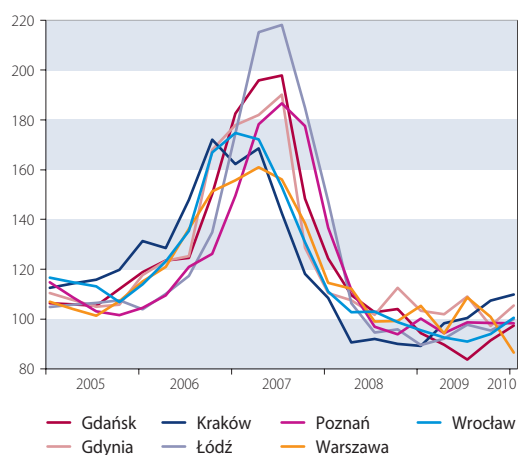
**Chart 2 Average House Price in the Existing Stock (PLN/m<sup>2</sup>)**



**Chart 3 House Prices in the Primary Market (growth Y/Y)**



**Chart 4 House Prices in the Existing Stock (growth Y/Y)**



Source: Own estimates on the basis of data PONT Info, NBP.

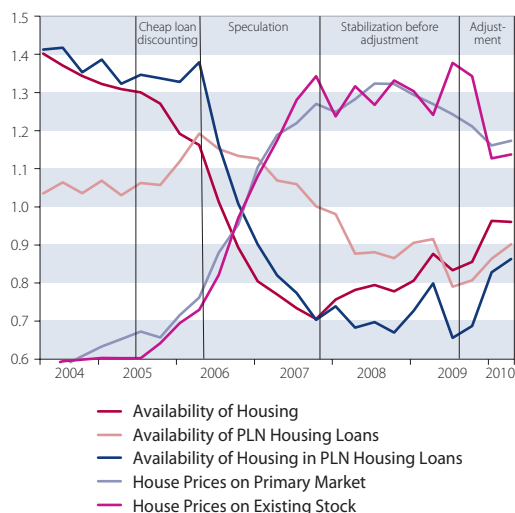
of short-term character, which triggered speculative behaviour and led to the discussed growth. Demand-side developments included growing availability of loans resulting from the decline in interest rates and bank margins and substitution of PLN loans with cheaper loans denominated in foreign currency (in particular, in Swiss franc). In the real economy, an increase in the number of households was noted, which was reflected in the increase of marriages and accelerated migration from country to major cities as well as wage rises. Housing demand, especially decisions on long-term mortgage debt, were also affected by the general optimism connected with Poland's entry into the EU. This optimism resulted from Poland's accelerated economic growth and numerous publications forecasting the continuation of this growing tendency in the long term. The direct driving force behind price increase was, as shown by market surveys, VAT. Announcements of VAT increases hastened households' decisions about house purchases thus triggering price growth which set off the process. The conse-

quences of the previous business cycle also constituted an important factor. Increased housing demand encountered reduced supply. As a result of the previous business cycle of the years 2001-2002, supply saw further tightening. Real estate developers, facing the surplus of unsold housing and enduring, in their opinion, a bearish market significantly reduced the number of investment projects under construction and stopped creating construction site banks, which increased the supply response period from 2-3 to 3-4 years or more. The analysis of further developments of the phenomenon shows that its fundamental driving force was the growing loan availability in global terms, which enabled considerable growth in loan granting decisions. This, combined with a short-term tightening of supply resulted in price increases. In the longer period, high housing prices triggered housing construction which led to growing supply, coinciding with the global financial crisis causing banking sector problems, increases in risk premium, loan tightening and in effect limited demand.



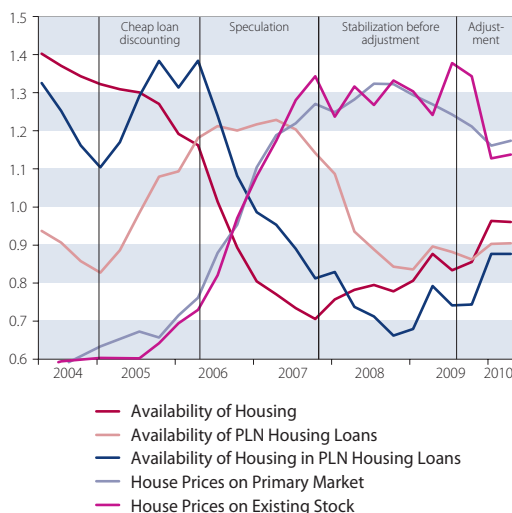


Chart 5 PLN Mortgage (PLN)



Source: Own estimates on the basis of data PONT Info, NBP.

Chart 6 CHF Mortgage (CHF)



Our detailed analysis of the Warsaw housing market makes it possible to present the fundamental causality and the mechanism of imbalance in the analysed market. We make use of diagrams to show basic variables explaining the demand side of the business cycle, i.e. housing availability, credit availability and credit-based housing availability. The maximum of normalized variables means the maximum hitherto observed level of a particular variable in the business cycle. Such form of presentation enables us to determine three phases of the business cycle marked in the diagrams called: cheap credit discounting phase, speculative phase and market stabilization before market slump phase.

In the first phase falling between the years 2005-2006 (largely differing in time for PLN loans and loans denominated in Swiss francs), moderate growth in housing prices was accompanied by faster growth in loan availability, which, in consequence led to a rise in credit-based housing availability, i.e. falling credit costs of more expensive housing. Increased loan availability was driven by growing competition in the banking sector and a fall in spreads; low inflation was also of considerable importance. As a result of falling costs of financing amidst a rather tight supply, housing demand was rising as defined in the model, which translated into a further price rise.

The second phase was observed in the Warsaw market between 2006 Q1 and 2007 Q3 (the corresponding phase in the markets of the major Polish cities occurred with a lag). During this phase, the rise in bank lending led to accelerated price rise, which combined with fading possibilities of interest and spread reduction, brought about growing house crediting costs, i.e. the costs actually paid by the household. Yet, the rise in costs did not curb demand as the well-known collective behaviour mechanisms were set off at that time. In particular, real estate developers and brokers managed to make households believe that housing costs

in Poland were undervalued and would continue to grow. This phenomenon was driven, to a certain extent, by foreign investors, especially from Ireland and Spain, i.e. countries affected by real estate speculation, who drew upon their own experience and started their investment projects in Poland. As a result, demand growth was triggered by the common belief that in future, house prices were bound to increase and, at the same time, the banking sector financed such purchases.

In the third phase which started in Warsaw in September 2007, the possibilities of further lending growth expired as the banking sector lost its liquidity based on domestic savings. Supply effects started to emerge on a considerable scale as the banking sector was incapable of ensuring balanced financing of high supply of new, rather expensive housing. Market tension indicators were comparable with those recorded in the American market and the first impact of the US crisis was experienced. This led to a rise in banks' conservative approach, resulting from their negative experience in this market and the loss of confidence in its safe character and excellence of risk management techniques (rating and scoring), as well as gradually increasing serious problems encountered by foreign parent banks. As a result, instead of the credit boom based on foreign funds being maintained, as it was the case in the Baltic States, Romania and Bulgaria, the market experienced pressure on limiting the size of integrated balance sheets, preceded by serious problems in refinancing the existing Swiss franc-denominated loan portfolios (the problem in financing short swap positions from the point of view of access to funds and funding costs). Also the zloty exchange rate was subject to strong fluctuations, which was directly reflected in the foreign currency-denominated debt and loan servicing costs. Amidst problems experienced by the banking sector and real estate developers as well as the growing economic activity risk in general,



consumers started to make more prudent decisions and postpone house purchases, expecting a fall in prices, cheaper lending and better market outlook. Falling demand was accompanied by growing supply which was the effect of real estate development projects commenced during the market boom. Real estate developers accumulated large construction site banks resulting in a considerable growth in construction site prices while their own funds were frozen in assets hardly marketable in those conditions. House prices showing strong upward trend became more rigid which brought about considerable imbalance in the real estate market.

