

Mundell-Fleming Criteria for Optimum Currency Areas: the Case of Slovakia

*Domenico RAGUSEO – Ján ŠEBO**

Abstract

This paper tests the suitability of Slovakia to join the European Monetary Union based on the international factor (labour and capital) mobility. The analysis involves others optimum currency areas criteria and also others Central and Eastern European countries and European Monetary Union member states as well are included in the sample as a benchmark for a better comparison. The results do not fully confirm the hypothesis that Slovakia already constitutes an optimum monetary union with the rest of the EMU countries; mainly the labour mobility is largely ineffective as adjustment mechanism. But, Slovakia is a open country and its economic and production structures are quite similar to the euro average. This would indicate that Slovakia should not suffer from increased likelihood of asymmetric shocks and that it is a suitable member of the euro area.

Keywords: *OCA theory, EMU enlargement, Slovakia*

JEL Classification: E30, F10, F41

Introduction

The creation of the European Monetary Union (EMU) and the successive enlargement of the European Union (EU) have provoked a renovated interest in the theory of Optimum Currency Areas (OCA), which in relatively recent time has been tested with empirical analysis focusing on the issue whether the EMU constitutes an Optimum Currency Area (Eichengreen, 1991; De Grauwe and Vanhaverbeke, 1991; Decressin and Fatas, 1995; Frankel and Rose, 1996; Gros and Hefeker, 2003). The classic OCA theory identifies the criteria that countries should satisfy if they want to have a benefit from joining a broader monetary

* Domenico RAGUSEO – Ján ŠEBO, Department of Public Economics, Faculty of Economics, University Matej Bel in Banská Bystrica, Tajovského 10, 975 90 Banská Bystrica, Slovakia; e-mail: Domenico.Raguseo@umb.sk; Jan.Sebo@umb.sk

union (Mundell, 1961; Fleming, 1971; Mckinnon, 1963; Kenen, 1969). In most recent time, the debate has shifted to the issue if also the Central and Eastern European countries (CEECs) are a natural part of the European Monetary Union (De Grauwe and Lavrač, 1999; Kornhonen, 2001; Frenkel and Nichel, 2002; Fidrmuc, 2004; Raguseo, 2007). This year Slovakia became member of the EMU and, as a consequence, its monetary policy is now matter of common concern and subject to coordination. The EMU membership implies the loss of the independent monetary and exchange rate policies, which are useful instruments to cope with asymmetric shocks. To what extent the loss of these adjustment mechanisms is really a cost of the inclusion in the EMU depends mostly on the degree of factor mobility existing between Slovakia and the rest of the EMU member states. This paper assesses the suitability for Slovakia to join the EMU based on the existing degree of international factor mobility as adjustment mechanism.

Other CEECs and EMU member states as well are included in the analysis as a benchmark for a better comparison. A higher degree of international labour and capital mobility reduces the usefulness of the nominal exchange rate as adjustment mechanism of the imbalances between countries, decreases the impact of some type of shocks and, in turn, reduces the cost from the participation to a monetary union. On the other hand, Mamingi (1993) stressed, that for the countries outside the monetary union, in the event of perfect capital mobility, one should expect: (a) monetary policy to be ineffective in influencing the prices of domestic financial assets; and (b) expansionary fiscal policy to be ineffective for purposes of demand management. Whereas complete capital immobility, which implies that domestic investment is entirely financed by domestic or national saving, should give rise to an active role for monetary and fiscal policies. Monetary union is therefore suitable for countries with high capital mobility, but it should be supported also by labour mobility.

The paper is structured as follow: Section 1 investigates the efficacy of the labour mobility as adjustment instrument in Slovakia. Section 2 focuses on the degree of the international capital mobility. Section 3 refers to others classical optimum currency areas criteria (degree of openness, production and trade structures diversification). The last section concludes and provides critical advices.

1. Labour Mobility in Slovakia

Slovakia joined the EMU in January 2009; this suggests the need to examine the suitability of its membership. Generally, the main disadvantage for a member country of a monetary union is developed when it is hit by an adverse

asymmetric demand shocks (Mundell, 1961). As a result the output falls and the unemployment rises. A country can absorb the effects of this shock in different ways. Of course, a country that is member of a monetary union cannot use the nominal exchange rate as adjustment mechanism. In this case, Mundell emphasizes the need of a high degree of international labour mobility. Indeed, if the jobless resident in the member country negatively hit by an asymmetric demand shock could freely seek employment in another member country experiencing economic prosperity at the same time, the initial equilibrium will be automatically restored.

