

ANALYSES OF THE CZECH REPUBLIC'S CURRENT
ECONOMIC ALIGNMENT WITH THE EURO AREA

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ANALYSES OF THE CZECH REPUBLIC'S CURRENT ECONOMIC ALIGNMENT WITH THE EURO AREA

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A . Introduction

Entry into the euro area will fundamentally change the Czech economy's possibilities for adjusting to economic shocks. If the price competitiveness of the domestic economy deteriorates in relation to the euro area countries, i.e. its biggest trading partners, there will be no possibility of adjusting through depreciation of the exchange rate. Moreover, monetary policy interest rates will be set at the euro area level, which will, in turn, increase the risk of the monetary conditions not corresponding to the situation in the Czech economy at any given moment. Therefore, it is important to examine not only how big these risks are, but also to what extent the Czech economy will be able to respond to them if need be.

The set of analyses of the Czech economy's alignment with the euro area is divided into two basic groups by the type of question which they try to answer. The section entitled "Cyclical and Structural Alignment" indicates the size of the risk of asymmetric shocks in the Czech economy vis-à-vis the euro area and hence the risk that the single monetary policy would be highly suboptimal for the Czech economy. The section entitled "Adjustment Mechanisms" answers the question of to what extent the Czech economy would be capable of absorbing the impacts of possible asymmetric shocks using its internal adjustment mechanisms.

These analyses are aimed at assessing the evolution of the individual alignment indicators over time and in comparison with selected countries which either are euro area members already (Austria, Portugal and Greece¹ were selected) or aspire to such membership (Poland, Slovakia and Hungary). All the analyses attempted to make comparisons with all the selected countries, but in some cases that was impossible owing to a lack of relevant statistical data. The conclusion as to whether the degree of economic alignment is sufficient for adopting the single currency cannot be made in absolute terms, but can ensue from the aforementioned comparison with other countries and the assessment of the evolution of the alignment indicators over time. In general, it can be expected that the benefits of adopting the single currency will grow with greater economic alignment and stronger adjustment mechanisms.

¹ The euro area countries were selected so as to include countries that are comparable in terms of economic level and countries with which the Czech economy has trading links. This selection is not related to any assessment of how successfully these economies have performed in the euro area.

B. Theoretical Foundation of the Analyses

The basic theoretical starting point for the analyses contained in this document is the theory of optimum currency areas.² This theory is one of the approaches often used to determine the appropriate exchange rate regime and, in particular, to determine whether the countries included in the analysis are suitable candidates for introducing a single currency. In the context of the creation of the single European currency, knowledge of this theory has been used recently to assess the appropriateness of adopting the single currency by the euro area countries and the suitability of the same step for the new EU Member States.

Generalising, one can say that economists agree on the set of fundamental benefits and costs of the single currency, even though this set may change over time or depending on the specific features of each economy. The benefits consist chiefly in an improvement in the functionality of money (including, for example, greater usability of the single currency, easier comparability of prices, a reduction in transaction costs), the elimination of exchange rate risk and the costs of hedging against it, and increased macroeconomic and financial stability (thanks to the elimination of excessive exchange rate fluctuations, financial market integration, an increase in price stability and potentially an overall increase in the credibility of the monetary authority).³

The costs can be broken down into two groups. There are the costs associated with the change of legal tender, including the physical exchange of money, the conversion of all contracts to the new accounting unit, and similar costs, namely costs which can be viewed, to a large extent, as non-recurring. The main long-term costs are a reduction in the effectiveness of domestic macroeconomic policies and the risk of greater volatility in output and consumption, because with the transition to the single currency the economy will lose its independent exchange rate and interest rate policies. The single monetary policy will not be able to respond sufficiently to shocks which affect only a small part of the currency area's economy. The costs of this loss will depend on the extent to which the exchange rate of the national currency absorbs real shocks or, on the contrary, generates financial shocks, on the degree of alignment of the business cycle with the cycle to which the currency area's monetary policy responds, and on the ability of economy to employ other adjustment channels.^{4,5}

However, despite the more than 40-year history of the above theory, the consensus is that there is no unambiguous definition of an optimum exchange rate regime. The potential costs and benefits differ depending on the specific situation, and political decisions play a significant role in the selection of exchange rate regime. Similarly, there is no method which in practice can unambiguously measure the potential revenues and costs associated with fixing the exchange rate and entering a monetary union (Vaubel, 1990). However, the current level of knowledge in this field can, *inter alia*, be used to identify potential sources of

² The papers by Mundell (1961), McKinnon (1963) and Kenen (1969) are regarded as the cornerstones of this theory. A survey of this literature can be found, for example, in Mongelli (2002), De Grauwe (2003) or Horváth (2003).

³ The increased macroeconomic stability and lower risk will facilitate a low and relatively stable interest rate level and higher investment growth. An increase in foreign trade and competition, productivity growth and subsequent GDP growth per capita can also be expected.

⁴ In the context of transition to another currency, there is also a risk of incorrectly setting the conversion ratio, as an excessively appreciated exchange rate may damage the competitiveness of the economy in the long term, while an excessively depreciated exchange rate will generate inflationary pressures.

⁵ From the viewpoint of the new EU members who are planning to join the euro area, another cost may be the fulfilment of the Maastricht criteria prior to entry, especially the inflation criterion.

macroeconomic imbalances associated with entering the monetary union and to assess the ability of the economy to benefit from such a move. Properties that reduce the usefulness of nominal exchange rate adjustments by fostering internal and external balance, reducing the impact of some types of shocks and facilitating adjustment, make up the set of “optimum currency area properties” (Mongelli, 2002).

One of the key properties determining the appropriateness of joining a currency area is the degree of the openness of the economy and its economic links with the other countries of the currency area. The greater the integration, the higher the potential benefits of the single currency against which the costs are gauged. These benefits reflect above all the elimination of exchange rate risk in economic relations, which will reduce the costs of foreign trade and foreign investment and lead to a strengthening of such relations (e.g. Rose, 2000; Micco, Stein and Ordóñez, 2003).⁶

Other properties tend to reduce the negative aspects of the loss of certain macroeconomic adjustment instruments at country level, and can be summarised under the headings of symmetry and flexibility (De Grauwe and Mongelli, 2005). The traditional optimum currency area criteria also include similar economic structure and economic shocks, output and consumption diversification, a similar inflation rate, stable terms of trade, mobility of labour and other production factors, price and wage flexibility, and fiscal and political integration.⁷

Crucial to the discussion of the benefits and costs of the single currency was the formulation of the opinion that not only can the ability to benefit from a monetary union and the risks of unbalanced developments in a monetary union be affected by appropriate reforms, but that large shifts also seem to result from the very introduction of the single currency (the “endogeneity hypothesis”, Frankel and Rose, 1998). According to this hypothesis, the adoption of the single currency should lead to a strengthening of the free market (Engel and Rogers, 2004) and growth in trade with partners in the monetary union (see above). Moreover, an increase in trade integration can lead to greater business cycle correlation (Frankel and Rose, 1997).⁸

The endogeneity paradigm is opposed by the view that greater openness of the economy leads to a greater degree of specialisation, a decrease in structural similarity and thus a higher probability of asymmetric shocks, which increase the costs of currency area participation (the “specialisation hypothesis”, Krugman, 1993). Kalemli-Ozcan, Sorensen and Yosha (2003) find that high financial integration can have a similar impact, thanks to risk sharing, which fosters greater specialisation.

De Grauwe and Mongelli (2005) review the literature on the endogeneity of foreign trade, financial integration, symmetry of shocks and product and labour market flexibility. Based on developments to date in the euro area, they conclude that it is more likely that the endogeneity hypothesis holds, i.e. that the similarity of economic shocks probably increases with greater economic integration.

⁶ A developed financial sector is capable of effectively reducing exchange rate risk even outside the currency area; in such case, the overall net benefits of currency integration may be lower than for a country with a less developed financial sector.

⁷ In the event of an asymmetric shock, fiscal policy can assist by means of either built-in stabilisers or discretionary measures. However, discretionary measures can give rise to further fluctuations (Feldstein, 2002). What is more, research has shown that a fiscal expansion can have a much lower impact on demand than expected (Blanchard and Perotti, 2002).

⁸ However, Kenen (2000) finds that although trade intensity can increase the correlation between cycles, asymmetric shocks are not necessarily fully eliminated. Hughes-Hallett and Piscitelli (2002) show that this causality between monetary union participation and cycle alignment exists provided that the convergence in institutional structures and the symmetry of shocks are sufficient.

C. Results of the Analyses

1 CYCLICAL AND STRUCTURAL ALIGNMENT

Greater similarity in economic structure and the business cycle between the Czech Republic and the euro area will lead to lower euro adoption costs. For the Czech economy, the risk of time misalignment or a suboptimal intensity of the response of the single monetary policy to economic shocks will decrease. The functioning of the monetary policy transmission mechanism will also converge. The direct indicators of alignment (describing various aspects of convergence with the euro area) and the effect of international relations and the financial sector (which can increase or decrease alignment) are both monitored.

1.1 Direct alignment indicators

The key direct alignment indicators are the development of domestic economic activity, the exchange rate and interest rates compared to the euro area. Convergence in economic and price levels increases the likelihood of similar processes proceeding in the economy and of there being no major differences in equilibrium development. High synchronisation of the business cycle and economic shocks increases the probability that economic developments will not differ substantially going forward, either. Disequilibrium pressures may stem from different economic structures and from insufficient convergence at the real interest rate level.

1.1.1 Real economic convergence

The degree of real convergence, as measured by GDP per capita at purchasing power parity and the relative price level of GDP, is a fundamental indicator of the economy's similarity to the euro area. A high degree of real convergence is not a necessary condition for joining the monetary union, but a low degree of real convergence could indicate some challenges for the adoption of the single currency. The real convergence process is often associated with alignment of price levels and structures with more advanced countries. The related real appreciation of the exchange rate vis-à-vis the euro may make fulfilment of the Maastricht convergence criteria more difficult and, in the run-up to joining the euro area, necessitate a combination of economic policies which will move the economy away from equilibrium.⁹ This departure from equilibrium can be viewed as a type of asymmetric shock acting primarily in the initial years of monetary integration. Following the adoption of the euro, price convergence will imply a positive inflation differential and lower real interest rates compared to the euro area average, raising questions about the appropriateness of the single monetary policy for a country that has joined the euro area.

As Table 1 shows, the Czech economy has been converging towards the euro area in terms of GDP per capita since 2000. This process has accelerated over the past three years. With this indicator currently around 65% of the euro area level, the Czech Republic, along with Hungary, belongs to the group of countries whose standard of living is approaching that of the least advanced euro area countries (Portugal and Greece). It is thus more advanced than the

⁹ The simultaneous restriction placed on the inflation differential and the appreciation of the nominal exchange rate represent an implicit restriction on the appreciation of the real exchange rate. If the equilibrium real appreciation is faster, fulfilment of the Maastricht convergence criteria may require a temporary deviation of the exchange rate from equilibrium. However, this potential problem is mitigated by the fact that the exchange rate criterion is significantly more tolerant of appreciation than depreciation.

other new EU Member States (Poland and Slovakia), but still lags well behind the wealthier euro area countries (e.g. Austria).

Table 1: GDP per capita in purchasing power parity (EU-12 = 100)

	1998	1999	2000	2001	2002	2003	2004
CZ	61.1	60.0	59.2	60.4	62.3	63.7	65.6
AT	114.3	115.9	116.7	113.5	112.6	112.9	113.5
GR	65.4	65.6	66.1	67.3	71.5	75.2	76.5
PT	68.7	70.6	70.6	70.5	70.7	69.2	67.9
HU	47.1	48.0	48.8	51.6	53.9	55.6	57.1
PL	41.0	41.7	42.2	41.9	42.1	42.6	43.8
SK	43.5	43.1	43.7	44.6	47.4	48.5	48.7

Sources: Eurostat, CNB calculations.

Table 2 illustrates the **price level of GDP** compared the euro area. In the case of the Czech Republic, this indicator showed the greatest convergence in 2001–2002. From then until 2004 the Czech price level tended to be flat relative to that in the euro area.¹⁰ The distance of the Czech Republic from the old EU countries in terms of this indicator is traditionally higher than in the case of GDP. The Czech Republic in this indicator lags markedly behind not only Austria, but also Portugal and Greece, and in recent years also behind Hungary. Of the countries under review, the price level is slightly lower only in Poland and Slovakia.

Table 2: Average GDP price level (EU-12 = 100)

	1998	1999	2000	2001	2002	2003	2004
CZ	43.2	43.2	45.6	48.6	52.9	51.7	52.4
AT	105.3	104.1	103.4	104.3	104.0	103.6	103.0
GR	77.3	79.6	78.3	78.7	77.3	77.9	79.6
PT	72.5	72.6	73.6	74.6	75.2	75.9	76.9
HU	43.6	44.2	46.7	48.7	53.9	54.2	57.0
PL	47.7	46.1	51.3	57.1	54.0	47.9	47.4
SK	42.3	39.7	42.6	42.6	43.3	46.6	51.2

Sources: Eurostat, CNB calculations.

Table 3 presents the evolution of **the real exchange rate** vis-à-vis the euro. As can be seen, the real exchange rate of the koruna has appreciated by roughly 15% since 1998, i.e. by an average rate of 2.4% a year (and since 1993 by an average of 3.9% a year). Relative to the current euro area countries surveyed, the rate of appreciation has been higher since both 1998 and 1993. The Polish zloty has appreciated more slowly. Conversely, Slovakia has recorded a faster appreciation, as has Hungary since 1998. Based on the results of international comparisons (see Čihák and Holub, 2003), continuing real appreciation of the koruna in the range of approximately 2%–3% can be expected going forward.^{11,12} If the Czech Republic

¹⁰ It could be said, however, that the flat price level in the Czech Republic was interrupted by appreciation of the koruna in late 2004 and in 2005.