### 3. BUSINESS CYCLE IN THE WARSAW REAL ESTATE MARKET – ANALYSIS OF DEMAND, SUPPLY AND PRICES

The analysis of the business cycle mechanism is supplemented by the analysis of the market situation presented on the charts below. We have made this analysis based on the classical, microeconomic analysis of market equilibrium. Data concerning prices, number of transactions, supply volume and economic developments have been taken from the NBP's own surveys, supplemented with data coming from consulting firms, mainly REAS. Housing demand curve is approximated on the basis of the global housing credit availability curve, defined as the number of housing units which may be purchased by a set of households at a particular place and time, at a given price, loan interest rate, other loan characteristics (maturity, type of facility and related prudential requirements) and income. The global credit availability curve for a particular city is obtained by calculating individual household credit availability, and by arranging it in ascending order. The global credit availability curve based on individual income differs from the credit availability curve in that it accounts for the effect of subsequent households exceeding the lower credit threshold as a result of growing income, falling interest rates or easing lending policy. The analysis makes use of data from household budget surveys conducted by the GUS (Central Statistical Office) taking into account all households from a particular city participating in the survey. We assume that this set of households is representative for the set of households actually creating housing demand. The comparison of characteristics of the sample of households from the budget surveys with the sample of households reporting demand for housing (data based on own survey results) shows that this assumption is correct.

The analysis of the housing market shows that the main factor curbing housing demand in Poland is low income, and, in consequence, credit availability. The main constraint for the popular segment of the housing market which is of interest to us, is creditworthiness of the households in question. Thus, the credit availability curve will be a good approximation of fundamental demand in the analysed markets in normal situation, i.e.

when interest rates, spreads and prudential requirements are the basis for loan granting. In an extraordinary situation, i.e. when banks limit their lending, this curve becomes the approximation of potential demand. The lower end of this curve will become perfectly flexible at the price level at which housing becomes a profitable financial asset. In the Warsaw market, given the lease risk, this is ensured at the level of PLN 4000-4500 per square meter. The beginning of the availability curve does not overlap with the demand curve as the rise in creditworthiness is not accompanied by the intention to buy more and more expensive housing. Additionally, this fragment of the curve shows a strong cash demand. Market analysis shows that the global credit availability curve may be a good approximation of the demand curve for prices below PLN 14 000 – 15 000 per square meter.

Credit-based housing availability, similarly to demand, is directly proportional to household income, and inversely proportional to house prices and interest rates, and prudential requirements of the financial sector. Estimated curves of housing demand in Warsaw in the years 2004-2008 (chart 7) show a change in the credit-based housing availability in the function of growing income, house prices and interest rate changes.

The starting point for the microeconomic analysis of equilibrium on the primary housing market in Warsaw was set at 2004 (chart 8). This was the year of Poland's entry into the EU and housing prices adjusted for this factor stabilized in 2003. In 2004 the market was balanced, there were no important surpluses or shortages of housing. The traded residential housing consisted of flats offered by developers that were either paid for in full or financed by means of instalments paid in advance depending on the current progress of work (raw state, building shell).

The years 2004 – 2006 bring the above-mentioned increase in incomes and drop of interest rates. As a consequence, the demand curve shifted away from the origin of the coordinate system. At the same time the supply of housing offered in the market increased. The point of equilibrium of the market shifted from point A in chart 9 to point B. In fact, the pressure of oversupply allowed the developers to sell virtual flats in amounts and at prices exceeding those indicated by the fundamental market equilibrium marked by point C. The area in the chart corresponding to the difference between the value of flats sold in the market (the product of the equilibrium price in 2006 and the actual number of transactions covering the existing and virtual housing) and the value of flats corresponding to fundamental demand (the product of the theoretical equilibrium price and the actual number of flats traded) is an approximate measure of surplus supply value, spurred by speculation and financed by the banking sector.

A similar situation occurred in 2007 (chart 10), despite the fact that the American crisis was already clearly underway challenging the myth that housing prices would grow indefinitely. In-



Chart 7 Estimates of housing demand in Warsaw (PLN/m<sup>2</sup>)

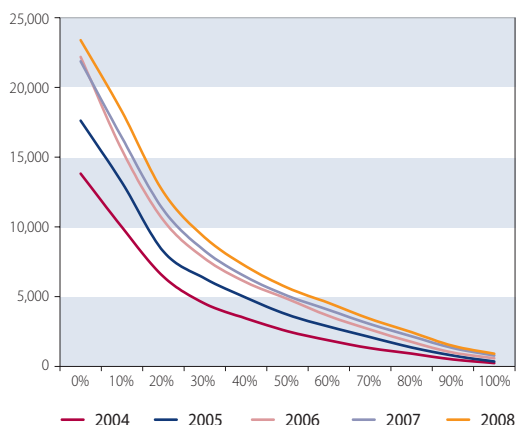


Chart 8 Warsaw primary housing market in 2004 (PLN/m<sup>2</sup>)

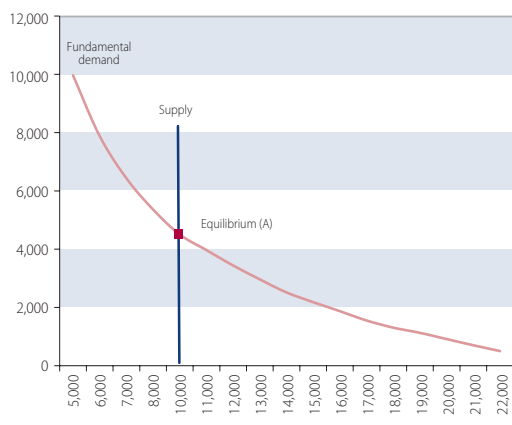


Chart 9 Warsaw primary housing market in 2004–2006 (PLN/m<sup>2</sup>)

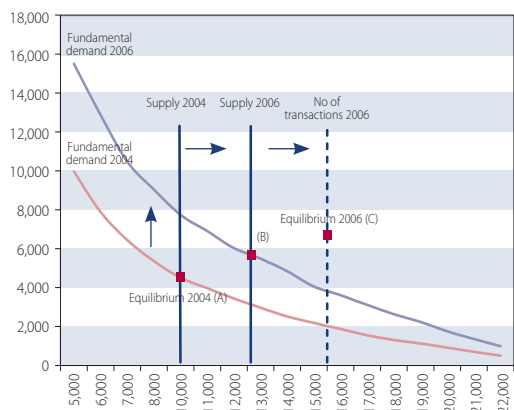


Chart 10 Warsaw primary housing market in 2007 (PLN/m<sup>2</sup>)

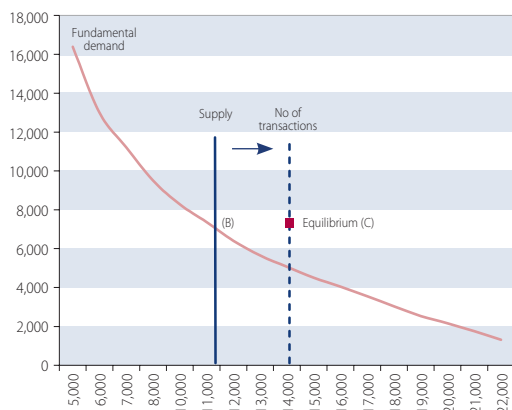


Chart 11 Warsaw primary housing market in 2008 (PLN/m<sup>2</sup>)

