



# The impact of the euro introduction on the banking sector

Part 2

Michael Benčík, Sandra Tatierská  
Národná banka Slovenska

*In the second part of our study about the impact of the euro introduction on the Slovak banking sector, we will focus on relations between individual variables according to different sources and correlation analyses as well. In the empirical part, we will present panel estimates of cyclical and structural influences on banking sector profitability in five euro area countries: Austria, Belgium, Germany, the Netherlands and Portugal (in the 1986–2006 period) and, for comparison's sake, the banks of Switzerland (CH), the United Kingdom (UK), and the United States (US) will be included in the equations again. We have chosen following significant aggregates as regressors: the ratio of the increase in financial investments to GDP, long-term interest rates, the ratio of banking sector assets to GDP and the openness of the economy. We will analyze the estimated changes in elasticities resulting from calculations before and after the euro adoption. We will also attempt to analyze the possible effect of the euro introduction on the Slovak banking sector.*

<sup>1</sup> In general, a common convergence of the average interest rates set by banks towards EMU levels has been recorded. This had been fostered by low inflation and decreasing interest rates. This structural development connected with EMU convergence has been important in Ireland, Italy and Portugal. ECB (Feb. 1999), ECB (Dec. 2000).

## ASSUMPTIONS OF STRUCTURAL AND CYCLICAL INFLUENCES ON BANKING SECTOR PROFITABILITY (1994–2003)

Several econometric studies have been concerned with the topic of structural and cyclical influences on the income of banks. Some of them say that if GDP growth increases, the growth of net interest income should also increase by means of increased demand for loans [Calza, Manrique, Sousa, 2003; Mendez, Abreu, 2003]. It is also mostly assumed that the growth of the long term interest rate should negatively affect the ratio of non-interest income to gross income from financial activities, because if income from government obligations is higher, demand for professional services provided to the depositor by the bank decreases [Albertazzi, Lambarcota, 2006]. The authors Mendez and Abreu (2003) have stated in their study that the annual growth of consumer prices should have a positive effect on the number of non-interest income due to a higher number of transactions. However, they found out that it also influences the growth of costs.

Athanasoglou, Brissimis and Delis, (2005) have pointed out that capital refers to the amount of financial resources available for the support of bank trades and therefore it works as a guarantee in the case of unfavorable developments. It is expected that after the euro introduction the spreading of cross-border contagion resulting from shocks on the domestic market among large banks will intensify and their risk will rise through a more integrated money market [Gropp, Duca, Vesala 2007]. It is expected that, even though the similarity

of banking sector riskiness was increasing from 1999, it was caused by an increased significance of specific components of the European banking system rather than by macroeconomic shocks [Brasili, Vulpes 2006]. As previously mentioned, the increasing level of capital should be a guarantee of higher income also in the event of crises brought by the years 2001–2002.

So much for some connections between cyclical and structural variables and the profitability of the banking sector as shown by various studies. However, the total influence on the profits in the given periods will depend on the extent of the impacts on individual items. Before we started to work with panel estimates, we had tried to explore these relations in more detail by means of correlations between the individual aggregates we found important during the 1994–2003 period in the banking sectors of 14 countries. We have also taken into account the situations before and after the euro adoption.

Based on our survey, we assume a strong positive influence of the annual GDP growth on the growth of loans provided to clients which will be reflected in higher interest income. The expected positive correlation should continue to hold throughout the period. The higher interest income should also signalize a positive effect on profits, if the cost of the creation of adjusting entries for loans were not too high in the given periods.

In the given period, long-term interest rates showed a negative correlation with loans and later on also with interest income.<sup>1</sup> We thus expect that due to a decline in the long term inter-



est rates interest income will also raise by means of higher demand for loans provided by a bank. We also expect a positive reaction of profits to a reduction of interest rates. This relation had been frequent, mainly before the introduction of the euro in a given country, but after the euro adoption many changes in the correlations of both the banking sectors of euro area countries and Switzerland set in.