¹¹ This figure is broadly in line with the current estimates of the equilibrium real appreciation vis-à-vis Germany used in the CNB's forecasts (approximately 3%, with a gradually slowing tendency).

joins the euro area in the next five years, an average inflation differential of similar size and consequently lower (i.e. negative) real interest rates can be expected.

Table 3: Real exchange rate against the euro (1998 = 100; HICP/CPI-deflated)

	1999	2000	2001	2002	2003	2004	Annual rate of appreciation		
							since 1993	since 1998	Estimate ^a
CZ	98	104	111	121	115	115	3.9%	2.4%	(1.8 ; 3.4)
AT	100	100	100	99	99	98	-0.5%	-0.3%	(0.0 ; 0.3)
GR	103	100	100	102	103	104	0.8%	0.6%	(0.3 ; 0.5)
PT	102	102	104	106	107	107	0.5%	1.2%	(-0.1 ; 0.5)
HU	104	108	117	127	125	132	2.8%	4.7%	(1.4 ; 1.6)
PL	98	112	125	119	103	101	2.4%	0.2%	(1.7 ; 2.0)
SK	98	111	115	118	129	140	5.1%	5.8%	(1.5 ; 1.7)

Sources: Eurostat, CNB calculations.

Note: a) Estimate of the average year-on-year real appreciation for the following five years, based on international comparisons (see Čihák, Holub, 2003). See *Methodological Part* for details on the estimate.

To sum, the Czech economy is gradually converging towards the euro area level. There is further substantial room going forward for convergence in GDP per capita and the price level. Some of the aforementioned challenges to smooth adoption of the euro may be associated with this process.

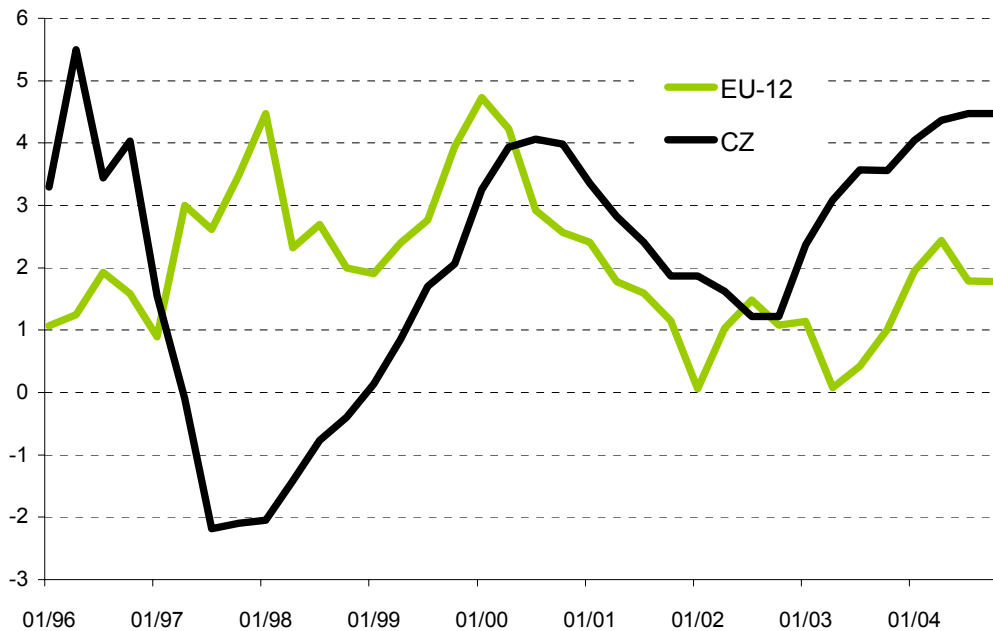
1.1.2 Correlation of economic activity

Upon joining a monetary union, a country gives up its own monetary policy and from then on its economy is directly affected by the single monetary policy of the union. One of the potential costs of abandoning independent monetary policy is some degree of misalignment between the monetary policy decisions adopted at the monetary union level and the needs of economies in a different phase of the business cycle than the monetary union average. The following analysis therefore examines whether there is any cyclical similarity between the Czech Republic and the other countries included in the comparison and the euro area. From the point of view of the optimum currency area theory, it is less costly for a country with higher business cycle correlation with the euro area to stay in the monetary union.

Chart 1 illustrates the degree of business cycle similarity between the Czech Republic and the euro area. Up until 1999, significant divergence between the two cycles can be observed. This was largely due to the fading impacts of the economic transformation in the Czech Republic, ongoing structural changes and the occurrence of a number of specific shocks (most notably the 1997 financial crisis). The development observed since 1999 would suggest that the degree of economic alignment has increased.

¹² This conclusion regarding the gradual real appreciation of the koruna is prevalent in the relevant literature. However, there is also an opinion that in the medium term the koruna may also be affected by depreciation pressures owing to its current real overvaluation (e.g. Bulří and Šmídková, 2004).

Chart 1: Annual percentage changes in real GDP



Sources: Eurostat, CNB calculation.

To measure the **degree of cyclical correlation** of the selected economies, a simple method of real GDP correlation was applied. For robustness, the results were compared using three different methods for detrending the underlying time series: year-on-year differences, quarter-on-quarter differences and the Hodrick–Prescott (HP) filter. Owing to the presence of the specific asymmetric shocks described above, we divide the available data into two 5-year periods and measure the correlation on these time series.

Table 4 shows that in the case of the Czech Republic, a statistically significant improvement in the correlation of the coefficient values over time can be observed in at least one case, reflecting a likely gradual increase in business cycle correlation with the euro area.¹³ This increase is not all that robust for the Czech Republic so far, and the positive correlation is statistically significant at the 10% level only and for one indicator only. However, the overall relatively low alignment of the domestic economic cycle with the euro area may be partially due to the excessive exchange rate volatility recorded in some years, which would be eliminated by euro area entry. If the correlation increases further, the costs due to misalignment of the single monetary policy with the needs of the Czech economy should decrease.

¹³ A statistically significant shift (at the 5% level) was also recorded for the correlation of the Hungarian cycle as measured by method 1.

Table 4: Correlation coefficients of economic activity – evolution over time

		1996 - 2000		2000 - 2004	
Method 1	CZ	-0,21	(-0,54 ; 0,19)	0,44 *	(0,07 ; 0,70)
	AT	0,51 **	(0,16 ; 0,74)	0,79 **	(0,58 ; 0,90)
	GR	0,09	(-0,30 ; 0,46)	0,42 *	(0,04 ; 0,69)
	HU	0,78 **	(0,57 ; 0,89)	0,95 **	(0,88 ; 0,98)
	PL	0,13	(-0,26 ; 0,48)	0,42 *	(0,05 ; 0,69)
	SK	-0,30	(-0,61 ; 0,08)	-0,62 **	(-0,81 ; -0,32)
Method 2	CZ	-0,15	(-0,50 ; 0,25)	0,27	(-0,12 ; 0,59)
	AT	0,23	(-0,16 ; 0,56)	0,25	(-0,15 ; 0,57)
	GR	-0,02	(-0,40 ; 0,36)	0,32	(-0,07 ; 0,62)
	HU	0,42 *	(0,05 ; 0,69)	0,70 **	(0,44 ; 0,85)
	PL	0,14	(-0,25 ; 0,49)	0,31	(-0,07 ; 0,62)
	SK	0,11	(-0,28 ; 0,47)	-0,17	(-0,52 ; 0,22)
Method 3	CZ	-0,17	(-0,51 ; 0,23)	0,25	(-0,14 ; 0,58)
	AT	0,81 **	(0,62 ; 0,91)	0,80 **	(0,60 ; 0,90)
	GR	0,19	(-0,20 ; 0,53)	0,05	(-0,34 ; 0,42)
	HU	0,82 **	(0,64 ; 0,91)	0,95 **	(0,90 ; 0,98)
	PL	0,56 **	(0,22 ; 0,77)	0,46 **	(0,09 ; 0,71)
	SK	-0,57 **	(-0,78 ; -0,24)	-0,71 **	(-0,86 ; -0,45)

Note: Method 1 – year-on-year differences, Method 2 – quarter-on-quarter differences, Method 3 – HP filter. The significance of the correlation coefficient is marked ** and * for the 5% and 10% significance levels respectively. The 90% confidence interval is in parentheses. Sources: Eurostat, CNB calculation.

1.1.3 Synchronisation of economic shocks

In the optimum currency area literature, similarity of economic shocks is viewed as another precondition for monetary policy effectiveness in a monetary union (e.g. Frankel and Rose, 1996). However, there is no consensus on the effect of demand and supply shocks. While asymmetry of demand shocks is a general argument against joining a monetary union, the literature does not provide an unanimous opinion on the need for the alignment of supply shocks.¹⁴

The following analysis assesses the degree of synchronisation of demand and supply shocks between the countries under review and the euro area. Estimates were made using a method identifying demand and supply shocks on quarterly data for 1995–2004. The correlation of the shocks can take values in the range of [-1, 1]. Positive values indicate that the shocks are symmetric with respect to the euro area. Low or even negative values correspond to asymmetric shocks. Table 5 contains a summary of the results for 1995–2004 and for 1995–1999 and 2000–2004.

¹⁴ Roisland and Torvik (2003) for example show that the monetary policy regime has to be taken into consideration when assessing the effect of symmetry of supply shocks. Asymmetry of supply shocks may increase the benefits of the monetary union for inflation-targeting countries by increasing output stability thanks to a smaller interest rate response to changes in inflation.

Table 5: Correlation of shocks vis-à-vis the euro area

a) Demand shocks

	1995-2004	1995-1999	2000-2004
CZ	0,23 (-0,03 ; 0,47)	0,16 (-0,23 ; 0,51)	0,27 (-0,12 ; 0,59)
HU	0,07 (-0,19 ; 0,33)	0,23 (-0,17 ; 0,56)	0,03 (-0,35 ; 0,41)
PL	0,35 ** (0,10 ; 0,56)	-0,10 (-0,46 ; 0,29)	0,54 ** (0,21 ; 0,76)
SK	0,27 * (0,01 ; 0,50)	0,22 (-0,17 ; 0,55)	0,30 (-0,09 ; 0,61)
PT	-0,18 (-0,43 ; 0,09)	-0,27 (-0,59 ; 0,12)	-0,13 (-0,49 ; 0,26)
AT	0,36 ** (0,11 ; 0,57)	0,43 * (0,06 ; 0,70)	0,24 (-0,15 ; 0,57)
GR	-0,16 (-0,41 ; 0,10)	-0,18 (-0,52 ; 0,22)	-0,12 (-0,47 ; 0,28)

The significance of the correlation coefficient is marked ** and * for the 5% and 10% significance levels respectively. The 90% confidence interval is in parentheses.

Source: CNB calculation.

b) supply shocks

	1995-2004	1995-1999	2000-2004
CZ	0,04 (-0,23 ; 0,30)	0,20 (-0,19 ; 0,54)	-0,02 (-0,39 ; 0,36)
HU	-0,07 (-0,33 ; 0,20)	-0,26 (-0,58 ; 0,13)	0,09 (-0,30 ; 0,45)
PL	0,05 (-0,22 ; 0,31)	0,42 * (0,05 ; 0,69)	-0,26 (-0,58 ; 0,14)
SK	-0,30 * (-0,53 ; -0,04)	-0,41 * (-0,69 ; -0,04)	-0,12 (-0,48 ; 0,27)
PT	0,10 (-0,17 ; 0,36)	0,27 (-0,12 ; 0,59)	-0,14 (-0,49 ; 0,25)
AT	0,11 (-0,16 ; 0,36)	-0,04 (-0,42 ; 0,34)	0,02 (-0,36 ; 0,39)
GR	0,04 (-0,22 ; 0,30)	0,21 (-0,18 ; 0,55)	-0,21 (-0,55 ; 0,18)

The significance of the correlation coefficient is marked ** and * for the 5% and 10% significance levels respectively. The 90% confidence interval is in parentheses.

Source: CNB calculation.

Based on the above results we can say that although the measured correlation of **demand shocks** identified for the Czech Republic in relation to the euro area increased from 0.16 for 1995–2004 to 0.27 for 2000–2004, this shift towards positive values is still not statistically significant. So far, then, there has been no statistically significant change in the correlation of this type of shock. The analysis implies that in 1995–2004, the correlation of the demand shocks of the Czech Republic, Poland and Slovakia with the euro area was roughly comparable with that of Austria and higher than that of Portugal and Greece. As for the individual countries, Poland has the most demand shock convergence (a change from -0.10 to 0.54). The synchronisation of shocks on the demand side in the Czech Republic is above the average of the three selected euro area countries, which suggests that the risk due to asymmetry of shocks is no higher in the Czech economy than in the countries included in the comparison.

The correlation between the Czech Republic and the euro area as regards **supply shocks** fell from 0.20 for 1995–1999 to -0.02 for 2000–2004, but the correlation coefficients are still not statistically significant. The analysis did not reveal any statistically significant differences in the correlation of demand shocks in the Czech Republic and the other countries included in the comparison, with the exception of Slovakia in 1995–2004.

As in the previous analysis of the correlation of economic activity, one can expect that the correlation of the demand and supply shocks is partly concealed by major exchange rate shocks and that exchange rate stability would probably have fostered greater correlation of the Czech business cycle with that of the euro area.