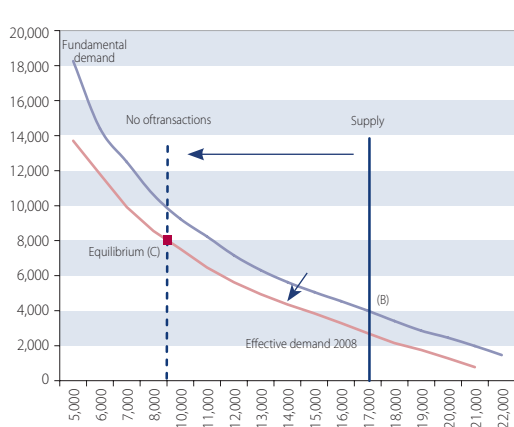
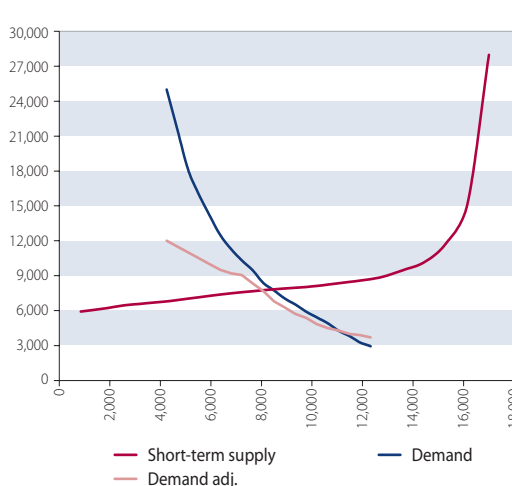


Chart 12 Warsaw primary housing market in 2009 (PLN/m<sup>2</sup>)



Source: Own estimates on the basis of data Central Statistical Office, NBP.

formation of problems in Spain and Ireland were becoming available as well, and the prices of flats reached such an elevated level that they became a real curb on demand, while the income effect measured by the drop in the population

of households which could afford an average flat amounted to 40-50%, depending on the city of residence.

Taking into account fundamental factors in the housing market, the year 2008 did not bring

**Table 1. Basic information concerning the Warsaw housing market in 2009**

2009 new supply forecast	Unsold flats offered for sale as of the end of 2008	Flats for speculation purposes, finished, delivered in 2005-2008 (estimate)	Total market supply	Including real-estate developer flats
5,000	16,800	15,000	36,800	21,800

Source: own estimates on the basis of data from REAS.

**Table 2. Basic information concerning the situation on the primary housing market in Warsaw in 2006-2010**

Period	Flats delivered onto the market	Flats sold	Transaction price (PLN/ m <sup>2</sup> )
2006	13,300	15,000	6,000
2007	25,300	18,000	7,700
2008	12,800	9,100	8,400
2009	5,000	7,500	7,500
2010	7,500	9,000	

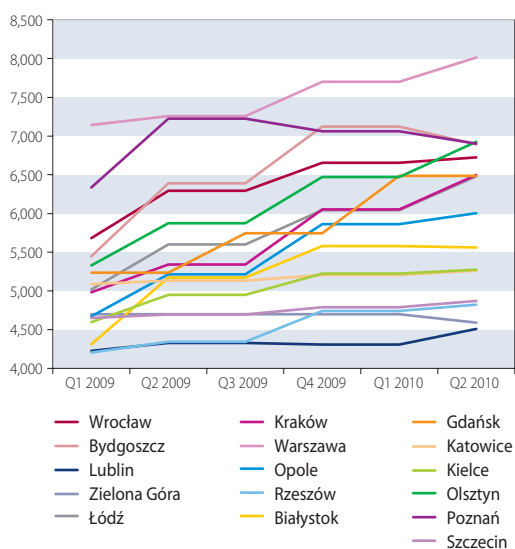
Source: See above.

a significant change in the situation. Household incomes were rising and bank lending was comparable in terms of value to the level from the previous year. These developments were taking place in spite of the situation in global markets (liquidity problems – particularly in the case of foreign currency denominated loans, problems facing parent banks, a more thorough analysis of the market situation) and in spite of increasing restrictions on housing loans granted by banks in Poland and clear limits to loans for the purchase of Warsaw properties. All of this became of secondary importance in the face of collective consumer behaviour, when despite a strong marketing pressure by real-estate developers consumers

formed the expectation of a fall in prices and suspended their purchases. As a result, significantly fewer flats were sold than supplied and at a lower price than the price resulting from fundamental demand (compare chart 11).

In 2009 the situation generally stabilized and it can be expected to continue so in 2010-2011. Housing prices, which remained very flexible while demand was growing, became more rigid when it fell in a manner typical to this particular market, i.e. forming a sloping down short-term supply curve and assuming a price that does not lead to market clearing. The imbalance between supply and demand results in a surplus of unsold flats, which we estimate in this case to be equivalent to an almost two-year stock. The sale of flats in quantitative terms is generally equal to the bulk of flats delivered for use in new housing projects of the primary market; with the share of finished flats having grown considerably.

Problems of the banking sector, including parent banks, aggravated and the domestic banks and regulators started to see the problems of local markets more clearly. As a result, lending dropped sharply reaching the level of 40% of the 2008 figure. Banks rationalized their lending and the loan availability curve became the curve of potential demand. As seen in the estimates presented in table 2, real demand in 2009 dropped by ca. 20%. A well-known phenomenon of substitution of credit with cash (family transfers, consumer loans) occurred. As a result, the supply pressure led to a slow decrease in housing prices, halted by a defective implementation of the government programme. It should be mentioned that the share of the year 2009 accounted for ca. 70% of the total amount of payouts from the government programme initiated in 2007, 30% of which was assigned to voivodeship capitals.

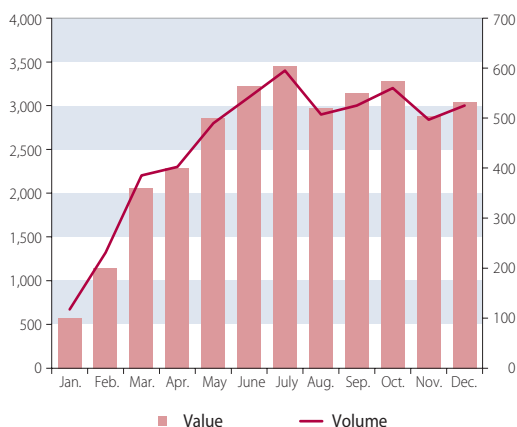
**Chart 13 House Price Limits in Governmental Program „Family in Their Own” (PLN/m<sup>2</sup>)**

Source: Own estimates on the basis of data from BGK.





**Chart 14 New Mortgage in Governmental Program „Family in Their Own” (mld. PLN)**



Source: Own estimates on the basis of data from BGK.

The analysis carried out on the example of the Warsaw market shows that the housing market in the biggest cities in Poland is characterized by a high level of tensions. High flat prices coupled with low availability of loans and household expectations shifted the demand curve in 2009 to the

origin of the coordinate system, while the supply curve shifted in the opposite direction. Moreover, the market is experiencing an influx of flats previously purchased for speculation purposes, whose number we estimate as approximately equal to the number of new flats. Prices have frozen and diversified adequately to sellers' price expectations. Sellers expect high prices, which results in a small number of transactions. Conversely, the equilibrium price would entail a sudden drop in prices. Global experience shows that this may be a typical situation for this market and that reaching the state of equilibrium may last several years (supply adjustments), although cases of sudden price adjustment are known as well. This is dependent on the scale of the imbalance and the financial condition of market participants. The developments to-date, characterized by slight declines of high prices show that a mixed variant of adjustment will take place, where the supply side will be of bigger importance. A relatively high profitability of the real-estate sector in comparison to other sectors of the economy will generate a flow of capital and price competition between new housing projects, which in a longer horizon will force a further decline in real prices.