During the entire period, the correlation of the growth of consumer prices with the level of non-interest income and later on of pre-tax profits was different. Therefore we expect this variable not to be significant in panel estimations either. The same problem appeared in case of the number of credit institutes, or subsidiaries, and their influence on the cost-to-income ratio of the banking sector. It cannot be said unambiguously, if the lowering of their number also has had a negative impact on the level of the ratio of operating costs to gross income from financial activities. As for the capital to assets ratio and capital to profit ratio we have also detected no significance of the correlations because of the low value and distinct nature.

We expect higher non-interest income by means of better risk management as the standard of securities, including shares, increases. We have also detected a positive relationship between the annual GDP and the volume of securities. Prior to and after 1999, we expect a positive influence also on the level of pre-tax profits because of higher non-interest incomes announced in advance. We expect a positive influence of the amount of the managed level of assets and financial investments on the profits of the banking sector on the grounds of their mutual positive correlation.

As for the effect of openness of the economy, its influence on the profit of banking sectors is questionable. Micco, Stein and Ordez (2003) have pointed out in their study that the euro led to an increase in bilateral trade both between euro area countries and with other countries. The growth of openness between two economies of the Economic and Monetary Union (EMU) after the euro adoption, based on the results of Rose and Stanley (2005), was at the positive level of 30 to 90%. Higher openness of countries' economic systems generally increases the propensity to crises with respect to foreign partners, but we assume that the banking sectors could benefit from lower transaction cost and currency risk just after the euro adoption. We thus assume pre-tax profits to grow along with the rise of openness by means of higher non-interest income, which has been partly also confirmed by a positive correlation between the indicator levels. And in the case of crises after the euro introduction, we hold that it was the more opened economy that has moderated their impact and benefited from the advantages resulting from EMU membership. Statistical estimates analyzed in the part about panel data will show whether our assumptions have been correct and significant.

## PANEL ESTIMATES OF THE INFLUENCE OF THE EURO INTRODUCTION ON BANKING SECTOR OF SELECTED COUNTRIES (1986 – 2006)

### Motivation and data used

A correlation analysis has shown that there can be causal relationships between the profit of the banking sector and other variables. Therefore we undertook to subject these data to a regression analysis, which can identify these relationships.

If analogous relationships in several countries are analyzed, we can define a systematic part of the variance, which corresponds to common relationships and an idiosyncratic part corresponding to influences limited to only one country. We have analyzed mainly the part corresponding to common influences for all countries or for most countries of the euro area.

For the analysis of these relationships, one can use independent estimates for individual countries or link all the observations and calculate one pooled estimate. Separate estimates are more general than a pooled estimate, but they are unable to sufficiently distinguish the systematic part of the variance from the idiosyncratic part for the respective country. As a result of this disadvantage, a higher variability of estimates of the parameters corresponding to common influences between the countries can be expected. The statistical significance considerably by-passes this problem because in this case the estimate of parameters corresponding to common relationships is also influenced by a part of the idiosyncratic component that is misspecified. On the other hand, common estimates can limit the estimated parameters by implicit restrictions, which do not have to be fulfilled (if, for example, the given relationship is only valid for some, not for all, of the countries for example). Such a misspecified model can be revealed by means of high standard deviations of parameters and abnormal residuals. However, if the model is formulated correctly, the parameters corresponding to common relationships can be estimated in a more reliable way, because idiosyncratic influences in individual countries tend to cancel each other out.

At first we attempted to estimate a series of one-equation models on profit of bank sector in selected countries in and outside the euro area [Austria (AT), Belgium (BE), Germany (DE), the Netherlands (NL), Portugal (PT), the United Kingdom (UK), Switzerland (CH) and the United States (US)]. We used annual data for the years 1986–2006. We tried out the following aggregates as a regressors<sup>3</sup>: the spread between the average interest rates on loans and deposits, the ratio of the increase in financial investments to GDP, the output gap (deviation of the logarithm of GDP from the linear trend), money market rates, long-term interest rates (for the Maastricht criterion), the rate of inflation, the ratio of securities including bonds to GDP, the ratio of the assets of the

2 For Poland, an economically developing country, Borowski (2003) even found out that the amount of trades with the euro area should increase by 40% to 60%.