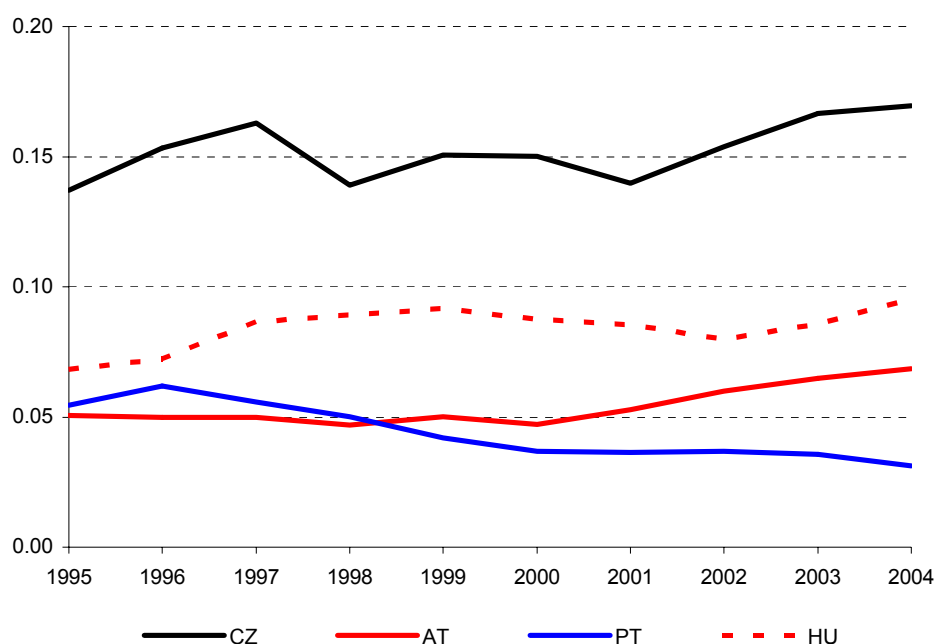
1.1.4 Assessment of the economies' structural similarity

Greater similarity of the structure of economic activity between the acceding economy and the other economies of a currency area decreases the risk of occurrence of an asymmetric economic shock. A sufficient degree of diversification of economic activity within a currency area also increases its resistance to fluctuations affecting only some industries, and hence also its stability (Kenen, 1969).

The **structural similarity** of the economies of the countries included in the comparison with the euro area is expressed using the Landesmann structural coefficient, which compares the shares of six sectors of the economy in total value added in the countries included in the comparison and the euro area. This coefficient takes values in the range of [0, 1]. The closer the coefficient is to zero, the more similar is the structure of the economies.

Chart 2 illustrates that the Landesmann index for the Czech Republic is the highest of all the selected countries, implying the greatest structural difference. This difference has tended to increase moderately over time. The difference in the structure of value added in the Czech economy consists mainly in a high share for industry and in a lower share for services, in particular financial intermediation, real estate and business activities and other services (see Table 6). However, the Landesmann index is still close to the lower boundary of the interval [0, 1].

Chart 2: Structural similarity vis-à-vis the euro area



Sources: Eurostat, CNB calculation.

Table 6: Shares of economic sectors in GDP in 2004 (%)

	A,B	C,D,E	F	G, H, I	J, K	L-P
EU-12	3	22	5	22	26	21
CZ	5	35	5	26	17	13
AT	2	25	7	25	20	19
PT	4	22	5	24	23	22
HU	7	29	5	22	19	18

Note: The sectors are classified according to the NACE classification: A,B – agriculture, forestry and fishing, C,D,E – industry, F – construction, G,H,I – wholesale and retail trade, repair, accommodation, transport and communication, J,K – financial intermediation, real estate, renting and business activities, L-P – other services.

Sources: Eurostat, CNB calculation.

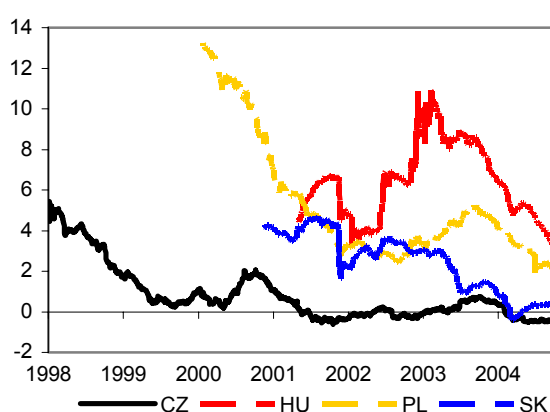
1.1.5 Convergence of the interest rate differential

Differing inflation in regions or countries of a monetary union, given unified nominal interest rates, will result in differing real interest rates.¹⁵ Countries entering the currency area will furthermore face nominal interest rate convergence to the union level, which, if it proceeds fast, can act as an asymmetric shock. Therefore, earlier nominal interest rate convergence is better for smooth accession to the euro area, as it will facilitate better adjustment of economic processes and eliminates the additional asymmetric shock associated with euro adoption.

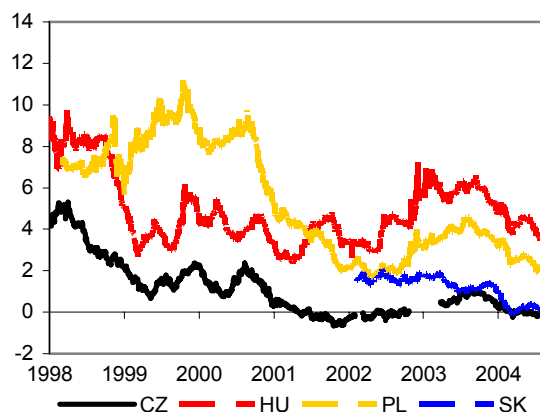
The following comparison of the **nominal interest rate differential** vis-à-vis the euro area attempts to express the probability of the asymmetric shock described above. The closer the nominal interest rate differential is to zero, the smaller is the risk that joining the monetary union will cause a change in real interest rates, which would have a destabilising effect on the economy. Chart 3 illustrates the interest rate differentials in the Czech Republic, Hungary, Poland and Slovakia vis-à-vis the euro area for one-year rates on the interbank market and five-year government bonds.

Chart 3: Differences in interest rates vis-à-vis the euro area 1998–2005 (percentage points)

a) one-year rates



b) five-year rates



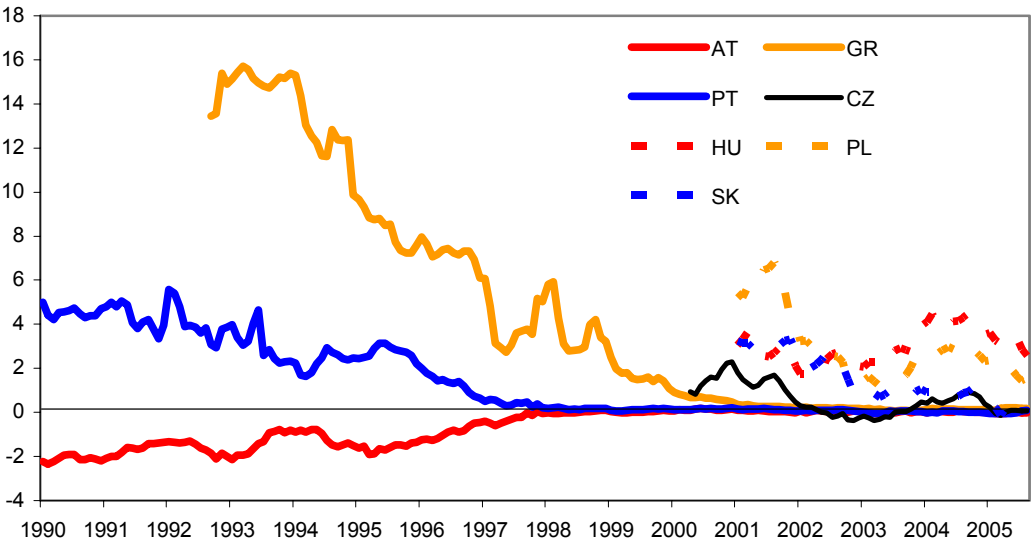
Sources: Bloomberg, CNB calculation.

¹⁵ See also section 1.1.1.

Interest rate convergence is observable for all the countries, and the compared maturities and interest rate differentials have both declined in recent years. However, apart from the one-year and five-year interest rates in the Czech Republic, and recently also in Slovakia, a significant interest rate difference remains. The one-year rate in the Czech Republic has been moving at the euro area interest rate level, or even below it, since 2002. A similar trend can be observed for five-year rates.

The evolution of interest rates in the euro area countries prior to the introduction of the euro can serve as an indication for countries planning to introduce the euro. Chart 4 gives a comparison for all the countries surveyed of the evolution of ten-year government bond yields, which are monitored as the Maastricht convergence criterion against the euro area average. For Austria, Portugal and Greece, the run-up to the introduction of the euro is included. However, when comparing the levels and evolution of these interest rate differentials, the fact that the structural characteristics of economies have changed since the 1990s should be taken into account.

Chart 4: Differences in interest rates vis-à-vis the euro area 1990–2005 (percentage points)



Sources: Eurostat, CNB calculation.

This chart shows that in 1993–1994 the interest rate differential in Greece was much higher than the current differential in any of the four new Member States included in the comparison. The current average level in the new Member States is broadly comparable to the time-corresponding level in Portugal, although the Czech Republic and Slovakia show a differential of almost zero.

1.1.6 Exchange rate convergence

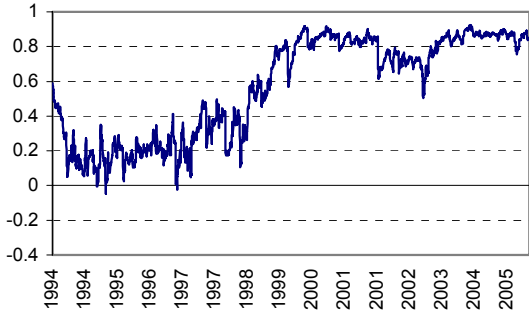
Similar movement in the exchange rates of two currencies in the long term vis-à-vis a third, reference currency reflects similarity in the factors which affect those exchange rates. A high **exchange rate correlation** of two currencies vis-à-vis a third currency can thus be an indicator that the two countries could share a single currency (Aguilar and Hördahl, 1998).¹⁶

¹⁶ Aguilar and Hördahl (1998) express the probability of euro adoption by the countries which at that time were EMU candidate countries, using the correlation of the exchange rates of their currencies and the Deutsche Mark (as a substitute for the euro) vis-à-vis the US dollar. Horváth (2005) shows that the stability of two currencies is affected to a large degree by the extent to which those countries satisfy the optimum currency area criteria.

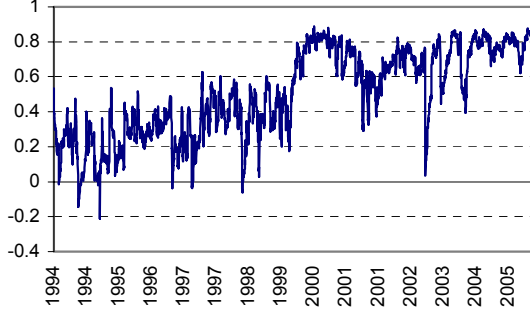
The following analysis uses a bivariate GARCH model to estimate the correlation between the exchange rates of the Czech koruna, the Hungarian forint, the Polish zloty and the Slovak koruna and the euro vis-à-vis the US dollar. A high degree of correlation reflects high similarity of exchange rate movements and lower intensity of asymmetric pressures; the exchange rate correlation of currencies in a monetary union would be one. Chart 5 illustrates the development of the correlation coefficients.

Chart 5: Correlation coefficient of exchange rates against the US dollar

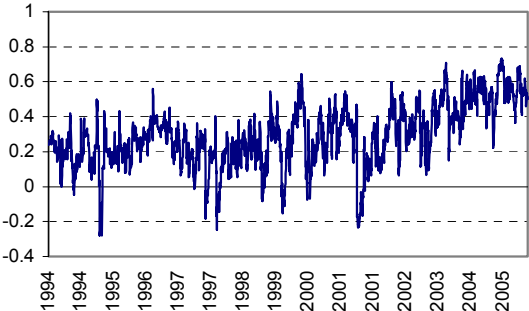
CZK/USD and EUR/USD



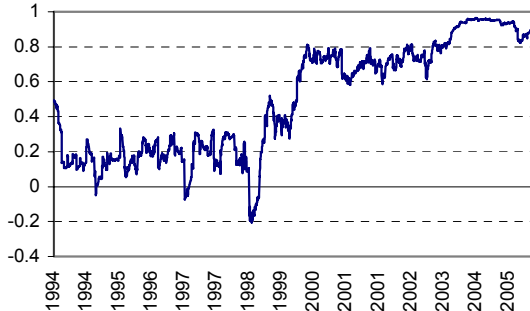
HUF/USD and EUR/USD



PLZ/USD and EUR/USD



SKK/USD and EUR/USD



Sources: Bloomberg, CNB calculation.

The charts show that the correlation between the Czech koruna and the euro has been relatively high since 2000 (although the period of 2001–2002 saw a short-lived decline related to an appreciation episode) and has been higher than 80% in recent years. We can see that the Czech and Slovak korunas have a higher and less volatile correlation with the euro by comparison with the Polish zloty; the Hungarian forint has a similar correlation to the Czech koruna, but its volatility is higher.

To assess the importance of exchange rate convergence it would be useful to compare the aforementioned results with the exchange rates of the Austrian, Portuguese and Greek currencies before they adopted the euro. However, the direct comparison unfortunately has a limited information value, owing to the different exchange rate regimes in these countries.