# Decade in Latvia's Housing Market (2001 – 2010)

Mikus Āriņš\*  
Bank of Latvia

*Latvia's housing market experienced dramatic changes in the last 10 years. Real estate intermediation and mortgage lending developed buoyantly during those 10 years, inflating a price bubble on the real estate market. Eventually, the bubble burst and Latvia experienced an exceptionally steep decline in the real estate prices which has now stopped and a gradual recovery of the housing market is on the way.*

\* The views expressed in this publication are those of the author, employee of the Bank of Latvia Monetary Policy Department. The author assumes responsibility for any errors and omission.

1 Although the State Land Register is operational already since 1993, until 2001 the shortcomings of the system posed a significant burden to the transacting parties.

2 Prior to the pegging to the euro, the Latvian lats was pegged to the SDR currency basket; therefore, it was more beneficial to transact in the USD on the real estate market, thereby ensuring protection against exchange rate volatility (prior to the introduction of the euro, the USD comprised the largest share of the SDR currency basket).

3 Although the USD also depreciated against the EUR, it can only partly explain such a price hike as the rate of increase for the housing prices was much higher than that of the exchange rate movements at that time.

4 Average price on unrededicated standard apartment block housing in Riga as reported by real estate intermediary company Latio Ltd. Latio Ltd. data are used as a market price indicator for housing due to the comparability and the length of the time series. The average price is

## DEVELOPMENT HISTORY OF THE HOUSING MARKET

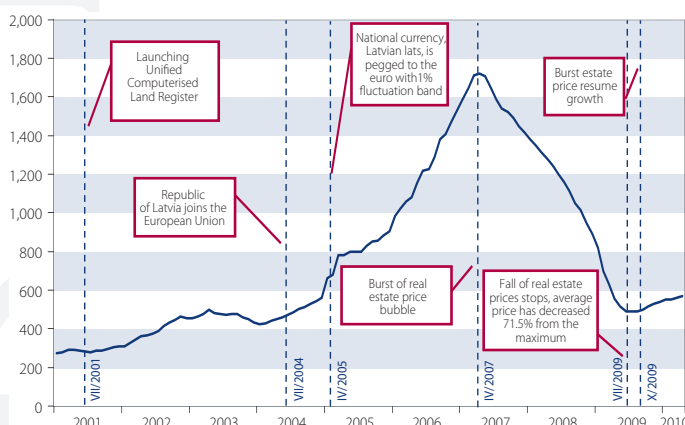
The year 2001 can be considered as the starting point for stable development of the real estate market, including the housing market (see Chart 1). It was the year when the implementation of the State Unified Computerised Land Register was completed, compiling and making available information on the ownership and legal status of all properties in Latvia<sup>1</sup>. This brought greater security to business as both the real estate buyers and lenders (banks) could check the legal status of properties easier and quicker. Solid economic growth also contributed to the market development, thereby adding slightly to the rise of the housing prices. While Latvia was preparing for the EU accession and the government was implementing numerous legislative reforms, the housing market development was moderate as the market was not fully aware of the upcoming changes implied by the country's participation in the EU. The financial markets and investors also preferred to remain observers.

After Latvia's accession to the EU on 1 May 2004 and the pegging of the national currency, the lats, to the euro (with a fluctuation band of  $\pm 1\%$ ) on 1 January 2005, the real estate market also came to

life. The leap of the real estate prices prior to and after the currency pegging is, however, explained by purely speculative motives driving the change of the quoting currency for real estate properties. Before 2004, the real estate prices were mostly set in the USD, while starting from 2005 the euro took over<sup>2</sup>; therefore, the real estate traders tried to make the most of the change<sup>3</sup>. With Latvia's accession to the EU and the pegging of the national currency to the euro, credit availability increased as a result of rapidly growing confidence of international financial markets in Latvia's economic growth prospects and, consequently, in the real estate market development. Against the background of favourable developments on the global financial market (primarily, the low EURIBOR), the borrowing rates decreased considerably, ever improving the availability of credits to fund real estate purchases. Economic boom that followed the EU accession also contributed to a rise in wages and salaries. As the number of people leaving Latvia for work abroad increased with the easing of labour migration rules, the government and the private sector were forced to raise the wages in order to retain the required specialists. Improved credit availability also for new real estate construction projects bolstered the growth of the real estate intermediation and construction sectors pushing up the demand for construction workers which, in turn, fuelled a steep rise in wages in the construction sector as well as the related sectors. Higher wages increased the affordability of bigger loans. With the affordability of real estate purchases increasing, the demand for real estate also went up, although it was partly speculative demand as businesses as well as individuals tried to reap profit from the rising real estate prices. Credit abundance, growing income and demand led the real estate market to believe that this situation was going to last long; therefore, the prices of the existing and newly-built housing (mainly as a result of the rocketing construction costs and high profit margins) escalated considerably creating a price bubble.

The situation changed in 2007. With the start of the global financial crisis, the international financial markets became exceptionally prudent, the

Chart 1 Prices on standard apartment block housing in Riga<sup>4</sup> (EUR/m<sup>2</sup>)



Source: LNB.



real estate price rise in Latvia came to an abrupt halt and reversed: the price bubble burst in April 2007. Prices continued to fall for more than two years, down to the level of 2004. Banks tightened their lending policies and the potential buyers expected further price declines; therefore, the demand collapsed resulting in a sharp decrease in the number of transactions on the market. The Anti-Inflation Plan implemented by the government also had a downward effect on the real estate market activity, as it imposed several restrictive measures on the real estate market<sup>5</sup>. The price drop on the real estate market coincided with a severe downturn in economic activity in Latvia: the government had to rescue one of the banks and turn to the International Monetary Fund for financial assistance. Real estate prices hit the bottom only in the summer of 2009 when the prices on standard apartment blocks had shrunk by more than 70% in comparison with the maximum. In autumn, the prices even resumed moderate growth.

### HOUSING MARKET IMPACT ON THE FINANCIAL STABILITY IN LATVIA

Plummeting real estate prices in combination with the weakening purchasing power and the credit crunch witnessed on the international financial markets had a significant adverse effect on the functioning of the financial system in Latvia. Shrinking income of the population caused by soaring unemployment and wage cuts as well as higher margins applied to loans translated into an increasingly larger number of borrowers facing solvency problems which increased the share of loans past due on the banks' balance sheets accordingly. Loans past due grew also in the real estate related sectors, particularly in real estate activities and construction. In 2008, the share of loans past due<sup>6</sup> in the aggregate loan portfolio expanded to over 3% as compared to under 1% in 2007, whereas in 2009 it exceeded 16%. While the increase in the share of loans past due decelerated in 2010, it still remains high. In context with the squeezed availability of funds on foreign financial markets, it put an exceptional burden on the banking sector. With the exposure to loans past due expanding rapidly both in the household loan portfolio as well as in the corporate loan portfolio, the banks minimised new lending, thereby contributing to a further decline in the real estate prices as there were no funds available to finance the purchases. Provisions for non-performing loans took over an increasingly larger share of the bank expenditure; therefore,

the banks had to optimise their expenditure structure, which mainly happened on account of cutting the administrative costs. Banks also tried to raise additional income, primarily by increasing the commissions and fees and interest margins as well as through active resident deposit attracting campaigns. Despite all the measures, the majority of banks sustained losses in 2009.

Nevertheless, the current stand of the bank system is stable: all banks are sufficiently capitalised, largely on account of the capital injections by Swedish parent banks into their subsidiaries enabling them to absorb the losses incurred, loans past due decrease alongside with the deceleration of the fall of the economic activity. Bigger banks have established subsidiaries to handle the management and sales of the foreclosed real estate.