3 We have taken the data from the databases: ECB Data Warehouse, Odisnet, Eurostat, from OECD publication *Bank Profitability, Financial Statements of Banks, 2002* and from data of national central banks. Pre-tax profit data is provided by the OECD only until 2003, therefore we have worked mainly with data provided by national central banks in this part. As for Germany, deviations from the OECD data have occurred, nevertheless the results of tests and estimates have not disappointed our expectations, so that we have not considered further adjustments in this respect necessary.

THE  
A  
H  
B



4 This procedure was motivated by the results of one-equation estimates, where the residual variance differed considerably among individual countries. The weights are construed in such a way that the higher the residual variance of the given country, the lower the weight of the pertaining observations. If we did not take into account this fact, the random components would be heteroscedastic and the quality of the estimates would suffer.

5 To rule out the possibility that the reversal occurred significantly sooner or later, we have added up two models analogous to the extended model. The dummy variables in these test models had non-zero values from 1996 or 2001 (the change for the years 1997, 1998 and 2000 would be too small compared to the original version). All variables were significant at a sooner time of reversal, but the coefficients of determination (both weighed and not weighed) decreased compared to the original version. In the case of a late reversal, the t-tests of parameters corresponding to dummy variables decreased and the coefficients of determination fell too. We conclude that the reversal really occurred in 1999. For the purposes of sensitivity analysis, we have estimated the basic model also without countries outside the euro area. The parameters of this model do not differ from the original model in the text by more than twice their standard deviation.

banking sector to GDP, openness of the economy (ratio of foreign trade sales volume to GDP at current prices) and the time trend. By comparing these estimates, we were able to find out that the idiosyncratic part of the variance has greater significance than the systematic part in the used observation sets. Then we examined the stability of those models and tried to introduce dummy variables to take into account the structural change in 1999. However, the quality of estimates did not improve. It was evident that the models for individual countries did not take into account the fact there were analogous relationships within the countries with a number of common features. That is why we have continued by formulating a common model for all countries.

**The model**

We started with the formulation of a panel regression with fixed effects. Let's assume N groups for  $i = 1$  to N (that correspond to the countries) and  $T_i$  observations for the group for  $t = 1$  to  $T_i$ . In our formulation, every value of the dependent variable  $Y_{it}$  variable is then a function of values of the values of the constant term  $\beta_0$ , of fixed effects  $F_i$ , such that and K regressors of  $X_{kit}$  (all of them are specific for individual groups, the index of regressors is k) and that implies a basic form of model:

$$Y_{it} = \beta_0 + F_i + \beta_1 X_{1it} + \beta_2 X_{2it} + \dots + \beta_k X_{kit} + u_{it} \quad (1)$$

where  $u_{it}$  is the random component. We have used an autoregressive random component ( $u_{it} = \rho u_{it-1} + e_{it}$ ) to achieve a better dynamic specification,  $e_{it}$  being a random variable that follows

a normal distribution and is uncorrelated to its previous values (the variance might be different in the individual groups). We have thus used the weighted least squares method with different weights for the individual countries.<sup>4</sup> We have used the ratio of banking sector profits to nominal GDP (GROSSPROF/GDPN) as the dependent variable, and the ratio of the assets of the banking sector to GDP (QASSETS) and the long-term interest rate (LTIR) as regressors (except for the constant and fixed effects). The form of the resulting equation was as follows (Table 12).

The model parameters are statistically significant at the 1% significance level (we do not indicate the standard deviations due to lack of space) and have the expected signs. The coefficient of determination RSQ, the standard error of the regression  $\sigma$  and the Durbin-Watson test DW have been calculated from weighted data. The more assets are managed by banks, the higher the profit; a growing interest rate, on the other hand, weakens economic activity and thus reduces the profit of banks.