The Austrian, Portuguese and Greek currencies were in essence pegged to Deutsche Mark since 1985,¹⁷ so the observed correlation should be very close to one, as the data confirm.

1.2 The effect of international economic relations

The integration of an economy into international economic relations has an influence on the effectiveness of independent monetary policy and the probability of asymmetric shocks. Similarity of economic developments can be fostered both by trade links and by ownership links.

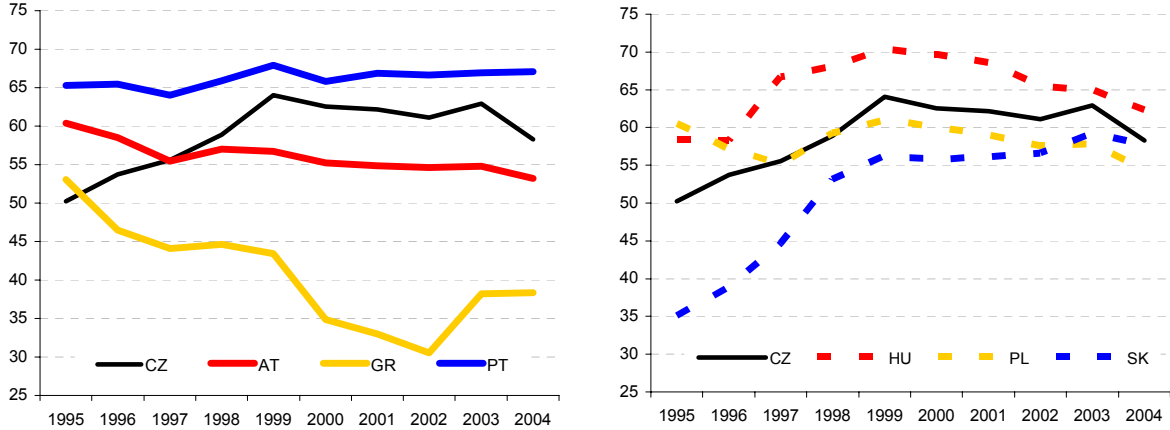
1.2.1 The openness of the economy and its links with the euro area

Greater economic openness of a country increases the weight of tradable goods in the consumer basket and reduces the effectiveness of changing the nominal exchange rate as an adjustment instrument in the event of an external imbalance (McKinnon, 1963), hence a loss of independent monetary policy is not such a big problem. Greater economic integration with countries using a single currency, as measured by the share of foreign trade on both the export and import side, also leads to a lower risk of asynchronous economic developments in the observed country with respect to the other countries of the single currency area. Closer trade links thus foster higher correlation of economic activity within a single currency area (Frankel and Rose, 1997). On the other hand, higher trade intensity may lead to growing specialisation and thus less economic symmetry (Krugman, 1993). An analysis of the openness of the economy is therefore an important addition to the other analyses of structural alignment.

The **intensity of mutual trade** of the countries under review with the euro area is illustrated in charts 6 and 7. These charts show that on both the export and import side the trade links of the new EU countries with the euro area countries intensified until 1999 and subsequently stabilised. All the countries under review currently have a high degree of economic integration with the euro area. The current degree of economic integration is comparable with, and in some cases even higher than, that of the euro area countries. The Czech Republic has close trade links with the euro area, which is its partner for approximately 60% of total exports and imports.

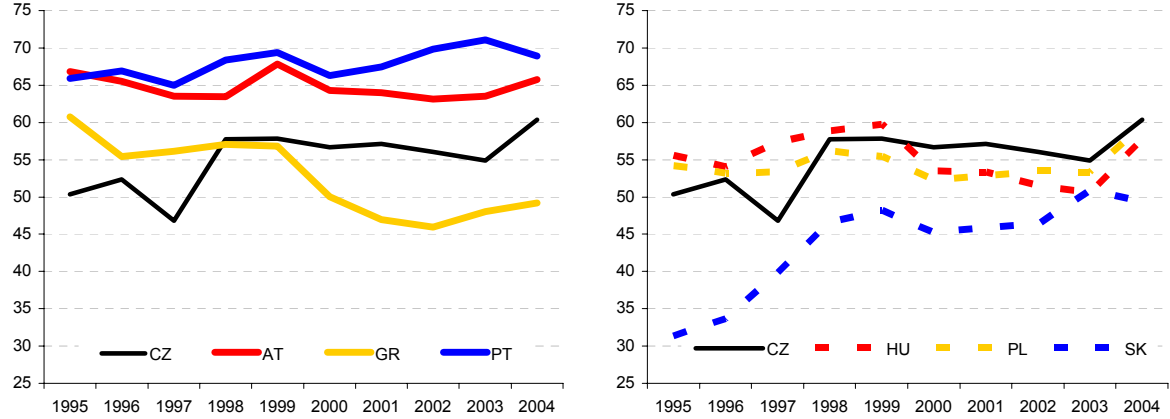
¹⁷ From 1985 on, these countries essentially had a fixed rate, a crawling peg or a moving band of up to $\pm 2\%$ vis-à-vis the Deutsche Mark (Reinhart and Rogoff, 2004). This link undoubtedly reduced the costs and benefits of entering the euro area.

Chart 6: Share of exports to the EU-12 in total exports (%)



Sources: IMF (Direction of Trade Statistics), CNB calculation.

Chart 7: Share of imports from the EU-12 in total imports (%)



Sources: IMF (Direction of Trade Statistics), CNB calculation.

Like trade links, **ownership links** foster higher correlation of economic activity. If domestic companies are part of multinational groups, this may help to transmit economic impulses. In addition, capital integration between two countries can help to dampen a negative unilateral demand shock.¹⁸ Ownership links with the euro area are measured by the share of foreign direct investment (FDI) from the euro area in the total amount of FDI in the countries surveyed (Table 7) and by the share of direct investment (DI) from the monitored country in the euro area in the total amount of DI from the monitored foreign country (Table 9). Moreover, comparison is made of the relative significance of DI in the countries being compared, measured as a percentage of GDP (Table 8 and Table 10).

¹⁸ A negative demand shock hitting one country may be partly offset by holding diversified investment portfolios. In this way, there may be “private insurance” against potential asymmetric shocks in addition to public transfers between countries (De Grauwe, 2003).

Table 7: Share of FDI from the euro area in total FDI (%)

	1995	1996	1997	1998	1999	2000	2001	2002	2003
CZ	.	.	78	76	79	78	77	82	79
AT	61	62	66	.	61	70	65	60	.
GR	.	.	.	88	.	.	67	69	64
PT	61	62	59	59	63	68	64	65	.
HU	68	64	65	69	.	.	58	55	.
PL	54	64	67	68	71	70	73	73	72
SK	.	.	.	.	.	67	.	72	.

Sources: OECD: Online Statistical Databases (International Direct Investment Statistics Yearbook), CNB calculation.

Table 8: Share of FDI in GDP (%)

	1995	1996	1997	1998	1999	2000	2001	2002
CZ	13	14	16	24	30	39	45	52
AT	8	8	8	10	11	16	18	21
GR	.	.	.	11	13	11	11	12
PT	17	18	18	22	20	27	31	36
HU^a	.	.	.	.	.	.	53	50
PL	6	7	9	13	16	21	22	25
SK	.	.	.	11	14	22	27	35

Sources: OECD: Online Statistical Databases (International Direct Investment Statistics Yearbook), Eurostat, CNB calculation.

Note: a) Due to a probable error in the OECD database, Eurostat data are used for Hungary.

Particularly in the new EU Member States, the share of FDI in GDP has risen rapidly from relatively low figures and is now at quite a high level. The majority of FDI in the countries included in the comparison come from the euro area, with the Czech Republic's share of FDI from the euro area in its total position being the highest (almost 80%).¹⁹

Table 9: Share of DI in the euro area in total DI abroad (%)

	1995	1996	1997	1998	1999	2000	2001	2002	2003
CZ	.	.	.	.	19	13	10	12	25
AT	40	40	33	.	29	31	29	29	.
GR	.	.	.	.	.	.	12	19	19
PT	.	59	56	53	30	35	50	57	.
HU	.	.	.	.	.	.	29	23	.
PL	16	29	26	35	31	.	25	38	44
SK	.	.	.	.	.	.	.	16	.

Sources: OECD: Online Statistical Databases (International Direct Investment Statistics Yearbook), CNB calculation.

¹⁹ Approximately 30% of FDI in the Czech Republic comes from the Netherlands, via which non-European companies often invest in Europe. The actual ownership links with the euro area may thus be slightly overestimated. For the other countries surveyed, the share of direct investment from the Netherlands is somewhat lower, between 11%–25%, except for Austria (about 7%).

Table 10: Share of DI abroad in GDP (%)

	1995	1996	1997	1998	1999	2000	2001	2002
CZ	1	1	1	1	1	1	2	2
AT	5	5	6	8	9	13	15	20
GR	.	.	.	2	3	5	6	7
PT	4	4	5	9	9	16	21	26
HU	.	.	.	.	.	.	3	3
PL	0	0	0	1	1	1	1	1
SK	.	.	1	2	2	2	2	2

Sources: OECD: Online Statistical Databases (International Direct Investment Statistics Yearbook), CNB calculation.

Ownership links the other way round, i.e. direct investment abroad from the surveyed countries, are insignificant, particularly in the case of the new EU members. Moreover (in the case of the new EU members), only a small proportion of this modest amount of DI is invested in the euro area.

In conclusion, it can be stated that ownership links with the euro area via foreign direct investment are very high in the Czech Republic. The ownership interests of Czech residents in the euro area are much lower, but the same ownership asymmetry also exists in most of the countries included in the comparison.

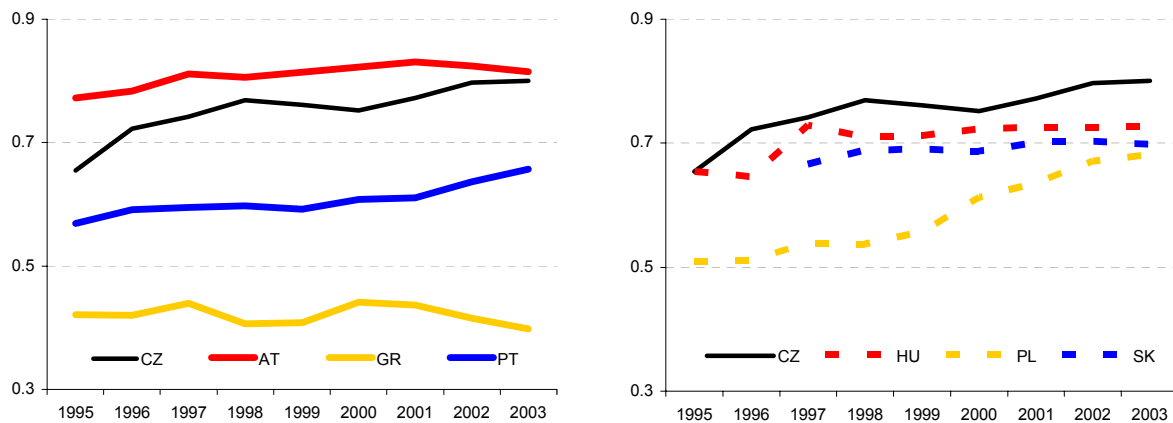
1.2.2 Intra-industry trade

Intra-industry trade is typical of countries with a similar factor structure and is thus one of many indicators of the structural similarity of economies. Intra-industry trade fosters cyclical convergence (Frankel and Rose, 1997) and can also affect the economy's ability to absorb economic shocks.²⁰ The theory of intra-industry trade (Krugman, 1981, Hoekman and Djankov, 1996) assumes the greatest intensity of intra-industry trade in capital- and research-intensive industries which can benefit most from economies of scale; as a rule these are industries with high market concentration. The lowest level can be expected in industries associated with certain natural resources.

To analyse intra-industry trade we used the Grubel–Lloyd index, which indicates the share of the absolute amount of intra-industry trade in foreign trade turnover. Chart 8 illustrates the evolution of this indicator in the countries included in the comparison

²⁰ Among other things, intra-industry trade growth may have a positive effect on the costs and speed of restructuring, since the transfer of resources may be faster and less expensive if effected within an industry than between industries. A larger proportion of intra-industry trade also acts to refute the specialisation hypothesis based on inter-industry foreign trade.

Chart 8: Intensity of intra-industry trade



Sources: OECD: Online Statistical Databases (International Trade), CNB calculation.

Intra-industry trade in the Czech Republic is high in comparison with the selected EU Member States, and even exceeds some of them.²¹ The developments to date may also imply further growth in future. The high level of intra-industry trade in the Czech Republic is a positive factor in terms of euro area accession.

1.3 Financial market

From the viewpoint of the optimum currency area theory it is useful to examine the financial sector similarities of the countries considering participation in a monetary union. A similar level of financial sector development and functioning increases the probability that the financial sectors in both economies will transmit external economic shocks and monetary policy impulses in the same way.²² The main characteristics under review are the depth and structure of financial intermediation.

In relation to GDP, the Czech financial sector is less than 40% of the size of the financial sectors of the euro area, Austria and Portugal. It is close to the relative size of the Greek financial sector. The **depth of financial intermediation** in the Czech Republic is, however, greater than that in some of the other central European countries which joined the EU at the same time. Nonetheless, the financial sector's assets as a percentage of GDP have gradually fallen in the Czech Republic, from 149% in 1996 to 129% in 2004, as a result of their slower pace of absolute growth in past years (see Table 11).

²¹ Our conclusions in this respect are identical to those of Fidrmuc (1999).

²² For completeness it should be added that the advanced state of the financial sector may also be reflected in its high ability to cover exchange rate risks and thereby reduce the costs associated with an independent currency.