This section investigates the efficacy of the labour mobility as adjustment instrument in Slovakia. Table 1 shows the unemployment rate (ILO definition – seasonally unadjusted) and the annual gross wage for Slovakia and the EMU average in 2007.

Table 1

Unemployment Rates (ILO) and Average Annual Gross Wages (in Euro) in 2007

	Unemployment Rate	Annual Gross Wage
EMU	7.4	37 391.4
Slovakia	11.1	7 152.1

Source: Eurostat (2008).

As we can see, Slovakia's unemployment rate is higher than the EMU average, while the annual gross wage is higher for the latter than the former. According to the theoretical foundation of the modern migration literature, the immigration would be positively related to the average wage and negatively to the unemployment rate prevailing in the country or region. Otherwise, asymmetric shocks would lead to persistent differentials in unemployment and wages (Decressin and Fatas, 1995; Fidrmuc, 2002). For this, it seems that the labour mobility in Slovakia does not play its role as national adjustment mechanism. In general, in the wake of asymmetric shocks the jobless would move in search of better employment prospect and doing so the adverse effects gradually get smoothed away (Gros and Hefeker, 2003). In other words, the condition for the equilibrium implies a positive relation between wages and unemployment rates. Looking at the Table 1, the Slovak economy does not seem to give the impression to respond to dissimilar national economic conditions restoring the initial equilibrium among countries hit by asymmetric shock. But, to be able to draw any conclusion about the labour mobility in Slovakia as a channel of adjustment, we have to analyze the extent to which labour market shocks are common to all Slovak regions. There are several reasons to focus on regions rather than countries. First of all, analyzing regional dynamics gives an idea on labour mobility for the whole Slovakia at (inter)national level (Decressin and Fatas, 1995).

Table 2 shows the rates of registered regional unemployment, the average annual gross wages and the migration flows for Slovakia in 2006.

Table 2
Regional Labour Market in Slovakia in 2006

Region	Average Annual Gross Wage (in SKK)	Registered Unemployment (in %)	Net Immigration	Immigration to the Region	Emigration from the Region
Banská Bystrica	15 657	21.1	-414	2 514	2 928
Košice	17 930	20.3	-532	2 450	2 982
Prešov	14 087	18.1	-876	2 235	3 111
Nitra	15 395	13.2	775	3 862	3 087
Žilina	16 437	11.8	206	2 496	2 290
Trnava	17 610	8.8	1 448	4 226	2 778
Trenčín	16 383	7.1	261	2 703	2 442
Bratislava	24 860	4.3	2 986	6 840	3 854

Source: Statistical Office of SR (2008).

We can see that unemployment rates between regions in Slovakia differ substantially. These regional divergences in unemployment trends are the result of different levels of economic development in individual regions. Moreover, during the last decade, the economic policy of the governments has been more worried to restructuring the economy at the national level than to prevent regional economic disparities. This is reflected by the regional distribution of unemployment and increased regional discrepancies. Indeed, in Slovakia, the unemployment rate fell in the less developed regions during the last 10 year by the average annual rate of 0.8%; while the average annual growth of wages was 9.5%. By contrast, in the most developed region, the unemployment rate fell during the 10 year period by the average annual rate of 2.5%; while the average annual growth of wages was almost 14%. In addition, the highest rates of unemployment are generally related with the lowest average wages of the regions. The relationship between unemployment rates and average wages is negative! The (inter)regional labour mobility is almost absent. Otherwise, higher wages and lower unemployment rates in a region would set off an immigration flow which equalizes wages and unemployment rates among regions (Gros and Hefeker, 2003). This implies low efficacy of the regional labour mobility in facilitating regional adjustment even if there are no informal (e.g. linguistic and cultural) barriers between regions, which are often the quoted reasons for low labour mobility between countries in Europe. This is confirmed by the economic development in Slovakia over the last decade. In fact, it has been relatively centralized in the sense that industrial and other enterprises were located closer to regional cities and most of new investments were located in the western part of Slovakia. Even this fact did not force people to migrate to more developed regions.