We have then extended the basic model by adding dummy variables capturing the euro introduction and their interactions with other variables, as well as similar variables for countries that have not introduced the euro. The variable EURO is defined as 1 from 1999 for euro area countries and is equal to 0 before, and it is equal to 0 during the entire term for countries outside the euro area. The variable NEURO is equal to 1 from 1999 for countries outside the EMU, otherwise it is equal to 0 and for euro area countries it is always equal to 0. The general version of the extended model takes the following form:

$$Y_{it} = \beta_0 + F_i + \beta_1 X_{1it} + \beta_2 X_{2it} + \dots + \beta_k X_{kit} + \gamma_0 * Euro + \gamma_1 * Euro * X_{1it} + \gamma_2 * Euro * X_{2it} + \dots + \gamma_k * Euro * X_{kit} + \sigma_0 * Neuro + \sigma_1 * Neuro * X_{1it} + \sigma_2 * Neuro * X_{2it} + \dots + \sigma_k * Neuro * X_{kit} + u_{it} \quad (2)$$

The specification of this equation is chosen to answer two questions:

1. Did the parameters change in 1999? If no parameter changed (not even the constant term), that would mean that the euro introduction had no effect on the profit of the banking sector.<sup>5</sup> However, if some of the parameters changed, another question ensues logically:
2. Have the changes of 1999 been caused by the euro adoption? We expect that if changes set in all countries, no matter if they have introduced the euro or not, it is the influence of some other factor. However, if the parameters in the euro area countries changed and remained unchanged in countries with their own currency, we can attribute those changes to the effect of the introduction of the euro.

We have also tried to introduce in the basic model variables that previously had not occurred in the model. Most of the variables were statistically insignificant. After the stepwise elimination of insignificant variables, the basic model

**Table 12 Parameters of the basic model**

Variable	Parameter
Constant term	0.0154
QASSETS	0.0043
LTIR	-0.0011
$\rho$	0.4266
Fixed effects $F_i$	
AT	-0.0073
BE	-0.0095
DE	-0.0089
NL	-0.0019
PT	0.0043
CH	0.0254
US	-0.0019
UK	-0.0007
RSQ	0.8771
$\sigma$	0.0041
DW	1.92

Source: Own calculations.  
 Note: QUASSET – Assets-to-GDP ratio; DSHARES – Increase in investment securities; OPEN – Ratio of foreign trade sales volume to GDP; LTIR – Long-term interest rate; RSQ – The coefficient of determination – R squared;  $\sigma$  – The standard error of the regression; DW – Durbin-Watson test.



Table 13 Parameters of the extended model

Variable	Parameter
Constant term	0.0165
QASSETS	0.0036
LTIR	-0.0012
EURO	-0.0113
EURO*DSHARES/ GDPN	0.1349
EURO*OPEN	0.0082
NEURO*QASSETS	0.0020
ρ	0.3125
Fixed effects Fi	
AT	-0.0057
BE	-0.0095
DE	-0.0064
NL	-0.0011
PT	0.0067
CH	0.0219
US	-0.0028
UK	-0.0011
RSQ	0.9145
σ	0.0037
DW	2.00

Source: Own calculations.

Note: QASSET – Assets-to-GDP ratio; DSHARES – Increase in investment securities; OPEN – Ratio of foreign trade sales volume to GDP; LTIR – Long-term interest rate; RSQ – The coefficient of determination R squared; σ – The standard error of the regression; DW – Durbin-Watson test.

extended by adding the dummy variable EURO and its interactions with ratio of the increase in financial investments to GDP and openness and interaction of the NEURO variable with the assets-to-GDP ratio was left over. Parameters of the extended model are presented in the Table 13.

All variables of the model were statistically significant at least at 5% significance level. The signs of the newly introduced parameters can be interpreted as follows: The euro introduction caused a fixed decline in profits by way of growth of costs, which was compensated by the fact that banks gained more opportunities for operations related to foreign trade and to fi-

ancial investments. The fact that openness and the ratio of the increase in financial investments to GDP are significant only after the euro introduction can be interpreted in such a way that the euro has brought about a growth of income rather than a fall of costs related to these factors. The change in countries outside the EMU related to the assets-to-GDP ratio has probably had a similar effect.