Table 11: Financial system assets/GDP (%)

	1996	1997	1998	1999	2000	2001	2002	2003	2004
CZ	148.8	147.6	138.9	141.2	142.6	139.3	136.6	133.9	129.3
HU	70.5	77.9	78.1	80.0	81.2	83.2	86.4	95.3	102.1
PL	54.0	57.1	62.4	65.5	69.2	74.2	76.3	78.6	82.1
SK ^a	117.8	114.9	108.0	97.1	96.5	98.6	100.5	92.6	100.5
AT ^b	.	276.8	295.7	317.4	332.5	341.2	328.1	338.5	352.8
GR ^b	.	132.9	152.3	190.2	200.2	176.9	159.1	154.8	156.4
PT ^b	.	286.7	342.6	338.7	329.7	342.1	328.7	326.3	316.1
EU12 ^{b,c}	.	278.3	331.7	357.2	364.8	348.7	342.1	352.3	348.1

Note: a) Excluding pension funds.
b) Total assets of credit institutions, insurance corporations, pension funds and investment funds.
c) Weighted average.

Sources: CNB, central banks – exchange of data, data on a non-consolidated basis.

Table 12 illustrates the ratio of credit to GDP, showing that in this indicator the Czech Republic lags behind the euro area countries surveyed. Compared to Austria and Portugal, the volume of loans in relative terms (including the government sector) is up to three times lower.

Table 12: Bank loans to non-bank clients/GDP (%)

	1996	1997	1998	1999	2000	2001	2002	2003	2004
CZ	59.6	61.9	56.2	51.5	48.9	42.1	39.3	40.2	40.0
HU ^a	22.1	24.3	24.2	26.0	30.4	31.9	33.5	38.5	41.6
PL ^a	21.2	23.2	24.8	27.8	29.1	28.6	26.6	27.1	25.8
SK ^a	58.5	54.7	51.8	48.7	43.7	33.5	31.2	32.9	33.4
AT	117.2	116.1	117.6	119.8	125.4	124.3	123.7	122.1	125.1
GR	34.1	35.9	41.7	45.3	54.4	62.3	67.1	71.7	77.2
PT	66.5	78.5	93.5	113.9	132.8	139.2	142.6	142.4	144.3
EU12 ^b	101.2	104.9	107.9	111.6	116.1	114.2	113.5	114.8	117.2

Note: a) Loans to the non-financial sector (excluding the government sector).
b) Weighted average.

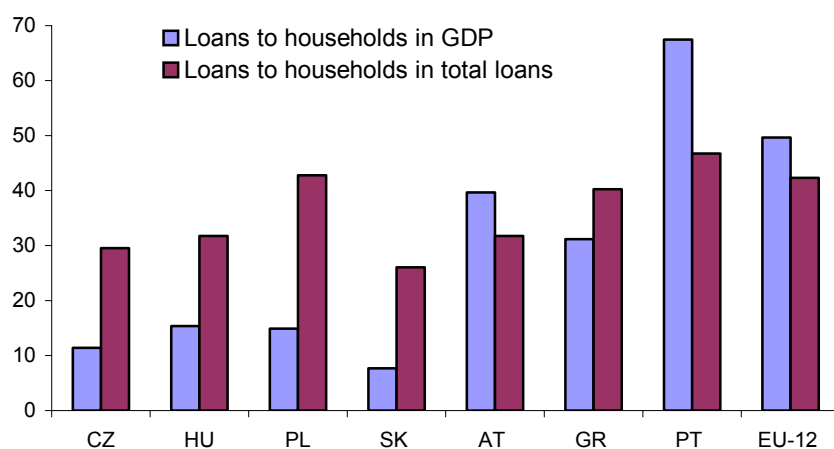
Sources: CNB, central banks – exchange of data, data on a non-consolidated basis.

From the point of view of the effects on the transmission mechanism and financial sector stability it has been necessary in recent years to monitor above all the relatively dynamic growth in **loans to households**. The share of bank loans to households in total lending is rising (see Chart 9) and is about 70% of the euro area average in the Czech Republic (compared to 57% in 2003), and 23% of the euro area average as a percentage of GDP (compared to 20% in 2003). Major increases in loans to the household sector have occurred in some current euro area countries (e.g. Portugal and Austria), and have not yet generated any problems in their financial sectors.²³

²³ These countries are showing signs of a modest improvement in the proportion of non-performing loans to total loans. Loans provided to households by non-banking institutions are not considered.

Chart 9: Bank loans to households in 2004

(% of GDP, % of total loans)



Sources: CNB, central banks - reports, exchange of data.

Banking assets account for 74% of the Czech Republic's **financial structure**. Poland and Hungary record similar figures (74% and 81% respectively). The structure of the Czech financial sector is approaching that of other European countries; banking assets account for about 75% of financial sector assets in euro area countries on average; individually, Austria is similar (see Table 13).

Table 13: Banking sector assets/financial system assets (%)

	1996	1997	1998	1999	2000	2001	2002	2003	2004
CZ	78.8	82.1	81.4	80.0	81.0	77.5	75.9	74.0	74.1
HU	94.5	93.2	92.4	90.4	87.3	82.1	80.2	81.8	81.2
PL	94.5	93.4	92.4	90.3	87.4	84.9	80.0	76.4	74.1
SK ^a	95.3	94.9	94.3	93.9	93.9	93.3	91.8	88.6	87.3
AT ^b	.	82.3	81.0	78.0	77.5	77.8	76.6	76.3	76.0
GR ^b	.	.	62.5	60.9	66.6	87.3	89.5	89.7	89.2
PT ^b	.	82.6	83.8	83.0	83.2	84.0	83.3	81.9	80.9
EU12 ^{b,c}	.	.	.	.	74.5	72.6	73.5	72.5	76.4

Note: a) Excluding pension funds.
b) Total assets of credit institutions, insurance corporations, pension funds and investment funds.
c) Weighted average.

Sources: CNB, central banks – exchange of data, data on a non-consolidated basis.

The Czech financial sector can be described as relatively similar to that of the euro area from the structural point of view. It functions in a standard manner and is able to ensure a sufficiently smooth process of monetary policy transmission despite the relatively small depth of financial intermediation compared to the euro area countries surveyed.

2 ADJUSTMENT MECHANISMS

The adoption of the single currency and the loss of an independent monetary policy will mean that the adjustment of the economy to shocks places higher demands on other adjustment mechanisms. The theory of optimum currency areas indicates the importance of the stabilising function of public budgets, labour market flexibility and the ability of the financial system to absorb shocks.

2.1 Fiscal policy

In the event of asymmetric shocks fiscal policy can have a stabilising effect either through built-in stabilisers or discretionary measures, thereby substituting to a certain extent for the missing adjustment channels.

2.1.1 The stabilisation function of government budgets

A desirable public finance policy is one that does not cause large changes in market agents' expectations and creates a stable economic environment. Rather, fiscal policy should be anti-cyclical and public budgets should develop continuously, without the need for dramatic fluctuations in either direction in the short term (i.e. not in a "brake-accelerator manner"). It is also necessary to respect the requirements and commitments arising from the Maastricht criteria and the Stability and Growth Pact, which limit to some extent the possibility of using active fiscal policy (deficits) to achieve stabilisation within the business cycle and in the event of various other economic shocks

Fiscal policy affects the economy via automatic stabilisers and discretionary measures. At present, economists' general opinion on the possibility and appropriateness of active discretionary fiscal policy (i.e. policy freely changeable by the government) is largely pessimistic. This is primarily because various types of lags mean that fiscal policy measures planned by the government usually start to take effect just as the given shock stops having an effect. Discretionary fiscal policies can thus often destabilise the economic environment. A typical example is the risk of "pro-cyclical fiscal policy", i.e. policy which attempts to even out the business cycle (which can be viewed as one specific type of economic shock) but in reality – owing to the above lags – intensifies the cycle.

The EU fiscal rules therefore regard the optimal situation as balanced government budget policy within the business cycle and the free operation of built-in automatic stabilisers, which can moderate shocks without the need for ad-hoc measures. In a period of recession, public finances thus stimulate aggregate demand by means of deficits. By contrast, in a period of expansion they should subdue demand by creating fiscal surpluses without infringing the maximum allowed deficits. The above limits on the general government deficit are not absolutely strict, however, since in the event of a really strong economic shock fiscal policy can deviate beyond these limits in the short term.²⁴

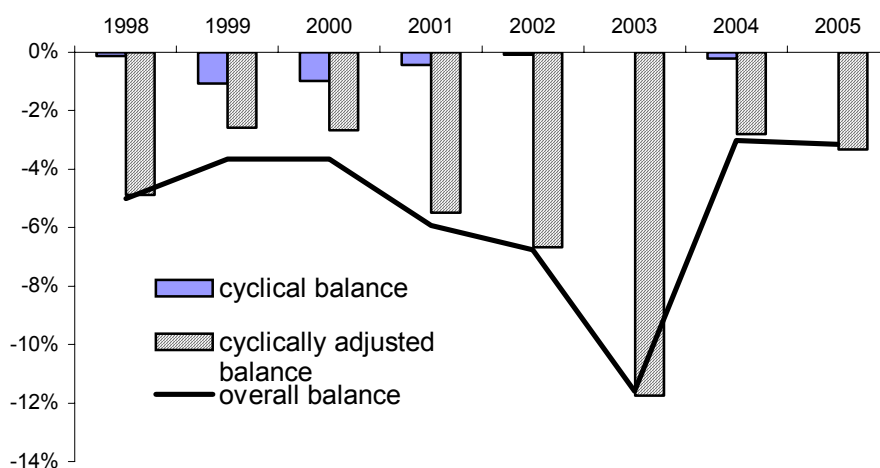
The existing estimates²⁵ of the breakdown of the Czech Republic's government deficit into cyclical and cyclically-adjusted components (Chart 10) suggest that the role of the cyclical component has played rather an insignificant role in the past (in an anti-cyclical direction) and the total deficit was almost identical to the cyclically-adjusted component. In other words, the

²⁴ The historical experience of the countries that have already joined the EMU shows that although most of them were able to carry out efficient fiscal consolidation before accession, after accession they relaxed their public finances and, as a result, their deficits are now fluctuating around the limit of 3% of GDP or even exceeding it in some cases.

²⁵ Based on ESA95 data using the ESCB methodology.

existing Czech general government deficit is primarily due to structural effects and is not cyclical in nature. Removing these non-cyclical influences is an important condition for long-term ability to comply with the Stability and Growth Pact. In the run-up to euro area accession, the Czech Republic's fiscal policy should therefore focus on eliminating these structural deficits.

Chart 10: Decomposition of the fiscal deficit into its cyclical and structural components (% of GDP)



Note: ESCB methodology, data for 2005 - CNB estimate.

2.1.2 Government deficit and debt and the scope for fiscal stabilisation policy²⁶

The ability of fiscal policies to react discretionarily or automatically to unforeseen shocks is determined primarily by the gap between the structural amount of the general government deficit and the reference value of 3% of GDP and the gap between the amount of public debt and the reference value of 60% of GDP. Table 14 below sums up the fiscal consolidation strategies of the selected countries for the period 2004–2008. It provides a comparison of the countries' own estimates as presented in their last Convergence Programmes²⁷ (non-EMU members) and Stability Programmes²⁸ (EMU members) and the estimate of the European Commission.

²⁶ All debt and deficit data given here are based on the ESA 95 methodology.

²⁷ Updated in November 2004

²⁸ The difference between the figures for 2004 in the Convergence Programmes and the European Commission's projection represents the difference in the deficit expected in November 2004 and the deficit measured ex-post within the spring notification in 2005.

Table 14: General government deficit (ESA95), % of GDP

	2004	2005	2006	2007	2008
CZ	5.2 (3.0)	4.7 (4.5) ^a	3.8 (4.0) ^a	3.3	<3.0
AT	1.3 (1.3)	1.9 (2.0)	1.7 (1.7)	0.8	0
GR	6.1 (6.1)	3.7 (4.5)	2.9 (4.4)	2.4	.
PT	. (2.9)	. (4.9)	. (4.7)	1.1	.
HU	4.5 (4.5)	3.8 (3.9)	3.1 (4.1)	2.4	1.8
PL	5.4 (4.8)	3.9 (4.4)	3.2 (3.8)	2.2	.
SK	3.8 (3.3)	3.8 (3.8)	3.9 (4.0)	3	.

Note: Data without parentheses are taken from the latest Convergence Programmes and Stability Programmes; data in parentheses are the European Commission's spring 2005 projections.

a) The CNB currently forecasts the public finance deficit in the Czech Republic at 3.6% of GDP in 2005, 3.0% of GDP in 2006 and 2.8% of GDP in 2007.

Sources: Convergence Programmes, Stability Programmes, European Commission, CNB.

It can be concluded from the table that all countries except Austria should have excessive fiscal deficits in 2005. Although the estimates of the individual governments are mostly more optimistic than those of the European Commission,²⁹ all the countries except for the Czech Republic and Slovakia have committed themselves to reducing their deficits well below 3.0% by 2007 at the latest.

In the last two years, the deviation of the Czech actual deficit from the declared intentions has aided consolidation. In 2004, the government's expectations of a deficit totalling 5.2% of GDP did not materialise. The reality was much better, with the fiscal deficit reaching the reference value of only 3% of GDP. The government has not yet responded sufficiently to the considerable overvaluation of spending plans, an issue already identified in the past. This overvaluation is carried over to future years, which deviates the budget documentation plans from the ex-post reality. This is also suggested by development of the 2005 budget to date. This means that the Czech Republic is probably not yet in a state of readiness for euro adoption regarding the fiscal sphere. The objective should be to bring public budgets soon close to balance or to surplus so that room is created for expected effects associated with demographic developments and sufficient space is preserved for stabilising fiscal policies in difficult times. The implementation of hitherto-postponed fundamental reforms on the expenditure side is the main condition for the long-term sustainability of public budgets (see Section 2.1.3).