In conclusion, the implications with respect to the accession of Slovakia in the EMU are straightforward. Because of the low regional labour mobility a rapid accession to the euro-area may not be the optimal policy choice. Joining the EMU implies the loss of an autonomous monetary policy and also imposes important limitations on the counter-cyclical fiscal policy (due to the Maastricht fiscal criteria). In the case of small open economy with inefficient labour mobility, the occurrence of external demand asymmetric shocks (like the one, we are experiencing now) will cause the rise of regional disparities and unemployment in poorer regions faster. With labour mobility largely ineffective as adjustment instrument, other alternative mechanisms to cope with asymmetric shocks need to work in order to restore equilibrium between member countries of a monetary union.

2. Capital Mobility in Slovakia

In its article of 1961, Mundell introduced the concept of optimum currency area focusing on the existence of a high degree of factor mobility, mainly labour, as criterion to judge the optimality of the currency union. We could expect that higher the factor mobility (labour and capital) between member countries of a monetary area, lower the need to adjust the exchange rates and the cost from the participation to the common currency union. In reality an important distinction should be done between labour and capital mobility.

Fleming (1971) emphasized the case in which the capital mobility worsens instead of adjust the imbalances between member countries of a monetary area.

The adjustment mechanism provided by the international factor mobility is more certain in the case of labour mobility rather than capital mobility. Indeed, in the case of asymmetric demand shock, the higher the labour mobility, the smaller the amount of unemployment and inflation that will persist in the member countries. But, if high capital mobility will increase or decrease the imbalances between member countries of a currency area is more uncertain than in the case of labour mobility and it depends on both the nature of the shocks and the sensibility of the investments to the economic activity level.

The Fleming's criteria assumes that the level of the relative costs between member countries of a currency area is in disequilibrium because of imbalances in the current account of the balance of payments, and, that the equilibrium is partly restored by a reduction of the demand in the countries with high costs and partly by an expansion of the demand in the countries with low costs. As a result, there will be a reduction of the savings in the first group of countries and an increase in the second group of countries.

Now, whether or not the capital mobility will play its role as adjustment mechanism, it depends on the sensibility of the investments to the economic activity changes in both countries.

If the reduction of the investments is smaller than the reduction of the savings in the countries with high costs, and if the incentives to invest increase less than the incentives to save in the countries with low costs, then the interest rate will increase in the first and decrease in the second country. As a consequence, there will be a capital flow from the countries with low costs toward the countries with high costs in order to ensure the latter with higher employment level and the former countries with lower inflation rate.

However, if the changes in the investments level in both countries are higher than the changes in the level of savings then the capital mobility will not play its role as adjustment mechanism, so that the equilibrium in the balance of the payment will be reached only with more unemployment in the countries with high costs and more inflation in the countries with low costs.

A more careful analysis of the business cycle's behavior advises that in the short period the investment is little sensitive to the economic activity changes, so that the interest rate should increase in the countries with high costs and decrease in the countries with low costs.

In the middle period there could be a rank of production within which, if the interest rate is kept constant, economic activity changes yield greater changes in the investment than in the saving rate. If and when the production level in both countries with high and low costs is found within this rank of instability, the capital mobility will worsen instead of adjust the imbalances between member countries of a monetary area.

In this case, the countries with lower cost will increase their rate of interest in order to prevent an unexpected inflation and the burden of the adjustment will fall on the countries with high costs.

This section pays attention to the long term effect of capital mobility testing the Feldstein-Horioka hypothesis that the investment-to-output ratio and the saving-to-output ratio are highly correlated, suggesting international capital immobility. Statistically Feldstein and Horioka (1980) used average data in a cross-section regression model. This paper deviates from such an approach and focuses on the long term relationship between the variables. Feldstein and Horioka (1980) attempt to estimate the degree of international capital mobility by regressing averages of investment shares of output on saving shares of output, using a cross-section of 16 OECD member countries. But, because the short term distortion in the true international capital mobility, the most appropriate framework to investigate the saving-investment relationship is based on time-series of the two variables (Serletis and Gogas, 2007).

Our sample data includes 14 EU member countries observed during the period 1995 – 2007. The data are taken from the Eurostat database. In order to estimate the saving-investment relationship we use a panel data set which also allows for either fixed or random effects (Greene, 1997). Our model is given by:

$$i_{it} = \alpha_i + \beta s_{it} + \varepsilon_{it} \quad (1)$$

where

i_{it} – the investment-to-output ratio (I/Y) in country i at the period t ;

α_i – the constant term;

s_{it} – the saving-to-output ratio (S/Y) in country i at the period t ;

ε – the error term;

β – the coefficient measuring the degree of capital mobility;

i – the cross-country identifier;

t – the time-period identifier.