### The effects of the euro introduction in the euro area countries

Let us assume a linear function that can be written in matrix form as  $y = Xb$ , where  $y$  is the vector of dependent variables,  $X$  the matrix of independent variables and  $b$  the vector of parameters with the appropriate dimensions. Let us assume that both the variables of  $X$  and the parameters of  $b$  change because of an external factor. The total change of the dependent variable can then be expressed as  $\Delta y = X\Delta b + \Delta Xb$ , i.e. as the sum of changes associated on the one hand with changes in parameters, on the other hand with changes in regressors. Using a one-equation model, however, it is only possible to identify the changes in parameters. Further models for regressors would be needed, bringing them in a direct connection with the euro introduction. However, the macroeconomic environment consists of many interconnected indicators, which have to be modeled in their mutual connections to achieve sufficient explanatory power. Such a model would go beyond the limits of this study. In addition, the euro adoption is part of the broader economic policy, so that even if we identified some changes as compared to the previous development, their direct allocation to the euro introduction is problematic. Therefore we will limit ourselves to the quantification of the part of the total effects that corresponds only to changes in parameters. Using the extended model we then can quantify the effects of the euro adoption as the part of fitted values that corresponds to dummy variables reflecting the introduction of the euro and their interactions:

$$EFFECT\_EURO_{it} = -0.011 * EURO_{it} + 0.13 * EURO_{it} * DSHARES_{it}/GDPN_{it} + 0.008 * EURO_{it} * OPEN_{it} \quad (3)$$

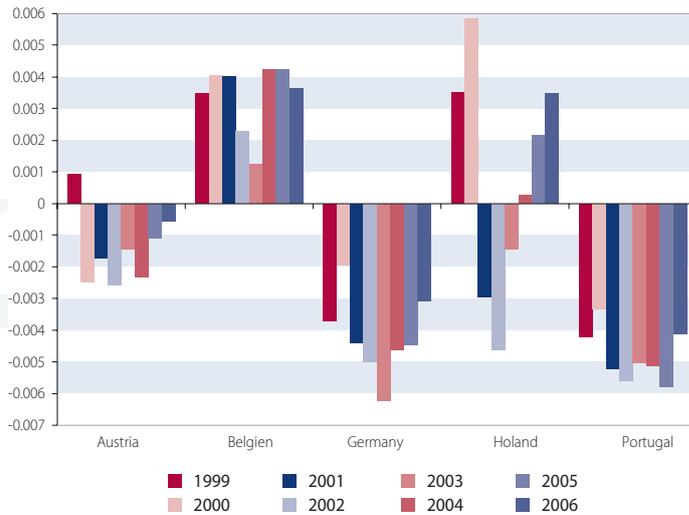
Table 14 The euro effect

	Austria	Belgien	Germany	Holand	Portugal
1999	0.0009	0.0035	-0.0037	0.0035	-0.0042
2000	-0.0025	0.0040	-0.0019	0.0058	-0.0033
2001	-0.0017	0.0040	-0.0044	-0.0030	-0.0052
2002	-0.0026	0.0023	-0.0050	-0.0046	-0.0056
2003	-0.0015	0.0013	-0.0062	-0.0014	-0.0050
2004	-0.0023	0.0042	-0.0046	0.0003	-0.0051
2005	-0.0011	0.0042	-0.0044	0.0022	-0.0058
2006	-0.0006	0.0037	-0.0031	0.0035	-0.0041

Source: Own calculations.