Table 15 provides a comparison of the outlook for **gross consolidated debt**; for the sake of comparability, the data are again taken from the latest available Convergence Programmes and Stability Programmes of the individual countries.

²⁹ There is a significant difference between the estimates of Greece and the EC ;this may be due to the problems with Greek government financial statistics.

Table 15: Government debt (ESA95), % of GDP

	2004	2005	2006	2007	2008
CZ	38.6 ^a	38.3 ^b	39.2 ^b	40 ^b	.
AT	64.2	63.6	63.1	61.6	59.1
GR	110.5	108	103.9	99.9	.
PT	.	.	.	.	.
HU	57.3	55.3	53	50.6	48.3
PL	45.9	47.6	48	47.2	.
SK	43	44.2	45.3	45.5	.

Note: a) This figure corresponds to the November 2004 expectations; the outcome of 37.4% was measured ex post.

b) The CNB currently forecasts the Czech Republic's government debt at 35.8% of GDP in 2005, 36.1% of GDP in 2006 and 36.7% of GDP in 2007.

Source: Public Finance in EMU 2005.

In 2004, the Czech Republic's gross consolidated government debt amounted to 37.4% of GDP and was the lowest among the countries included in the comparison, despite a fairly strong increase in debt growth in past years.³⁰ The outlook up to 2006 is still relatively favourable, although the debt/GDP ratio is likely to rise. In relative terms, the growth of government debt due to budget deficits will be dampened by nominal GDP growth. The Czech Republic will thus probably still remain below the levels of all six countries given in Table 16.

Debt service may increase in the future as a result of the rising debt volume and/or the possible increase in interest rates. In 2004, debt service was at about 1.3% of GDP, with debt amounting to 37.4% of GDP and historically low interest rates. In addition to the interest rate effect, a further positive factor was that part of the debt was not financed by the market (debt under the ESA 95 methodology also includes state-provided guarantees, for example). Debt expressed under ESA 95 can therefore be understood as a leading indicator for the level of securities issued by the state in the future. Although debt under ESA95 is at present roughly double the volume of government securities issued (and loans received), given the relatively slow pace of deficit reduction and the anticipated decline in the volume of existing government securities, the total volume of securities issued will gradually grow closer to the level of ESA debt, thereby increasing debt service costs. The consolidation of public finances should also be accelerated in order to prevent further increases in mandatory expenditure connected with debt service.

2.1.3 Long-term sustainability of public finances

The long-term sustainability of public finances is a key prerequisite for their stabilising effect on the economy. Virtually all EU countries are exposed to the problem of population ageing and the expected rise in pension expenditure, which may generate instability in the future. In the Czech Republic and in some other countries, this problem is accompanied by the current imbalance of the government's short-term economic policy, which is not cyclical in nature.

Table 16 shows a long-term extrapolation of government debt (up to 2050) carried out by the European Commission.³¹

³⁰ Public debt has almost tripled in the last eight years and the Czech economy has thus partly lost one of its comparative advantages.

³¹ The assumptions of this extrapolation are given in the methodological section.

Table 16: Gross debt (% of GDP)

	2010	2030	2050
CZ	41	83	306
AT	54	16	-19
GR	96	120	347
PT	.	.	.
HU	46	47	83
PL	45	-8	-69
SK	43	29	52

Source: European Commission.

Although this is a simplified simulation, it points to rising fiscal uncertainty related to demographic changes in the Czech Republic and Greece. By contrast, Poland and Austria may achieve a pension system surplus by 2050. The existing trajectory of ageing-related expenditure in the Czech Republic appears unsustainable in the long term. If essential pension, health and labour market reforms are not carried out, it is likely to lead to a debt level exceeding 80% of GDP in 2030. This conclusion is, moreover, in line with that reached by the Executive Preparatory Commission for Pension Reform in the Czech Republic whose concluding report highlights the need for a thorough reform of the Czech pension system.

2.1.4 Macroeconomic effects of EU fund inflows

Membership of the European Union brings the possibility of using funds from the EU budget. At the same time, each Member State is obliged to contribute to the EU budget. The difference between total revenues from and payments into the EU budget is known as the member state's net position. From the fiscal policy point of view, the achievement of a surplus net position does not mean an automatic improvement in the government budget balance. The reason is that while budget expenditure shows the total amount of payments to the EU budget including co-financing of all projects, the revenue side shows only the funds provided for public sector projects and compensation payments. In general, however, the inflow of funds from the EU is likely to provide a positive stimulus for the economy, particularly in the area of investment activity.

The Czech Republic's net position in 2004 was CZK 6.4 billion. However, this surplus net position was achieved solely thanks to advance payments for economic and social cohesion projects and so-called budget compensation. Current data on the actual draw-down of funds by final recipients are showing that the commencement of EU fund draw-down is very slow in the Czech Republic, partly because of the lengthy process of project selection, as well as the gradual fine-tuning of the institutional environment. This delay in drawing on structural funds has also been noted in some other Member States in the past. However, the Czech Ministry of Finance is assuming a considerable increase in drawing from EU funds (and a rise in the net position) in the next few years, probably most visible between 2007 and 2008. Table 17 shows the total value and structure of realised and expected flows of funds between the European Union and the Czech Republic in 2004–2013.³²

³² The expected financial flows from EU funds are included in the Convergence Programme for the period it covers and are included in Table 14.

Table 17: Expected financial flows arising from the Czech Republic's membership of the EU (CZK billions) and their estimated effect on the economy

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total income										
from EU membership	25.0	37.8	37.5	61.1	119.2	130.5	114.9	126.0	135.1	141.2
Pre-accession instruments	5.0	2.0	0.9							
Agriculture	2.9	14.2	15.2	22.3	27.1	27.6	29.9	33.1	36.3	33.4
Structural operations	6.2	12.1	14.7	37.8	91.3	102.3	84.4	92.3	98.8	107.8
Internal policies	0.3	0.2	0.3	0.4	0.2	0.1				
Compensation	10.6	8.9	5.9							
Other		0.3	0.5	0.6	0.6	0.6	0.6	0.6		
Total payments										
from EU membership	18.6	30.5	34.2	36.2	37.8	38.7	39.1	40.8	42.6	44.4
Net position	6.4	7.3	3.3	24.9	81.4	91.9	75.9	85.2	92.6	96.8
Net position in % of GDP	0.2	0.2	0.1	0.7	2.2	2.3	1.8	1.9	1.9	1.9
Impulse in pp of GDP		0.01	-0.09	0.38	0.91	0.07	-0.32	0.06	0.02	-0.03

Note: 2004 data = reality; payments of own funds to the EU until 2006 are estimated on the basis of the current system; the assumption for the period 2007–2013 is that the EU budget will equal 1% of EU GNP.

Sources: Ministry of Finance of the Czech Republic (document for negotiations with the European Union, July 2005) and CNB.

The inflow of funds from the EU will reach about 3–3.5% of GDP after 2007 and will approach the 4% limit. At the same time, approximately 1% of GDP will be transferred to the EU budget. The expected net annual revenues from EU funds after 2008 will thus be around 2% of GDP, and represent a strong additional economic impulse.³³ There is some risk that this impulse could lead to economic overheating (particularly in sectors linked to infrastructure investment) and to wage and inflationary pressures.

The aim of the following analysis is to examine the impacts on macroeconomic stability of the above-mentioned increase in financial flows from the EU into the Czech economy. This analysis uses the method applied by the CNB's forecasting system to calculate the fiscal impulse (for details see the methodological section). The impulse estimate, which takes into account the Finance Ministry's assumptions on the start of EU fund draw-down, develops in line with the Czech Republic's net position vis-à-vis the EU budget, i.e. is significantly positive in 2008 (see the last line of Table 17). The simulation of the effects of this impulse on the economy has been conducted using the CNB's quarterly forecast model, with the CNB's macroeconomic forecast of July 2005 being the baseline scenario. The analysis concentrates chiefly on the short- and medium-term impact of this impulse on the demand side of the economy; impacts on the supply side of the economy are expected only in the long term.³⁴ It is also assumed that the inflow of funds will not have a direct effect on the exchange rate in terms of conversion of euro into koruna.

The estimate of the impact of the additional impulse from the inflow of EU funds on inflation, the output gap, the koruna-euro exchange rate and the implied trajectory of interest rates was made using the methodology above. Table 18 shows, for each year, the deviations of the individual variables from their values in the baseline scenario of the CNB's July forecast. The simulation assumes that the above scenario for the commencement of EU fund draw-down is generally expected.

³³ European funds must be additional, i.e. they must not substitute national expenditure in the area of economic and social cohesion, which must not fall below the initial level in the future (the additionality principle).

³⁴ Because of uncertainty regarding the volume and structure of investment financed by European funds we do not estimate changes in potential output growth compared to the baseline scenario.

**Table 18: Impact of the additional impulse due to the inflow of funds from the EU
(deviations from the baseline scenario of the CNB's July forecast)**

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Inflation (pp)	0.0	0.0	-0.1	-0.1	0.1	0.1	0.0	0.0	0.0
3M PRIBOR (pp)	0.0	-0.1	-0.2	0.1	0.2	-0.1	-0.1	0.0	0.1
Output gap (pp)	0.0	0.0	0.3	0.6	-0.1	-0.7	-0.2	0.1	0.0
CZK/EUR (CZK)	0.0	0.0	-0.3	-0.6	-0.4	0.0	0.1	0.0	0.0

Source: CNB calculation.

The simulation shows that the significantly positive impulses that the Czech economy will experience in connection with fund inflows from the EU in 2007 and 2008 will increase demand-pull inflationary pressures, which in turn will be reflected in the output gap. As the result of monetary policy reaction, the evolution of inflation in the simulated scenario is almost identical to the baseline scenario over the entire period. The response of interest rates, the exchange rate and inflation is not so intense as to endanger the Czech Republic's ERM II membership and fulfilment of the convergence criteria. The results of the simulation should, however, be taken as tentative and conditional on the given assumptions.

Nonetheless, the results show that monetary policy in coordination with other macroeconomic policies can help the macroeconomic impacts of this inflow to be dealt with using standard instruments, and that the risk of marked movements in interest rates, the exchange rate and inflation arises only if other shocks occur at the same time and in the same direction.

2.2 Wage and price flexibility

One of the prerequisites for successful functioning within a monetary union is the ability of the economy to effectively absorb shocks to which a single monetary policy is unable to react. This ability depends, among other things, on the possibility of real wage and price adjustment. It is this adjustment which acts as an impulse for economic agents to change their behaviour in a direction corresponding to a given shock.

2.2.1 The degree of adjustment of real wage growth to the unemployment rate – the Phillips curve

The response of wages to changes in demand for labour is one of the methods of economic adjustment and a means of preserving a high employment rate. The following analysis assesses the ability of the Czech economy to dampen the impacts of shocks by means of real wage adjustment. The degree of real adjustment of wages to changes in unemployment, i.e. real wage elasticity, is measured using a simple Phillips curve.

Real wage elasticity may be either positive or negative. Negative values suggest that wages are flexible (growth in unemployment suppresses growth in wage costs). By contrast, positive or insignificant values of wage elasticity point to the absence of wage flexibility (a phenomenon known as *hysteresis*). The Phillips curve estimates were made using the least squares method (OLS) on quarterly data for the period 1999–2004. Table 19 sums up the results.³⁵

³⁵ Because of the presence of a structural break in the examined relation for the Czech Republic and some other countries, the results for the whole period under review are not meaningful.

Table 19: Elasticity of wages to the unemployment rate

	1995-1999	2000-2004
CZ	-0.031 ***	-0.008
AT	0.013	-0.017
GR	-0.078 ***	0.171
PT	0.006	-0.020
HU	0.059 *	-0.001
PL	0.020	-0.013
SK	-0.046 **	0.041

Note: ***, ** and * denote significance levels of 1%, 5% and 10% respectively.

Source: CNB calculation.

The results of the analysis suggest that the Czech Republic recorded a decline in wage flexibility (elasticity was down from -0.031 in 1995–1999 to a statistically insignificant value close to zero in 2000–2004). The situation is very similar in Slovakia and Greece (elasticity down from -0.046 and -0.078 respectively to insignificant values); recently, wage elasticity has been insignificant in all the countries surveyed. The estimates suggest that unlike in Hungary, Poland, Austria and Portugal, where wages probably failed to fulfil the adjustment role throughout the period under review, the Czech Republic, Slovakia and Greece saw a decline in elasticity only in recent years.

2.2.2 The degree of adjustment of regional real wages to the regional unemployment rate – the wage curve

A supplementary view of wage elasticity is provided by wage curve estimates, measuring real wage flexibility by the degree of adjustment of regional wage levels to the level of regional unemployment (Nickell, 1997). A low absolute value of the coefficient means that the relationship between regional unemployment and wage levels is weak, and the coefficient can theoretically be expected to take negative values. Blanchflower and Oswald (1994) have found that the coefficient of the logarithm of the regional unemployment rate is negative at around -0.1% in a number of advanced and transition countries.³⁶

Table 20 (Galuščák and Münich, 2005a) for 1994–2001 shows that wage flexibility (coefficient β) is similar to that in other EU countries. Wage flexibility in the period under review fluctuated between -0.08 and -0.13, except for a cyclically conditioned weakening in the 1997–1999 economic recession (columns 5–7 in the table). It thus appears that, in line with the theory of efficiency wages (Shapiro and Stiglitz, 1984), wage formation in the Czech economy is dependent on regional, and especially short-term, unemployment. The statistically insignificant decline in wage flexibility in the period from 1999 may be associated with the marked increase in long-term unemployment in the late 1990s. If long-term unemployment continues to rise, real wage flexibility may decrease.³⁷

³⁶ Blanchflower (2001) estimates the wage curve for 23 Central and Eastern European countries in 1990–1997.