The regression technique employs an ordinary least square (OLS) method. In our model, when we apply a fixed effects estimator each country will have an unrestricted intercept meaning that a constant is added to the common coefficients to capture the country specific effect. In order to get more valuable results, all variables need to be converted in natural logarithms so that the resulting equations are linear.

Table 3

Panel Data Regression

Dependent Variable: Investment				
Method: Pooled EGLS (Cross-section weights)				
Sample: 1995 – 2007				
Included observations: 13				
Cross-sections included: 14				
Total pool (balanced) observations: 182				
Linear estimation After one-Step Weighting Matrix				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
α	0.077097	0.003005	25.65210	0.0000
Savings	0.072701	0.021718	3.347436	0.0010
Weighted Statistics				
R-squared	0.914848	Mean dependent var	0.131026	
Adjusted R-squared	0.914375	S.D. dependent var	0.073738	
S.E. of regression	0.021577	Sum squared resid	0.083802	
F-statistic	1933.868	Durbin-Watson stat	0.262509	
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.094270	Mean dependent var	0.084102	
Sum squared resid	0.092820	Durbin-Watson stat	0.130849	

Source: Own calculations.

As Mamingi (1993) presented in his work, the absolute value of the coefficient β represents the degree of capital mobility. Absolute capital immobility is defined by the estimate of 1. Estimates of coefficient β in the range 0.65 to 1 represents

low capital mobility, estimates in the range 0.35 to 0.65 represents intermediate capital mobility and estimates under the 0.5 indicates high capital mobility. Perfect capital mobility is defined by the coefficient of 0. Table 3 presents the results of the analysis of panel data of all analyzed countries. The estimates from our model found the absolute value of the coefficient β to be fundamentally close to 0 for the whole sample of analyzed countries (Table 3 and graph 1).

Table 4
Single Specific Regression per Each Country

Dependent Variable: Investment Method: Pooled Least Squares Sample: 1995 – 2007 Included observations: 13 Cross-sections included: 14 Total pool (balanced) observations: 182				
<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob.</i>
α	0.103933	0.012247	8.486378	0.0000
Belgium	-0.317790	0.159886	-1.987606	0.0486
Czech republic	-0.125058	0.158327	-0.789873	0.4308
Denmark	-0.370193	0.165810	-2.232630	0.0270
Germany	-0.229891	0.725959	-0.316672	0.7519
Estonia	-0.538529	0.079404	-6.782133	0.0000
France	-0.365335	0.681646	-0.535960	0.5928
Italy	-0.122047	0.133275	-0.915747	0.3612
Latvia	-0.259535	0.138278	-1.876911	0.0624
Lithuania	-0.058170	0.128515	-0.452632	0.6515
Netherlands	-0.300495	0.156979	-1.914240	0.0574
Austria	-0.141854	0.311594	-0.455253	0.6496
Poland	-0.161194	0.103202	-1.561923	0.1204
Portugal	0.386435	0.228020	1.694743	0.0921
Slovakia	-0.258724	0.136548	-1.894743	0.0600
Fixed Effects (cross)				
Belgium	0.036981			
Czech republic	-0.005974			
Denmark	0.016620			
Germany	0.034659			
Estonia	-0.009806			
France	0.041007			
Italy	0.005596			
Latvia	-0.065479			
Lithuania	-0.043486			
Netherlands	0.057752			
Austria	-0.001275			
Poland	-0.021523			
Portugal	-0.049289			
Slovakia	0.004219			
Effects Specification				
Cross-section Fixed (dummy variables)				
R-squared	0.756889	Mean dependent var	0.084102	
Adjusted R-squared	0.714265	S.D. dependent var	0.023795	
S.E. of regression	0.012719	Akaike info criterion	-5.750756	
Sum squared resid	0.024914	Schwarz criterion	-5.257831	
Log likelihood	551.3188	F-statistic	17.75759	
Durbin-Watson stat	0.527379	Prob(F-statistic)	0.000000	

Source: Own calculations.