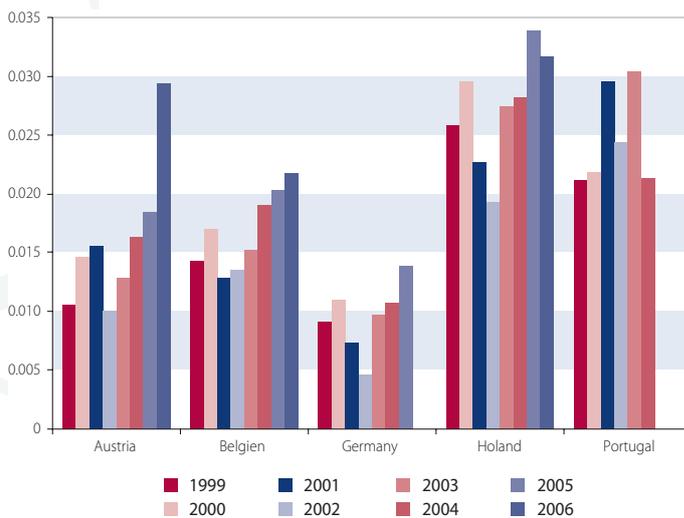


Chart 2 Effects of the euro introduction



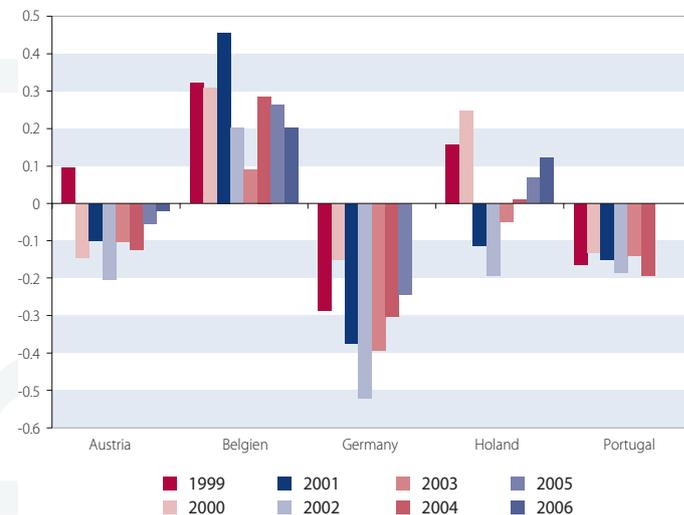
Source: Own calculations.

Chart 3 The ratio of the profit of banks to GDP in selected euro area countries



Source: Own calculations.

Chart 4 Significance of the effects of the euro introduction



Source: Own calculations.

After putting in the values of the appropriate variables we obtained the following values (Table 14).

The fitted values of the extended model for countries of the euro area can be divided in two parts: a part corresponding to the effects of the euro and an autonomous part (the variable *NEURO* has zero values for these countries). The autonomous part corresponds to the expression  $0.017 + F_i + 0.004 * QASSETS_{it} - 0.001 * LTIR_{it}$  and corresponds to the systematic component of the hypothetical profit the banks would achieve without the euro introduction. The relative significance of the effects of the euro adoption can be assessed based on the those effects' percentages of the theoretical profit of banks, which would exist without the introduction of the euro (if the variable euro equals zero after 1998, after adding the random component – the difference between the dependent variable and the effects of the euro):

$$rel. \text{significante} = \frac{effect\_EURO}{(GROSSPROF/GDPN) - effect\_EURO} \quad (4)$$

Based on these values, it can be stated that the euro adoption in Austria and Portugal has had a slightly negative effect (up to -20% from the hypothetical profit for all years). In Germany, the euro introduction has had a considerably negative effect (from -20% to -55% from the hypothetical profit). In Belgium, the effect of the adoption of the euro has been moderately positive (from 0 to +45% of the hypothetical profit). In the Netherlands, the effects of the euro introduction have been mixed (from -20% to +20% of the hypothetical profit). More detailed information is shown in the following charts.

**Possible effects of the euro on the profitability of the Slovak banking sector**

When reflecting on the effects of the euro introduction in Slovakia, it has to be pointed out that we assume, in line with the framework of our model, that the effects depend on the openness and the level of investment securities. On the other hand, we do not take into account the fact that banks in the original EU countries have acquired capital participations in the banking sectors of the new countries, and that this has increased the profitability in the banking sectors of the original EU countries (taking into account this factor would virtually make it impossible to use the model from the previous part, it would be necessary to construct a model that would enable profit transfers between countries). The situation in Slovakia is being compared ex post with the banking sector in Belgium, where the effects of the euro adoption have been positive and with Germany, where they have been negative.