### NEAR-TERM AND LONGER-TERM DEVELOPMENT OF THE HOUSING MARKET

Developments in Latvian real estate market over the last decade – the augmentation of the price bubble and the painful consequences of its burst, reassure the significance of the sustainable growth in the real estate market, as well as its vital role in the economy. An importance of prudent lending and a necessity to limit speculative incentives are now evident. Tax reforms in the real estate field have been done and some issues are still in the process.

Recently the real estate prices have started to rebound somewhat, though it rather should be considered a price adjustment after an exceptionally steep dive than resumed growth. The most important pre-requisite for the housing market to develop is restored lending. Yet no significant unwinding of the tight lending terms in the field of real estate can be expected before the reduction of the banks' exposure to loans past due in the household and real estate related sectors. Speed up of insolvency proceedings could contribute to the contraction of the share of loans past due.<sup>7</sup>

In the near-term the demand for housing is expected to remain subdued as the recovery of the households' purchasing power will be slow and the number of households has declined. Alongside with the economic development trends, the demand will be largely dependent on the government's fiscal policy and the banks' lending policies implemented in Latvia. It is in the interests of both parties to achieve stable market development and prevent any future price bubbles as well as restore sustainable economic growth.

*applied for the capital (Riga) only as the historically most active housing market to some extent representing also the overall national housing market developments.*

*5 Including a provision that a loan for purchase of property may not exceed 90% of its market value and the borrower has to make the first instalment amounting to 10% of the property value.*

*6 Loans to residents past due over 90 days.*

*7 Currently, a new version of the "Insolvency Law" is being prepared, potentially optimising the foreclosure process.*

# E

# A

# I

# B



# Importance of real estate as credit risk mitigation in the Slovak Republic

Viktor Lintner and Štefan Rychtárik  
Národná banka Slovenska

*1 Building loans are not a priori pledged by real estate, guarantee by real estate depends for example on the amount of loan drawn. As a result, interim loans and building loans are not part of the sensitivity test below in this text.*

Real estate represents an integral part of banking activities. On one hand, the loan activity is influenced to a great extent by current and expected real estate prices; on the other hand, real estate prices are significantly influenced by loan activity. From the banks' point of view it is crucial in what scope the real estate provides protection against the risk arising from the loans that they secure.

This issue needs to be divided into two main categories. One category is represented by the housing loans applying mostly to mortgage or construction loans<sup>1</sup> provided to households for a flat or house purchase. The other group are loans provided to developers for commercial real estates. Although the nature of both segments and their risk are different, their common characteristic is still the loan securing by a real estate. In this context it is logical to describe in brief both segments and to ask in what scope real estate alleviates their credit risk.

## MARKET DEVELOPMENT AND RISKS

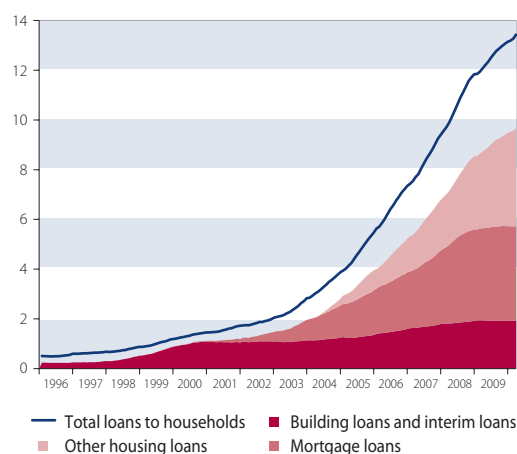
The Slovak market for housing loans is quite young. In spite of the gradual development of building savings by the end of the 1990s, its real growth is linked with the implementation of mortgage loans from 2001 to 2003. These provided for a more flexible and faster purchase of real estate than construction loans, especially

considering the gradual decrease of interest rates on loans and the state premium for building savings. In this context, the implementation of "other housing loans" was another step towards flexibility. From the position of the client, these loans behave in much the same way as mortgage loans, on the other hand, the loan does not have any legal limit regarding the amount of collateral (*loan to value*, LTV 70%) and the bank is not obliged to issue mortgage bonds (MB) and is exempted from other administrative obligations. It is likely that just higher flexibility is the reason for their significant growth in the recent period, because construction savings and mortgage loans were rather stagnating (Chart 1).

The first view of credit risk in respect to housing loans is provided by the proportion of non-performing loans to total loans. In the recent period it has been growing in all categories of housing loans (Chart 2).

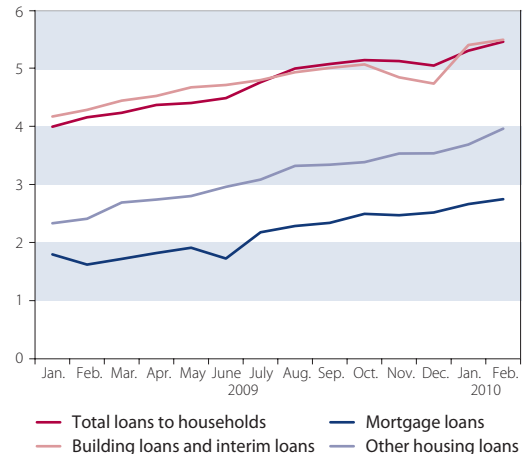
In general, the credit risk in respect to housing loans is influenced by several factors leading either to the increase of the monthly instalment or decrease of the disposable incomes of households. In addition to the overall macroeconomic development determining to a great extent disposable incomes, we can also assign other market factors such as exchange rates or interest rates influencing the level debt burden under certain

Chart 1 Development of individual components of housing loans (EUR billions)



Source: NBS.

Chart 2 Share of non-performing loans to total housing loans (in%)

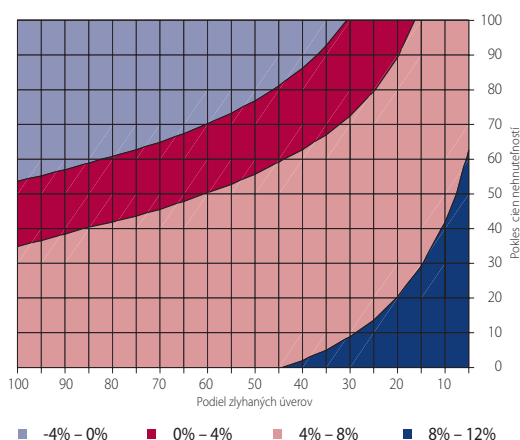


Source: NBS.





**Chart 3 Impact of the combination of real estate prices and the share of non-performing loans (in%)**



Source: NBS, own calculation.

Explanation: Colour scale is used to differentiate the value of the capital adequacy ratio after the tested scenario application.

conditions. A special factor may also be represented by real estate prices that may influence the debtor's behaviour under certain conditions. However, in Slovakia households guarantee their liabilities by all of their property, so the price decrease of the financed real estate does not have an impact on their motivation to continue with the loan repayment.

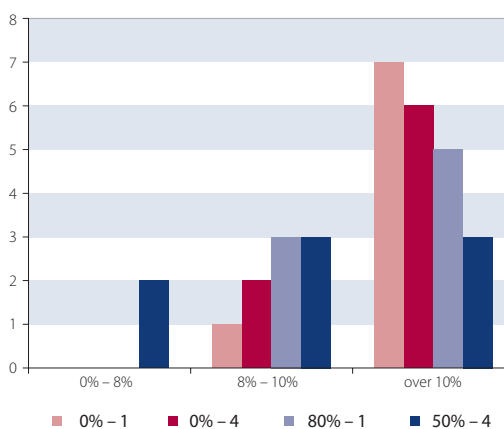
The increase of the volume and share of non-performing housing loans in the Slovak banking sector (Chart 2) may so far be attributed to the macroeconomic development. The current economic crisis increased unemployment, which had an adverse effect on the disposable incomes of Slovak households. As for the further development of credit risk, a significant adverse effect would result from the potential increase of interest rates that would lead to the increase of instalments with respect to loans with shorter fixation of interest rate. On the other hand, disposable incomes would be adversely affected by the potential tax burden increase which cannot be excluded considering the growing indebtedness of Slovakia.