Regression equation for the whole sample is as follows:

$$I_p = 0.077097 + 0.072701 * S_p$$

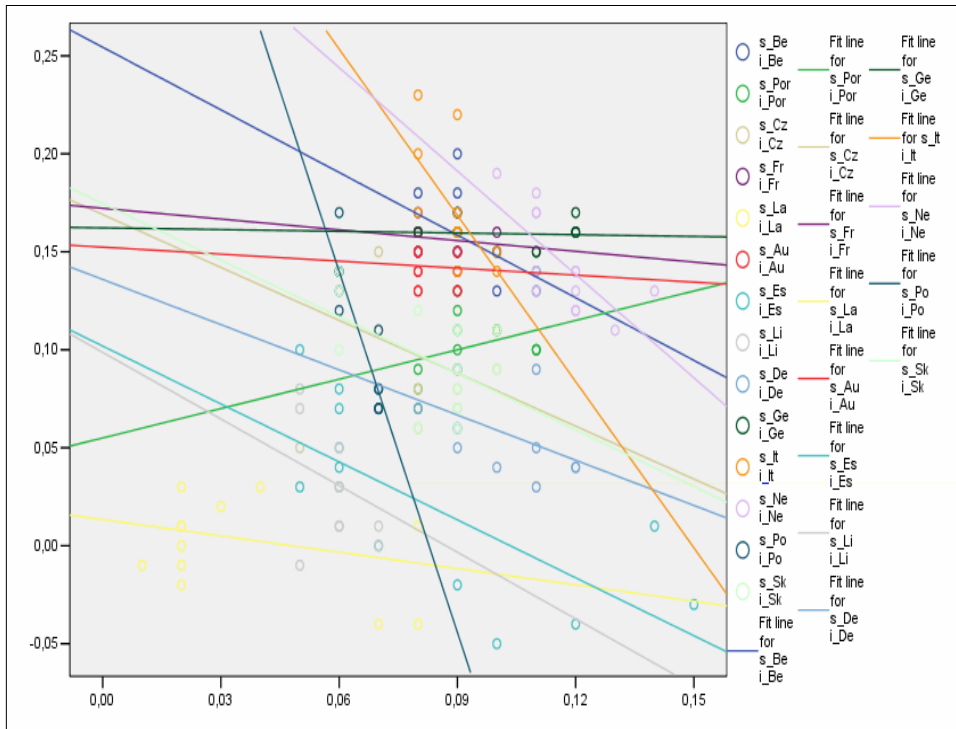
This implies almost perfect capital mobility ($\beta = 0.072701$) among sample countries and thus high ability to cope with external asymmetric shocks. The question remains, whether there are differences among individual countries, and what is the position of Slovakia among them.

Following table presents the results of regression analysis of individual countries.

Considering individual countries, as shown in the Table 4, our model found significant differences among countries expressed by both the β -coefficients and the fixed effect intercept.

The fact, that there are differences among individual countries, is also shown in graph 1, which depicts the relationship between investments and savings for individual analyzed countries.

Graph 1
Investments-savings Relationship



Source: Own elaboration.

Generally, countries that started with a higher level of investment have seen a considerable decrease of it over the sample period and countries with lower

share of investment have been able to catch-up with the rest of the sample. To same extend, based on our OLS estimates and using Mamingi's (1993) approach, our sample countries can be aggregated into two main clusters from the point of capital mobility, as presented in the Table 5.

Table 5

Clusters of Countries Based on Capital Mobility

<i>Cluster 1</i> <i>High capital mobility</i>	<i>Cluster 2</i> <i>Intermediate capital mobility</i>
Belgium, Czech republic, Germany, Italy, Latvia, Lithuania, Netherlands, Austria, Poland, Slovakia	Denmark, Estonia, France, Portugal

Source: Own elaboration.

Slovakia belongs to the group of countries with high capital mobility, which provides the country effective adjustment tool in the case of asymmetric shock.

3. Others Classical Optimum Currency Areas Criteria

The OCA theory also stresses that the cost of giving up the exchange rate instrument declines with the degree of openness of the country. For very open country the monetary and exchange rate policies are less effective to affect output and employment due to the large pass-through effect of the changes in nominal exchange rate into domestic prices. The higher the degree of openness, the more rapid the changes of international prices of tradable goods that are transmitted to the domestic cost of living. So, more open a country is, the larger this effect is and a county should have higher interest to join a currency union to protect its trade interests against exchange rates fluctuations and safeguard the stability of domestic prices at the same time (McKinnon, 1963). The McKinnon's criterion explains the interest for very open and typically small countries to join a monetary union since for such economies the monetary and exchange rate policies are less useful as adjustment mechanisms.