³⁷ Besides long-term unemployment, wage flexibility may be affected by the institutional framework for collective bargaining. For low wages, the factors behind wage flexibility are the minimum wage level and the tax and benefit system (see Section 2.3.3).

Table 20: The wage curve in the Czech Republic

	1994-2001	1994-2001	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001
β	-0.086*** (0.022)	-0.112*** (0.033)	-0.105*** (0.033)	-0.125** (0.043)	-0.052 (0.047)	-0.017 (0.033)	-0.058 (0.060)	-0.114*** (0.040)	-0.081*** (0.032)
$\beta*d_1$		0.095** (0.047)							
$\beta*d_2$		0.029 (0.048)							
N	74	74	73	73	74	74	74	74	74
NT	589	589	146	146	147	148	148	148	148
F statistics	3104***	2327***	3085***	3443***	4551***	1741***	1149***	874***	1166***

Notes: Estimates using the 2SLS method; $d_1=1$ for 1997–1998, $d_2=1$ for 1999–2001; the unemployment rate is instrumented; significant at the 10% (*), 5% (**) and 1% (***) significance levels; robust standard deviations; dummy time variables not included.

Source: Galuščák and München (2005a).

2.2.3 Price flexibility

The ability of the economy to absorb shocks also depends on price flexibility. One of the ways of examining price flexibility is an analysis of inflation persistence (rigidity), i.e. the speed at which inflation returns to equilibrium after a shock. It can be said that high inflation persistence signals price inflexibility.

To analyse inflation persistence we use a method proposed by Marquez (2004). According to this method, the longer it takes actual inflation to return to equilibrium, the more rigid is the inflation. The methodology used puts the resulting values of inflation persistence between 0 and 1. The closer the values are to one, the more rigid is inflation.

Table 21: Inflation persistence

	CZ	PL	SK	HU	PT	AT	GR
Inflation persistence	0.95	0.95	0.93	0.88	0.87	0.83	0.83

Source: CNB calculation.

Table 21 shows the inflation persistence indicators for 1998–2004. The results suggest that inflation exhibits a high level of persistence in the Czech Republic in comparison with the other countries surveyed. This means that inflation in the Czech Republic returns to equilibrium relatively slowly after a shock.

2.3 Labour market flexibility

Labour market adjustment is a significant equilibrating process which, like wage and price adjustment, increases in importance as the efficiency of exchange rate adjustment and monetary policy becomes lower. Changes in employment, as well as wage adjustment (see Section 2.2), may dampen the negative impacts of asymmetric shocks. In addition to labour force flexibility, labour market flexibility is determined to a large extent by institutional factors.

2.3.1 Unemployment and internal labour market flexibility

An insufficiently flexible labour market is generally associated with higher long-term unemployment and significant regional differences in the unemployment rate. While long-term unemployment points to a high structural component in unemployment, regional differences in unemployment may be due to low regional mobility of labour.

Table 22 illustrates the evolution of the **long-term unemployment** rate in the countries surveyed. In the late 1990s, this indicator saw a marked deterioration in the Czech Republic

and in 2004 the long-term unemployment rate was higher than in Hungary, Austria and Portugal. Nonetheless, long-term unemployment in the Czech Republic is still much lower than in Poland and Slovakia. The same conclusions can be drawn from the data on the long-term unemployed as a proportion of total unemployment (Table 23).³⁸ The increase in long-term unemployment is chiefly due to the declining outflows from unemployment (Galuščák, München, 2005b) and is an indicator of worsening labour market flexibility. The lower outflows from unemployment may be connected with tax and benefit levels, which may not sufficiently motivate job-seeking (see Section 2.3.3).

Table 22: Long-term unemployment rate (%)

	1998	1999	2000	2001	2002	2003	2004
CZ	2.0	3.2	4.2	4.2	3.7	3.8	4.2
AT	1.3	1.2	1.0	0.9	1.1	1.2	1.2
GR	5.8	6.5	6.2	5.5	5.3	5.3	5.6
PT	2.2	1.8	1.7	1.5	1.7	2.2	3.0
HU	4.2	3.3	3.0	2.5	2.4	2.4	2.6
PL	4.7	5.8	7.6	9.3	10.8	10.8	10.2
SK	.	8.0	10.2	11.4	12.2	11.4	11.7

Note: Share of persons unemployed for 12 months or more under ILO methodology in the labour force.

Source: Eurostat.

Table 23: Share of the long-term unemployed (%)

	1998	1999	2000	2001	2002	2003	2004
CZ	32	37	50	53	51	49	51
AT	.	.	25	.	30	26	29
GR	55	55	57	53	53	56	55
PT	46	42	44	39	36	33	43
HU	51	48	48	45	45	41	45
PL	48	.	45	50	54	55	54
SK	53	48	55	58	65	66	64

Note: Share of the long-term unemployed (12 months or more) in all the unemployed under ILO methodology. Data for the second quarter of each year.

Source: Eurostat.

Regional differences in unemployment can be quantified using a coefficient of variation for areas (NUTS 2) and regions (NUTS 3). Table 24 shows that the regional differences in the unemployment rate in the Czech Republic are high compared to other countries, and increased in 1999–2002. The modest fall in this indicator in 2003 may be cyclically motivated. The

³⁸ According to the International Labour Organisation (ILO) definition, a person is unemployed if he/she is without work, actively seeking work and willing to take up employment. In the long-term unemployed category the intensity of job seeking decreases, which may cause total and long-term unemployment to be underestimated. For this reason, a broader definition has been introduced in the literature (so-called “weak unemployment”), which comprises working-age persons who do not work and at the same time have no serious reason not to seek a job. An analysis of the Labour Force Survey data shows that long-term unemployment is not underestimated in the Czech Republic. Weak long-term unemployment is roughly flat, with a modest decline during the 1997–1999 recession (Jurajda and München, 2003).

long-lasting high regional differences in unemployment in the Czech Republic point to low labour market flexibility in the area of population mobility.³⁹

Table 24: Coefficient of variation of the unemployment rate

	NUTS 2 regions					NUTS 3 regions				
	1999	2000	2001	2002	2003	1999	2000	2001	2002	2003
CZ	33	39	39	44	42	39	44	44	48	45
AT	29	33	36	43	43	31	36	39	44	44
GR	14	15	16	16	16	14	15	16	16	16
PT	11	30	29	31	30	11	30	29	31	30
HU	35	32	30	32	33	.	36	34	36	37
PL	23	19	18	17	16	36	38	36	27	26
SK	27	27	24	23	27	31	29	28	31	36

Note: Ratio of the standard deviation weighted by region size and the average unemployment rate.

Labour Force Survey data. The coefficient of variation depends on the degree of disaggregation.

Source: Eurostat.

Structural unemployment is assessed by means of structural unemployment indices (Table 25), expressing the regional mismatch between the number of unemployed and the number of vacancies. The results show that the regional differences in the unemployment rate are to a large extent due to the structural gap between the supply of and demand for labour. The number of unemployed persons in the Czech Republic would have been 39.4% lower in 2004 if the unemployed had moved to regions with vacancies or undergone retraining. Structural unemployment has increased since 1999, and is comparable with Slovakia. It is also much higher than in Austria.

Table 25: Structural unemployment

	index	1999	2000	2001	2002	2003	2004
CZ	I1	33.9	35.2	35.9	34.1	35.5	39.4
	I2	1.8	1.9	1.9	1.9	1.9	2.0
AT	I1	28.2	27.2	31.2	32.6	30.7	28.2
	I2	1.1	1.0	1.3	1.2	1.3	1.2
SK	I1	41.5	40.7	38.6	40.5	39.7	37.4
	I2	3.5	3.0	3.5	3.6	3.3	3.0

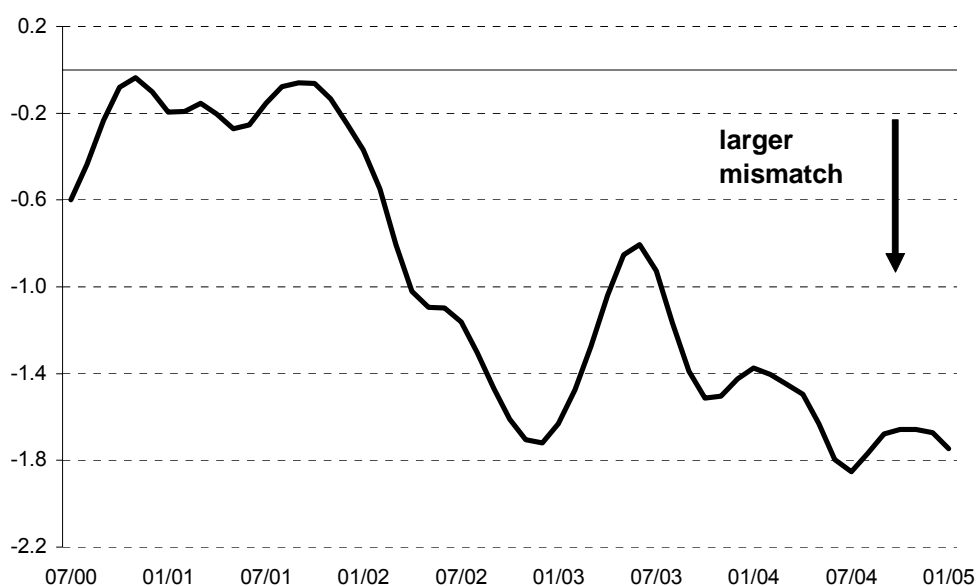
Note: As of year-end; % of the unemployed (I1), % of the labour force (I2).

Sources: Labour offices, own calculations.

Changes in structural unemployment can be examined using the aggregate fixed effects of the matching function. The evolution of this (see Chart 11) does not indicate any improvement in the mismatch between vacancies and the unemployed during 2004 and 2005, even after the new Employment Act came into force in October 2004. The constantly high regional mismatch between the number of unemployed persons and the number of vacancies on offer, visible from structural unemployment indices and estimates of the matching function, indicates a lower labour market flexibility with regard to population mobility.

³⁹ Regional differences in the unemployment rate reflect differences in the labour force broken down by age, gender, education and skills. According to the OECD (2000), a high proportion (58%) of the regional variation in unemployment in 1998 was explained by differences in the education of the workforce (the proportion was 50% in Hungary and lower in the other countries under review). The initial sector specialisation of the individual regions and the influence of housing policy (rent regulation, support for private ownership, OECD 2004c, OECD 2005a) also have some effect on regional differences in unemployment.

Chart 11: Aggregate fixed effects of the matching function



Note: Seasonally adjusted fixed effects for the period from January 2000 to July 2005. Each point on the horizontal axis represents the middle of a 13-month estimate period for the matching function. For example, the point marked 07/04 represents the average of the fixed effects for January 2004 – January 2005.

Sources: Own calculation, methodology taken from Galuščák and Münich (2005b).

The large regional differences in unemployment in the Czech Republic may be due to low regional mobility. Although **internal mobility** (Table 26) in the Czech Republic is greater than in Slovakia, it is lower than in Austria. In the Czech Republic this indicator has remained almost unchanged, and has not changed significantly since accession to the EU.

Table 26: Internal migration

	1999	2000	2001	2002	2003	2004
CZ	19.6	19.4	20.0	21.9	20.7	21.2
AT	32.6	31.9	34.4	.	.	.
SK	14.6	14.2	14.8	16.7	15.7	.

Note: Volume of internal migration per 1,000 citizens. The time series is affected by the censuses that took place in these countries in 2001.

Sources: Statistical yearbooks, own calculations.

2.3.2 International labour mobility

2.3.2.1 Migration abroad

According to the theory of optimum currency areas, **international mobility** may be important for the economy's ability to absorb asymmetric shocks, in particular those of a long-term nature, through changes in regional relative wages and by influencing price competitiveness.

Not only do the inhabitants of the Czech Republic not move much within the Czech Republic, they do not move abroad much either. Only 0.49% of the Czech population lived in the

selected EU countries after 2000, compared to 0.58%, 0.75% and 0.99% for the Slovaks, Hungarians and Poles respectively (Alvarez-Plata, Brucker and Siliverstovs, 2003).⁴⁰

Data on registered international mobility show that although the number of emigrants from the Czech Republic increased after 2001, it did not see a further significant rise after EU accession in 2004 (Table 27). Data on international mobility are not fully internationally comparable owing to different data collection methodologies. Nevertheless, the number of emigrants from the Czech Republic appears to be lower than from Austria.⁴¹ Compared to Austria, the Czech Republic also records a lower number of immigrants. While the Czech Republic recorded fewer immigrants than Hungary in 2001, the relaxation of administrative barriers to immigration during 2001 was reflected in a marked increase in immigrants. In 2002, almost three times more persons per 10,000 of the population moved to the Czech Republic than to Hungary. However, the data on registered international mobility provide only a limited picture of it. Moreover, the shortness of the time series and the effect of EU accession do not allow an analysis of whether the international mobility of the Czech population responds to economic shocks.