It is evident from Table 15 that Slovakia resembles Belgium in terms of openness, while the ratio of the increase in investment securities to GDP is lower. Profitability in Slovakia's banking sector



Table 15 The ratio of the increase in investment securities to GDP, openness and the profit-to-GDP ratio

Quantity/Year	1999	2000	2001	2002	2003	2004	2005	2006
Ratio of the increase in sec. to GDP (DE)	0.021	0.029	0.010	0.006	-0.003	0.006	0.004	0.009
Ratio of the increase in sec. to GDP (BE)	0.020	0.012	0.013	0.003	-0.003	0.016	0.012	0.006
Ratio of the increase in sec. to GDP (SK)	-0.003	0.026	0.052	-0.007	0.093	0.016	-0.013	-0.011
Openness (DE)	0.579	0.664	0.676	0.669	0.674	0.715	0.762	0.847
Openness (BE)	1.463	1.664	1.661	1.604	1.576	1.628	1.696	1.728
Openness (SK)	1.259	1.431	1.534	1.491	1.549	1.531	1.596	1.760
Profit-to-GDP ratio (DE)	0.009	0.011	0.007	0.004	0.009	0.010	0.013	-
Profit-to-GDP ratio (BE)	0.015	0.017	0.013	0.013	0.014	0.018	0.018	0.019
Profit-to-GDP ratio (SK)	-0.034	0.005	0.009	0.011	0.009	0.011	0.011	0.014

Source: OECD, National central banks.

Legend: sec. – security, DE – Germany, BE – Belgium, SK – Slovakia

Table 16 The optimistic and pessimistic scenario with the corresponding effects

Scenario	Ratio of investment securities to GDP	Openness	Profit-to-GDP ratio	Effect of the euro introduction	Ratio of the effect of the euro introduction to profits
Optimistic	0.00	1.8	0.015	0.003462	30.0%
Pessimistic	-0.02	1.6	0.009	-0.000875	-8.9%

Source: Own calculations.

develops in a quite irregular manner. To calculate the expected effects of the euro for 2009, we need forecasts of those variables, which we formulate as expert estimates for two scenarios (an optimistic and a pessimistic scenario).

Due to the strong growth of financial investments in Slovakia in 2003, we expect a stagnation of financial investments in the optimistic scenario. This quantity has a high volatility; therefore it is difficult to determine its value reliably. We expect that, in the optimistic case, our economy will be even more open than in 2006. In the pessimistic scenario, we reckon with a certain decrease against the last known value, both for ratio of investment securities to GDP and openness. Profit-to-GDP ratio is difficult to forecast as well, because it contains a saldo in numerator. It is assumed to grow somewhat in optimistic scenario and to drop by certain amount against the last known value in pessimistic scenario. This quantity does not appear in the calculation of the effects of euro, we indicate the quantity only in the calculation of the values in the last column of Table 16, which represent the importance of these effects, similarly to previous calculations.

We consider the optimistic scenario more likely due to the current development. It has to be also pointed out that the situation in Slovakia, where the amount of financial investment in one year (2003) was growing at a high rate and was decreasing in the following years, does not occur in countries, in which we have estimated the model applied, leading to a decreased reliability of our model in this application. In addition, unlike the countries under review, Slovakia is catching up

with the developed countries and market economy mechanisms are not yet the same as in the original EU countries and it is possible that our model overestimates the influence of investment securities on the profit of the banking sector.

In sum, it can be expected that the effect of the euro introduction on the profit of banks is likely to be positive in Slovakia<sup>6</sup> due to the high openness of our economy. In the case of a decrease in the level of investment securities, our model indicates negative effects, but due to differing conditions of the banking sector in Slovakia and in other euro area countries, this result has to be taken cautiously.

## SUMMARY AND CONCLUSIONS

We have dedicated the study to the issue of the impact of the euro introduction on the euro area banking sectors from an informative and empirical point of view. In doing this, we have compared the results with countries outside the EMU and have tried to apply the possible effects on the situation of the banking sector of Slovakia after the euro adoption using yearly aggregates.

A direct influence on profitability items in the year of the adoption of the euro as a single currency has been recorded by six euro area countries in the reduction of non-interest income. In general, however, based on the periods under comparison 1994 – 1998 and 1999 – 2003 we can claim that on average banking sectors in countries of the EMU and outside the EMU have improved their profitability and despite of growing operating costs the cost-to-income ratio has remained constant or even improved. However,

<sup>6</sup> Additional information on the Analysis of the impacts of the euro introduction on the Slovak financial market can be found at: <http://www.nbs.sk/DFT/PUBLIK/ANALYZA/ANALE-UR.PDF>.



we had to look at the issue at hand in more detail from an empirical point of view, with a short list of the euro area banking sectors within a wider period of time from 1986 to 2006.