Raguseo and Šebo (2008) argue that Slovakia has a relatively high degree of openness indicating that Slovakia would be a successful member of the European Monetary Union (EMU). Their research findings confirm that more open a country is, more interest it has to join a currency union. The sign of the regression coefficient on the degree of openness is positive and significant at 1% level. They also find a positive impact of the bilateral trade.

However, how costly is the loss of an independent monetary and exchange rate policy depends mostly on the exposure to asymmetric shocks. Only if a country is hit by an asymmetric shock, it will need an "adjustment" to restore

the initial situation; otherwise, in the case of symmetric shocks, a common monetary and exchange rate policy will be adequate. According to Kenen (1969), the likelihood of major asymmetric shocks depends on the economic diversification of a country. Countries with well-diversified production structure are natural candidates to form a monetary union (Kenen, 1969).

Raguseo and Šebo (2008) claim the Slovakia's economic and production structure diversification seems quite similar to that of the other EMU countries. This is particularly true regarding the importance of the manufacturing sector, while some dissimilarity still do exist in the financial and business sectors. The resemblance of the Slovak manufacturing production structure to the euro-area average is caused by the magnitude in its exports toward the EMU countries of the category of basic manufactures, machinery and transport equipment.

Thus, Slovakia today seems to have a good economic configuration with diversified economic and production structure. This indicates that Slovakia exports and imports a same range of products to and from the EMU countries. Moreover, due to its relatively high degree of openness and the importance of the bilateral trade vis-à-vis the EMU, Slovakia seems to face favorable preconditions for a rapid convergence toward the business cycle in the EMU (Raguseo, 2007). Therefore, the Slovakia can be find to be a suitable candidate for the monetary integration with the other EMU member countries, even if the effects of a more tighten integration on the degree of specialization/diversification are still ambiguous.

Indeed, we must warn the reader that it is the structure of foreign trade and not the direct effect of the trade that may be viewed as a major adjustment force inducing synchronization of business cycles among trading partner (Fidrmuc, 2004; Mongelli, 2002; European Commission, 1990).

It is evident that not only the similarity of the trade structures between member countries can be a measure of the expected impact of the European Monetary Union membership.

Conclusions

The results of this analysis do not fully confirm the hypothesis that Slovakia already constitute an optimum currency area with the EMU, mainly the labour mobility is largely ineffective as adjustment mechanism. But, due to the great headway made in the last years, it seems that it will eventually fulfill the OCA criteria to the same degree as EMU member in the future. Indeed, Slovakia is a small open country, its bilateral trade intensity with the EMU is the highest among the CEECs and its business cycle appears at least as highly synchronized with the EMU as some, small or peripheral, current EMU member countries

(e.g. Italy, Ireland, Portugal and Greece). Moreover, this analysis also revealed that the Slovak economic, production and trade structure diversification became more similar to that of other EMU countries. Also, we can assume that the monetary integration process in Europe is likely to increase the similarity of the industrial structures, because of the reduced trading costs beyond the elimination of the risk from exchange rate volatility. In addition, the coordination of the economic policy with the EMU is likely to result in a faster convergence of the Slovak business cycle. Thus, Slovakia faces positive pre-conditions for fully fulfill the OCA criteria as new member of the EMU. This expectation is particularly based on the high degree of trade integration of Slovakia vis-à-vis the EMU, which is the highest among the others CEECs.

To conclude based on the analysis of labour and capital mobility as well as other factors, Slovakia seems today to be a country acceptable for joining the EMU. Therefore, Slovakia should not expect serious asymmetric shocks, which would cause problems for its economy once in the euro area, and the relinquish of an autonomous monetary and exchange rate policy could represent a benefit rather than a cost from the EMU participation.

But there are still some risks Slovakia will face. Substantial risks, which will cause an enormous pressure on fiscal policy, persists on the side of labour immobility supported by high regional disparities. As we presented, the labour mobility is almost absent and the specialization of the manufacturing industry on few sectors may, during the occurrence of asymmetric shocks, put the country into the position where significant changes in demand of EU countries, given the high degree of openness of Slovakia, could strengthen the changes in output and thus the Slovak business cycle. More attention therefore should be paid in formulating the public policy in order to prepare the country to better cope with potential asymmetric shocks, which will have major impact on the labour market.

It is also obvious that there are other benefits expected in relation to the participation to a broader monetary union. For instance, increased economic growth (due to increased competition and decreased transaction costs and exchange rate risks) and political weight of the countries having joined the monetary union.

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