#### TEST OF SENSITIVITY ON THE CHANGES OF REAL ESTATE PRICES AND THE PROPORTION OF NON-PERFORMING HOUSING LOANS

The recent development has stressed the presence of factors of credit risk in both segments. In some instances, their importance has recently increased. Because of that it is logical from the banking sector's stability position to analyze the degree by which pledged real estate mitigate this risk.

The basic question therefore is to what scope the pledged real estate cover the exposure of banks, and how the coverage would change in the case of the price decrease of such real estate. The decrease of value off collateral, i.e. increase of

**Chart 4 Distribution of impact on individual banks**



Source: NBS, own calculation.

Explanation: The first number reflects the decrease of real estate, the other number expresses the multiple of problematic loans.

the loan-to-value, is problematic especially at the increase of the risk of the stated exposure. In such instance we presume that the unsecured part of non-performing loans is covered by the additional provisioning, which is reflected in the decrease of the value of own funds (Lintner, Rychtárik, 2007). In the calculation we do not consider the bank's right to ask the debtor to complete the amount of collateral in the case of its value decrease. In general it must be determined at what combinations of the default rate of housing loan and the decrease of real estate prices will the fulfilment of the capital requirement be endangered (Chart 3).

The positive result is that with an unchanged rate of non-performing loans, even in the case of the most extreme decrease of real estate prices the ability of the banking industry as a whole to fulfil the regulatory capital requirement would not be endangered. Similarly, under the presumption of stable real estate prices this collateral would be able to cover the housing loan portfolio in such a way that the capital adequacy would not be endangered.

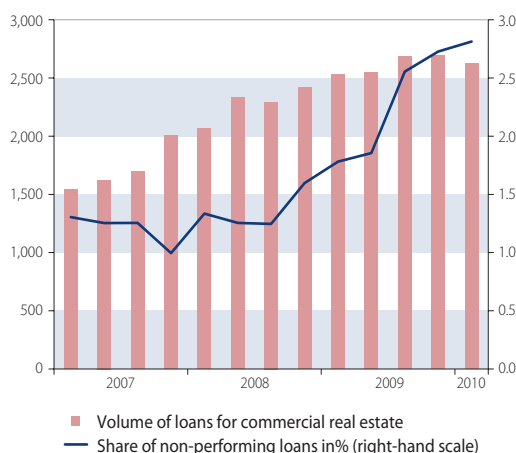
In spite of quite favourable impacts of the negative scenarios on the banking sector as a whole, it is necessary to point out differences among individual banks<sup>2</sup>. In this case we will not apply the common scale of the non-performing loans rate, but we will consider the current quality of the loan portfolio. We will express the rate of deterioration of the housing loans quality as the multiple of the current volume of non-performing loans and doubtful loans.

It was confirmed on a sample of individual banks that with the preserved default rate, even an extreme (80%) real estate price tumble would not endanger the 8% limit of the capital adequacy of any of the banks. The regulatory minimum is only violated in the case of a combination of both variables.

<sup>2</sup> Considering the Slovak housing loan market, the calculation was done on a sample of 8 banks.



**Chart 5 Development of the volume of loans for commercial real estate and the proportion of bad loans (in EUR millions)**



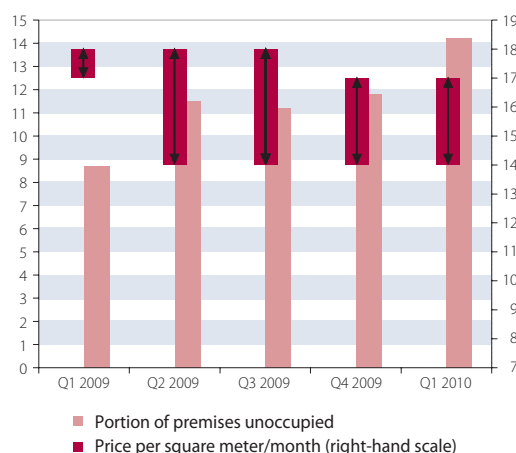
Source: RBUZ.

### LOAN MARKET FOR COMMERCIAL REAL ESTATES

The onset of commercial real estate building in Slovakia (and related financing of such projects by domestic banks) relates to the period of dynamic economy growth about five to six years ago. From that time, the volume of loans extended by banks for the construction of commercial real estates was growing rapidly. Only in the period from the beginning of 2007 up to the beginning of 2009 the portfolio of loans directed to the commercial real estate segment increased by 64% (Chart 5). It was the result of the overall dynamically improving economic situation in Slovakia when on one side the expansion of established companies and inflow of new ones stimulated demand for modern office spaces and logistics capacities that had been lacking, while on the other hand the improving financial conditions of households were reflected in interest in housing in newly built real estate.

Starting at the turn of the first and second quarters of 2009, i.e. at the time of the culminating financial and deepening economic crisis, the net flow of loans to development slowed down significantly, but the volume of loans was still showing a positive trend unlike the overall exposure of banks against non-financial companies. The volume decreased, however, also in the segment of commercial real estate in the first quarter of 2010. The reason why in 2009 the volume of loans for the construction of commercial real estate was growing although the economy was in recession and the banks were decreasing exposure against other segments is that the commercial real estate sector shows quite high inertia and its cycle lags behind by a certain period compared to the overall economic cycle of the country. The construction of many bigger projects taking several years often starts just at the peak or shortly before the peak of an economic cycle and continues through the time the economy goes into

**Chart 6 Development of occupancy and prices (in %)**



Source: CBRE.

recession. Because the funds for such constructions are often released in several stages, the banks provide financial coverage also for projects in progress which may lead to the increase of exposure against the sector, in spite of the fact that the current economic position is deteriorating at that time. This is just what happened in Slovakia in the recent year when the majority of loans drawn was determined for financial coverage of already started projects which, in spite of the lack of willingness to financially support new projects, sufficed for a slight growth of the total volume of loans.

It seems that even if in recent periods the banks decided to finance a new construction of commercial real estate, in general these projects were smaller than ones in the pre-crisis period. Another change occurring as a result of the crisis was the shortening of the period for which banks were providing loans for new projects. The total maturity of the portfolio of the commercial real estate sector weighted by volume has decreased in the recent three years from 6.7 years to 5 years.

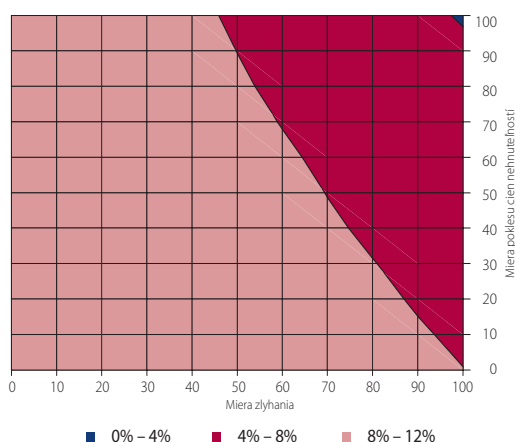
The share of loans provided for the financing of commercial real estate of the total volume of non-financial corporate loans recorded by the end of the first quarter of 2010 in the whole banking sector almost 15%, which is an important part of the total credit exposure. In four banks, this relative representation even exceeded 20%.