When detecting the effects of the euro introduction, we first estimated a basic model with an assumption of the constant parameters, which we then extended so as to take into account changes that occurred in 1999. We have found out that there has been an autonomous decrease in profit in 1999 and the sensitivity of the profit to the ratio of the increase in financial investment to GDP and to openness increased. Because these changes did not repeat in countries that have introduced the euro, we attribute them to the euro adoption.

We have identified the effects of the introduction of the euro as the part of the fitted values that corresponds to dummy variables reflecting

the euro adoption and their interactions. After putting in the values of independent variables in these expressions, we found out that the effects of the euro introduction were positive in Belgium, mixed in the Netherlands, and negative in Austria, Germany and Portugal.

We have also tentatively quantified the effects of the adoption of the euro in Slovakia in 2009. We have obtained the necessary values for openness and financial investments by a combination of extrapolation and expert estimates. The performed calculations indicate that the effect of the euro introduction on the profitability of banks is likely to be positive, but if there is a negative development of openness and a decrease in the level of investment securities with deposits, there is also some risk that the effect will be slightly negative. However, we consider such a scenario less probable.

#### References

16. EU Banks' Margins and Credit Standards; ECB December 2000, <http://www.bportugal.pt/euro/emudocs/bce/margins.pdf>.
17. Gropp R., Duca M. L., Vesala J.: Cross-Border Bank Contagion in Europe; Working Paper No. 662; ECB 2006; <http://www.ecb.eu/pub/pdf/scpwps/ecbwp662.pdf>.
18. Havrylych O., Jurzyk E.: Profitability of foreign and domestic banks in Central and Eastern Europe: does the mode of entry matter?; LICOS Discussion Papers 16606; LICOS – Centre for Institutions and Economic Performance; K.U.Leuven 2006; <http://perso.univ-lille3.fr/~dsaidane/Papiers-%20atelier%200507/Havrylych.pdf>.
19. Mendez V., Abreu M.: Do Macro-Financial Variables Matter for European Bank Interest Margins And Profitability?; 2003, [http://ecomod.net/conferences/ecomod2003/ecomod2003\\_papers/Abreu.pdf](http://ecomod.net/conferences/ecomod2003/ecomod2003_papers/Abreu.pdf).
20. Micco A., Stein E. and Ordóñez G.: The currency union effect on trade: early evidence from EMU; CEPR, CES, MSH; pp. 315-356; Great Britain 2003.
21. NBS (2007): Analýza dopadov zavedenia eura na slovenský finančný trh; <http://www.nbs.sk/DFT/PUBLIK/ANALYZA/ANALEUR.PDF>.
22. Pawlowski B. (2006): Financial System Stability in the New EU Member States Ahead of the Euro Adoption; EUROFRAME; [http://euroframe.org/fileadmin/user\\_upload/euroframe/efn/spring2006/EFN\\_Spring06\\_App\\_Pawlowski.pdf](http://euroframe.org/fileadmin/user_upload/euroframe/efn/spring2006/EFN_Spring06_App_Pawlowski.pdf).
23. Resende J., Silva E. (2007): A Profit Efficiency Perspective on the Future Strategic Positioning of the Portuguese Banks; Research Study; CETE; <http://www.fep.up.pt/investigacao/cete/papers/dp0702.pdf>.
24. Rose A. K. and Stanley T. D.: A Meta-Analysis of the Effect of Common Currencies on International Trade; Journal of Economics surveys. 2005, Vol. 19, No. 3.
25. Vennet R. V., De Jonghe O., Baelle L.: Bank risks and the business cycle; Working paper 2004/264; Universiteit Gent 2004 [http://www.feb.ugent.be/fac/research/WP/Papers/wp\\_04\\_264.pdf](http://www.feb.ugent.be/fac/research/WP/Papers/wp_04_264.pdf).