Just as housing loans, the credit risk expressed by the share of non-performing loans to total loans for commercial real estate has also been rising in the recent year and a half. In the stated period the share almost doubled and at present stands at 2.8%.

The main factor determining the riskiness of loans to the commercial real estate sector is the economic cycle. The slow-down or decrease of economic activity is also reflected in growing unemployment and falling disposable incomes, which, together with a lower willingness of house-



**Chart 7 Impact of the combination of default rate and real estate price decrease on the capital adequacy ratio in the banking sector (in%)**



Source: the NBS, RBUZ, own calculations.

Explanation: Colour scale is used to differentiate the value of the capital adequacy ratio after the tested scenario application.

holds to take on debts, results in the decrease of demand for housing in newly constructed real estates. The decrease of economic performance is reflected in consumption decrease which subsequently influences retail trade and may lead to the decrease of the occupancy of shopping spaces within individual projects. The same applies for areas leased as office space, because some companies occupying such spaces either leave the market during the recession or work under a cost-saving regime and rent smaller areas.

All the aspects described lead to the decrease of occupancy and prices (Chart 6, Chart 7) and subsequently to the decrease of the financial flow of the developer that at a certain point may not be sufficient for covering loan instalments. This situation may lead to a past dues and subsequently the loan is either restructured or fully defaults. Another factor that may have an adverse effect on the loan portfolio quality is the possibility of market interest rate growth. If we presume that the situation with loans for commercial real estate is similar to the that prevailing on average in the whole portfolio of non-financial corporate loans, i.e. that the majority of loans bear a variable interest rate linked to the inter-bank market rates, then the interest rate growth in the economy also means a higher interest burden at repayment. A specific risk with commercial real estate is the high concentration of loans against a small number of counterparties. The banks in this sector often finance several big projects worth millions of euro representing a major part of exposure within loans for commercial real estate and/or the whole portfolio of non-financial corporate loans. The last risk factor playing a role from the point of credit risk that the bank undergoes is the decrease of prices of financed real estate. Unlike housing loans for households, the decrease of commercial real estate prices may have a direct impact on

the developer's willingness to continue with the project and so also repay its obligations. Starting from a certain rate of decrease it is better-off for the developer to leave the whole project because the developer's losses are limited by the volume of own funds invested into the legal entity established by it specifically for the purpose of the specific project. In this way the remaining property of the developer is legally separated from the individual project and may not become part of the foreclosure. From this point, the credit risk for commercial real estates is the higher the smaller part of the financing is ensured by the developer from its own funds.

### SENSITIVITY TEST FOR THE CHANGE OF THE PRICE OF SECURING WITH COMMERCIAL REAL ESTATE LOANS

In addition to the fact that real estate price has an impact on the moral hazard, it significantly influences the amount of loss the bank faces if the loan is not repaid and the default occurs, because the relevant real estate usually functions as collateral. The smaller the ratio of real estate price to the loan balance at the time of default, the understandably smaller part of loss can be covered by the bank by its potential sale.

In this context it is interesting to what scope Slovak banks are exposed to the risk of real estate price decrease from the point of their function as collateral. One of the ways to quantify this is the sensitivity test in which the size of the loss of the banking sector is examined depending on the selected pair of input parameters that are the default rate and the percentage decrease of real estate prices. The whole range of potential combinations was covered, i.e. both parameters assumed values independently from the interval from 0% to 100%, although not continuously but rather from a discrete network with the step size of 10%.

At the calculation we followed individual data about loans taken from the Registry of Bank Loans and Guarantees, where it is possible in respect to any loan to obtain – inter alia – the information about its outstanding amount and the value of the corresponding collateral. For every fixed pair of inputs, the subset of loans within the whole sector was first of all randomly generated so that their volume in proportion to the total volume of loans for commercial real estate reached the determined default rate. Because it was presumed that these loans would default, an expected loss was subsequently calculated as the difference of the loan balance and the stress value of the collateral, which – in other words – is the unsecured part of the loan. The total loss for the industry then represented the sum of losses for individual loans from the generated subset. To minimise the impact of the random selection on the test outcome, the stated procedure was repeated a hundred times (always with a different random sample of defaulted loans) and the resulting expected loss was the arithmetic average of individual

3 The calculation for the sector did not include branches of foreign banks, building savings banks, and Slovenská záručná a rozvojová banka.



simulations. For a more tangible expression of the testing scenario impact, the loss calculated was deducted from own funds of the sector and subsequently the new value of the capital adequacy ratio was calculated.

It results quite clearly from the test outcome (Chart 7) that in spite of the fact that the loans for commercial real estate belong to a more important group within individual sectors in terms of volume, the banking sector possesses sufficient capital to absorb even significantly unfavourable development in terms of the quality and value of collateral. With the exception of very extreme combinations of default rate and real estate prices

decrease, the capital adequacy ratio of the banking sector as a whole would be maintained over the limit of 8%. Regardless of the absolute and in fact non-realizable extreme of whole portfolio default and the decrease of prices of collateral to zero, the indicator of own resources adequacy under any other circumstances would reach at least 4%. It is also interesting to note that even under the presumption of a 100% real estate price decrease, the default rate could be about 45% and still – even after considering the loss thus incurred – the ratio of capital and risk weighted assets would not be lower than 8%.

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# Real estate prices

1. Which data on real estate prices do you use for analyses?
2. How can the national database of data on real estate prices be improved? How do you perceive the deliberations on the opportunity of also using alternative sources of data, such as, for example, the credit register and cadastre of real properties?
3. What development of average house and flat prices do you expect in 2010 and in the medium-term horizon?
4. Average price per square meter of residential area decreased to less than EUR 1,300 in Slovakia in the recent quarter of the year. Compared to the maximum achieved in the 2<sup>nd</sup> quarter of 2008 this represents a decline of more than 16%, prices thus returned to 3<sup>rd</sup> quarter of 2007 levels. What is the level under which real estate prices should not fall in Slovakia?
5. What basic attributes should the so-called equilibrium price of real estate fulfil, so that the difference between market price and equilibrium price indicates an unbalance on the residential market in order to prevent the formation of disproportional price bubbles?
6. What is the development outlook for particular segments of the Slovak real estate market (housing, retail, recreation facilities, offices, industrial parks) in the forthcoming period?
7. In the residential market in Slovakia is currently an unambiguous overhang of supply over demand. When do you expect higher interest for housing loans from developers and households?
8. How did commercial banks change the criteria for granting housing loans as a consequence of the mortgage crisis? Can you specify concrete measures?
9. Mortgage loans in Slovakia are approximately one third more expensive compared to the euro area average. Why?

**Mr. Boris Fojtík,**  
**economic analyst, Tatrabanka, a. s.**

1. We use real estate prices disseminated by the NBS for analyses of the real estate market.

3. We expect a stabilization of real estate prices in 2010 as well as their slight oscillation around current levels. In the medium-term horizon the development will depend to a great extent on the revival of new flats' construction. In the case of a longer-term absence of adequately high new supply, a fast price rise could be started.

5. One of the views which offers itself is the assessment of price by means of the real estate accessibility index. It is a combination of wage levels, interest rates, real estate prices, and LTV. The compilation of a composite index from these coefficients and comparing its present-day level with its long-term average can also testify about the risk of inflating the real estate bubble. However, the problem in Slovak conditions is the limited historical data concerning previous development, a fact which is strongly influenced by the non-standard market conditions of the past.

7. A moderate increase in inhabitants' interest in mortgages has been seen in the first quarter of this year. We expect the growth rate of real estate loans to moderately increase even during 2010. We view the situation in the field of project financing more pessimistically; we do not even expect considerable recovery this year mainly due to greater bank cautiousness.

8. The change of criteria mainly referred to the decrease of LTV or debt-to-income, which means the level of monthly instalments compared to the monthly income of the person interested in a mortgage.

9. We see the reasons first of all in higher refinancing costs that reflect the difference between the yields of SR state bonds and benchmark bonds. Negatively contributing is also the risk profile of clients due to a higher recorded growth of unemployment compared to other euro area countries.

**Mr. Michal Mušák,**  
**analyst, Slovenská sporiteľňa, a. s.**

1. NBS data are the main source for us as far as real estate for housing are concerned. We recently started to also follow [www.trh.sk](http://www.trh.sk) statistics, which has a similar methodology and is accessible more quickly, although its robustness is to yet to be tested over time. For non-residential real estate we use data from real estate consulting companies. The overall picture of the Slovak real estate market is supplemented by articles in the press.

2. We watch the Bratislava market as well as other regions. Recording an average for the whole of Slovakia does not make much sense in my opinion, as the market in Bratislava is significantly different compared to the rest of Slovakia. The average price for the whole of Slovakia is a mix of two heterogeneous markets and does not represent anything concrete. Besides this a considerable influence on average price can be exerted by the changing structure of real estate on offer, for example a higher ratio of new buildings or city flats in a given quarter of the year. If possible, it would be advisable to adjust the resulting price for such structural changes. One option would be to watch repeated sales (as the Case-Shiller index); the Slovak market however, is perhaps too illiquid for this. An advance in the



right direction would be passing from classified ads prices to realization prices, this is where I see an opportunity mainly for taking advantage of data from the cadastre of real estate. Slovakia is also lacking a reliable source for rental prices and rent yields (N.B.: it is not sufficient to use average rent against average price of the flat, because the structure of flats being rented may be different compared to that of flats being sold) at least for Bratislava. I also would appreciate the monitoring of non-residential real estate.

3. This year we expect moderate growth of prices in Bratislava, annually around 5% towards the end of the year. In other regions average growth may be slower. In the medium-term horizon we expect that the growth of real estate prices could approximately follow the growth of incomes or be mildly slower, together with how new construction increases and how the influence of demography grows weaker. We estimate the nominal growth of incomes in the first years after the fading away of the impacts of last year's recession to be about 8-9 % per year, it should decelerate together with continuing convergence later on.

4. If nothing unexpected happens, such as for example second wave of crisis, I expect that the prices of Slovak real estate for housing have already bottomed out.

5. We do not have an estimate on the equilibrium price of real estate. I consider it useful to watch the growth of real estate prices in comparison with income, as well as the yield of rent in comparison with the price of the flat. A past decrease, sometimes even under the interest rates of mortgages, should indicate that real estate investors have, to a great extent, relied on future growth of prices.

7. In the household sector, recovery of interest in real estate can already be seen. Cheaper flats, lower interest rates, and a more optimistic view of households are contributing to this. Besides this, on the side of developers we expect a delay of new construction, as the existing supply of available flats must first be decreased and the banks have also tightened conditions for granting loans.

8. The creditworthiness of clients is considered more severely by banks under the influence of the crisis. They mainly stopped granting loans over 100% of the value of collateral, and they stopped lending to highest risk clients who would have obtained housing loans in the past. Besides, the differences between interest from the most creditworthy and least creditworthy clients have increased. In spite of a tightening up of the conditions, Slovenská sporiteľňa granted more housing loans last year than in 2009.

9. One of the reasons for this is the fact that Slovakia has a higher risk surcharge in comparison with the euro area, which expresses itself in the more expensive financing of banks. Additionally, the time planning of banking risk models is short, which speaks in favour of a cautious approach.

Higher prudence from commercial banks is also required by the central bank.

**Ms. Eva Sadovská,**  
**analyst, Poštová banka, a. s.**

1. Our main source for the creation of real estate price development analyses is the NBS quarterly statistics.

2. Any supplementary or more detailed data on the development of real estate prices are definitely welcome. We consider also interesting: the distinction of new buildings versus older flats, the number of rooms, and variations at the regional level.

3. Enduring long queues at unemployment agencies will not lead to a big growth in prices of flats or houses even this year. Real estate prices should remain at lower levels compared to their height in 2008. Most potential buyers of flats or houses this year are inhabitants of cities or regions less afflicted by the growth of unemployment, and those who have waited until now to purchase real estate. This year as last year, the first fiddle will be played by the buyer not the seller.

4. The average price of flats and houses in SR moved in the first quarter of 2010 to a level only one euro per square meter lower than the last quarter of 2009. Half of regions even recorded a moderate growth of prices in comparison with the end of 2009. These were the regions (BA, BB, KE, PO) in which real estate prices first had a negative reaction to the crisis. And as for the east of Slovakia, there is one more particularity. In its regions the most notable decrease of real estate prices (one quarter to one fifth) was recorded. We expect that the minimum to which average real estate prices approach in subsequent quarters will be close to the level reached in the 2<sup>nd</sup> quarter of 2007. A decrease of prices below EUR 1,000 per m<sup>2</sup> currently seems improbable to us.

7. The year 2009 was marked by weaker credit activity. The rapid increase of unemployment and the potential inability to repay instalment obligations led banks to increased care when granting loans to clients. Under the influence of worries about their future, many people lacked the appetite to take on a new or additional loan. These aspects led to a decrease of up to one third of the volume of newly granted housing loans. A larger fall (almost 60%) was registered in the case of standard mortgage loans. A more moderate fall of 5.4% was recorded for other housing loans (e.g. consumer loans secured by real estate, loans for reconstructions, and the like.).

8. One of the reasons may also be the higher rate of unemployment in comparison with the euro area average. The associated higher risk of bad debts may be the reason for the application of a higher risk surcharge. At the time of the crisis, Slovakia recorded one of the fastest increases of unemployment rate.

In the first quarter of 2010 though, banks granted new housing loans to clients in the volume of EUR 612 million, and so approximated the volume



of two years ago (i.e. the volume of loans for the first quarter of 2008, which was not affected by the crisis).

9. The tightening up of conditions concerned the height of loans according to us – banks financed from 85% up to 70% of the 100% value of real estate.

Moreover, banks concentrated themselves in 2009 more on the sale of loans for the purchase of real estate other than mortgages (e.g. consumer loan secured by real estate). New volumes of housing loans thus “spilled over” markedly from standard mortgages into other housing loans on a yearly basis.

EFFATB



# Monetary ups and downs

*The NBS prepared a new touring exhibition – Monetary ups and downs – monetary reforms, separations, and other disasters in the 20<sup>th</sup> century. The exhibition was opened to the public at Trenčín's Army House.*



Photo: Igor Plavka.

*The exhibition's opening ceremony was attended by NBS Vice-Governor Mr. Viliam Ostrožlík and Mayor of Trenčín Mr. Branislav Celler.*

The exhibition surveys in detail such historical events within the history of Central and Eastern Europe that had an impact on the currencies being used since the times of the Austro-Hungarian Monarchy, due to the creation and demise of individual states or political and warlike changes that led to monetary shocks during the last century. The exhibition will be appreciated foremost by experts and numismatists, but also by the wider public and students with an interest in the history of the development of payment means during the last hundred years in our region.

The exhibition Monetary ups and downs has been open to the public from 27 May to 2 July 2010 in the premises of the Army House (Garrison Club of the Training and Support Forces Command of the Armed Forces of the Slovak Republic) at Hviezdoslavova street No. 16 in Trenčín.

The exhibition will also be installed in Žilina, Martin and Trebišov this year, with the installation being expected to take place in other Slovak towns next year.



General view of exhibitory panels.



Individual panels map the situation in countries.