Table 27: International migration (number of persons per 10,000 citizens)

	Source	2001	2002	2003	2004
Immigrants					
CZ	OECD	11	43	.	.
	CZSO	13	44	59	52
AT	OECD	93	.	.	.
	Statistical yearbook	112	.	.	.
HU	OECD	20	15	.	.
Emigrants					
CZ	OECD	20	30	.	.
	CZSO	21	32	34	34
AT	OECD	63	.	.	.
	Statistical yearbook	91	.	.	.
HU	OECD	2	2	.	.

Notes:

Czech Republic: residents or holders of long-term visas of over 90 days (OECD: only such persons resident for more than 1 year, Statistical yearbook: all persons with visas of over 90 days). In mid-2001, the strict administrative requirements for immigrants valid since 2000 were relaxed.

Hungary: persons resident for more than 1 year who are holders of long-term residence permits.

Data on emigrants do not include persons whose residence permits have expired.

Austria: holders of residence permits who intend to stay for at least 6 weeks (Statistical yearbook: all registered persons).

Sources: OECD (2005c), national statistical offices.

⁴⁰ This involves persons from the above-mentioned countries dwelling in selected EU countries as follows: 2001 Austria, Finland, Germany, Sweden; 2002 Italy, Netherlands; 2003 Denmark, Luxembourg.

⁴¹ Whereas the CZSO monitors persons with permanent residence or holders of long-term visas of over 90 days, Austria monitors persons who are residence permit holders or who wish to stay in the country for at least six weeks, i.e. 42 days. Data on emigrants from Hungary do not cover persons whose residency permit has expired. The best comparable data in Table 27 are those on immigrants to the Czech Republic and to Hungary under OECD methodology.

Sociological surveys confirm that Czechs, Hungarians and Slovaks have on average a smaller **inclination to move abroad** than Poles (Table 28). On average, 0.6% of the population in the Czech Republic, Hungary and Slovakia in 2002 firmly intended to emigrate from the country, whereas the figure for Poland was 1.0%. Overall, 3.1% of the population in the ten accession countries in 2002 indicated a general inclination to emigrate, with 0.8% of the population firmly intending to emigrate. Most studies estimate the long-term migration potential from the ten new Member States at between 2% and 4% of the population.⁴² A simulation of the impact of transition periods shows that the restricted free movement of persons in the old EU countries is likely to have only a very small impact on migration in the initial period after EU enlargement in 2004 (Alvarez-Plata, Brucker and Siliverstovs, 2003). Typical potential migrants are young individuals with higher education (Krieger, 2004). According to data on registered mobility as well as sociological surveys, international mobility in the Czech Republic seems to be similar to Hungary and lower than that in Austria. Data on attitudes to international mobility suggest a high migration potential in Poland.

Table 28: Attitudes to international mobility

	General inclination	Basic intention	Firm intention
PL	3.7	1.6	1.0
HU, CZ, SK	2.4	0.8	0.6
10 new Member States	3.1	1.3	0.8

Note: 2002 data in % of the population.

The results for HU, CZ and SK were assessed together in order to make the sample representative.

Source: Eurobarometer 2002, taken from Krieger (2004).

2.3.2.2 Administrative restrictions on international labour mobility

The free movement of persons, including workers, is one of the four fundamental economic freedoms enshrined in the EU Treaty (Articles 39 to 42). However, during the negotiations on EU enlargement on 1 May 2004, most of the “old” Member States adopted **transitional restrictions on the free movement of workers from the new countries**. These transitional restrictions are stipulated in Annex V to the Act of Accession. Their adoption gives the new Member States the right to apply reciprocal measures. This right has not yet been exercised.⁴³

Of the twelve euro area countries, only Ireland opened its labour market to workers from the new Member States as of 1 May 2004 (EU enlargement). Other euro area countries apply a two-year transition period to workers from the new Member States, during which a work permit is necessary to employ them (specific circumstances relating to individual countries are provided in detail in Table 29). If serious labour market disturbances occur, these specific measures may be applied until the end of the seven-year period after accession. As of 1 May 2011, all EU Member States must introduce free movement of labour for all citizens of the countries which acceded to the EU on 1 May 2004.

⁴² Alvarez-Plata, Brucker and Siliverstovs (2003).

⁴³ The position of the Czech government is included in its resolution No. 13 of 7 January 2004.

Table 29: Administrative barriers for the new members of the European Union

Country:	Current situation	Outlook
Belgium	<i>A two-year transition period is applied</i> to workers from the new Member States surveyed. Workers from the new Member States surveyed may receive a one-year work permit. The work permit is applied for by the employer.	It is currently likely that the two-year transition period <i>will not be extended</i> or that the conditions will be moderated.
Czech Republic	<i>No restrictions are applied</i> to workers from the countries surveyed or other euro area countries.	
Finland	<i>A two-year transition period is applied</i> to workers from the new Member States surveyed.	It is currently likely that the two-year transition period <i>will not be extended</i> or that the conditions will be moderated.
France	<i>A two-year transition period is applied</i> to workers from the Czech Republic and Slovakia.	All the evidence suggests that the two-year transition period <i>will be extended</i> .
Ireland	<i>No restrictions are applied</i> to workers from the surveyed countries or other euro area countries. However, job applicants from the new Member States are not entitled to social benefits.	
Italy	<i>A two-year transition period is applied</i> to workers from the new Member States surveyed. A prime ministerial decree stipulated that 79,500 citizens of the new Member States may enter the Italian labour market in 2005. A number of professions are exempt from this quota.	All the evidence suggests that Italy <i>will not extend</i> the two-year transition period.
Luxembourg	<i>A two-year transition period is applied</i> to workers from the new Member States surveyed.	All the evidence suggests that the two-year transition period is likely to be <i>extended</i> by another 3 years.
Hungary	<i>No restrictions are applied</i> to workers from the countries surveyed or other euro area countries.	
Germany	<i>A two-year transition period is applied</i> to workers from the new Member States surveyed. The situation of job applicants from the Czech Republic and Slovakia is facilitated by the bilateral agreements which have been concluded. These include an agreement on procedures relating to employment in Germany for a period of up to three months during one year, an agreement on mutual employment of Czech, Slovak and German citizens for the purpose of extending their professional and language skills, and an agreement on the secondment of Czech and Slovak workers from companies with registered offices in the Czech and Slovak Republics on the basis of work performance contracts.	Given high unemployment and the overall economic situation, it is highly likely that the two-year transition period <i>will be extended</i> .
Netherlands	<i>A two-year transition period is applied</i> to workers from the new Member States surveyed. The work permit is applied for by the employer. The issuance of work permits is more benevolent in “non-sensitive” sectors.	Further development is <i>unclear</i> .

Table 29: Administrative barriers for the new members of the European Union (continued)

Country:	Current situation	Outlook
Poland	<i>No restrictions are applied</i> to workers from the countries surveyed or other euro area countries.	
Portugal	<i>A two-year transition period is applied</i> to workers from the new Member States surveyed. A quota of 6,500 workers from the new Member States has been set. For third-country nationals (including the new Member States) the performance of professional activities in Portugal is subject to quotas for the given sphere of work, which are set by the Portuguese government every two years. A work visa is granted for a period of one year, with the option of extension to a maximum of three years.	Portugal has declared that the two-year period will <i>not be extended</i> if most EU Member States take a similar decision.
Austria	<i>A two-year transition period is applied</i> to workers from the new Member States surveyed. A quota known as the “Bundeshöchstzahl” is set in Austria, stipulating that percentage of foreigners employed may not exceed 8% of the entire Austrian labour force. The individual federal states then set quotas known as “Landeshöchstzahlen”	The current situation on the Austrian labour market and the elections scheduled for 2006 suggest that the two-year transition period will most likely be <i>extended</i> at least until the end of April 2009.
Greece	<i>A two-year transition period is applied</i> to workers from the new Member States surveyed.	Further development is <i>unclear</i> .
Slovakia	<i>No restrictions are applied</i> to workers from the countries surveyed or other euro area countries.	
Spain	<i>A two-year transition period is applied</i> to workers from the new Member States surveyed.	The extension of the two-year period is generally <i>not expected</i> ; however, the decisions that are taken by France and Portugal will play an important role

2.3.3 Institutional environment

The institutional environment has a fundamental influence on the labour market. Economic adjustment may be limited by the relationship between wages and labour productivity, strict employment protection measures, administrative barriers to entrepreneurship, or a social system which fails to sufficiently motivate unemployed people to seek jobs.

Trade unions and collective bargaining

In the economy, wages represent price signals which influence the allocation of production resources. Wage-setting at the company level with regard to corporate labour productivity is an important prerequisite for wage flexibility. If industry-level collective bargaining plays a significant role, it may weaken the link to labour productivity and lead to a higher wage level and higher unemployment (Calmfors and Driffill, 1988).⁴⁴ If industry-level bargaining predominates, it may result in lower wage flexibility. The negative impact of industry-level

⁴⁴ While some studies confirm this hypothesis, Flanagan (1999) argues that in the case of an open economy, a high degree of economic integration or a large non-trade union organised sector, the given macroeconomic variables can be more or less independent of the collective bargaining structure.

bargaining can be intensified by regulations extending the binding effect of collective pay agreements beyond the contractual parties (Brandt, Burniaux and Duval, 2005).

Trade union density is relatively low in the Czech Republic, as in most of the other countries included in the comparison, with a sharp decline recorded in the 1990s (Table 30). Collective bargaining coverage is high in Austria and Portugal, while it is lowest in the Czech Republic. The effect of collective agreements on wage setting was relatively low in the Czech Republic in 2000 in comparison with other countries. In the Czech Republic, collective bargaining takes place mainly at the company level, as in Hungary and Poland. The coordination of bargaining in the Czech Republic, Hungary and Poland is low. Wage flexibility in the Czech Republic is not fundamentally limited by wage setting except in the non-business sector, where wages are set at the central level with a weak link to labour productivity.

In July 2005, an amendment to the law on collective bargaining came into force, introducing new regulations on the extension of the binding effect of higher-level collective agreements to other employers. This greater significance for industry-level collective bargaining might imply a weaker relationship between wages and labour productivity growth at the corporate level, with a negative impact on wage flexibility and employment. However, the figures shown in Table 30 relate to 2000, when the extension of the binding effect of higher-level collective agreements was also in force.⁴⁵

Table 30: Trade unions and collective bargaining

	Trade union density (%)		Collective bargaining coverage (%) ^c		Centralisation of bargaining ^d		Coordination of bargaining ^e	
	1990 ^a	2000 ^b	1990	2000	1990-1994	1995-2000	1990-1994	1995-2000
CZ	46	27		25+	1	1	1	1
AT	47	37	95+	95+	3	3	4	4
GR	32	27						
PT	32	24	70+	80+	4	4	4	4
HU	63	20		30+	1	1	1	1
PL	33	15		40+	1	1	1	1
SK	57	36		50+	2	2	2	2

- Notes:
- a) 1995 data for the Czech Republic, Hungary, Poland and Slovakia.
 - b) 2001 data for the Czech Republic, Hungary and Poland, 2002 data for Slovakia.
 - c) + denotes the lower boundary of the estimate.
 - d) 1: Company level predominant.
2: Combination of industry and company level, with company bargains predominant.
3: Industry level predominant.
4: Predominantly industrial bargaining, but also recurrent central level agreements.
5: Central level agreements of overriding importance.
 - e) Degree of coordination in wage bargaining. An index of 1 to 5; higher values mean higher degrees of bargaining coordination.

Source: OECD (2004a).

Minimum wage

The minimum wage reduces wage differentiation and wage flexibility at the low end of the wage scale, and consequently lowers demand for less-skilled labour and for graduates. This is

⁴⁵ The reason for the amendment was that the Constitutional Court had repealed, with effect from April 2004, the original provision on the extension of higher-level collective agreements. The new legislation introduces a definition of all employers in the given sector to which the binding effect of collective agreements should be extended.

likely to increase the total and long-term unemployment of people with low skill levels and unemployment among graduates and school-leavers (OECD, 1998; Gregg, 2000).

In the Czech Republic, the **minimum wage** as a percentage of the average wage was relatively low in the 1990s. This indicator has risen continuously since 1999, reaching 38.8% in 2004 (Table 31). By international comparison, the minimum wage as a proportion of the average wage in the Czech Republic is roughly the same as in the countries included in the survey. Compared to the Czech Republic, Hungary, Portugal and probably even Poland have a greater share of employees on the minimum wage (Table 32). The effect of the minimum wage on the flexibility of low wages and creation of low-skilled jobs is probably lower in the Czech Republic than in Hungary, Portugal and Poland.⁴⁶

Table 31: Minimum wage

	2002	2003	2004
CZ	34.0	35.8	38.8
PT	43.0	40.7	.
HU	42.1	38.6	40.7
PL	33.0	33.9	.
SK	32.4	34.0	34.1

Note: Monthly minimum wage as a percentage of the average wage in industry and services (excluding public administration).

Source: Eurostat.

Table 32: Share of employees earning the minimum wage (%)

	2000	2001	2002	2003	2004
CZ	1.6	1.7	2.0	2.0	2.0
PT	6.2	4	4.0	5.7	.
HU	3.9	8.4	11.4	8.1	8.0
PL	.	2.9	4.0	.	.
SK	.	0.2	0.1	0.4	1.9

Note: Percentage of full-time employees earning the minimum wage.

Source: Eurostat.

The minimum wage's negative impact on wage flexibility can be more pronounced in some sectors and professions. The minimum wage as a percentage of the wage in the first decile of wage distribution is high in low-skilled professions (Table 33). This indicates that for 10% of persons employed in the services and retail sector and in elementary occupations, the minimum wage as a proportion of their earnings in 2003 was higher than 80%. This increased further in 2004.⁴⁷

⁴⁶ As shown in Table 32, 2.0% of employees in the Czech Republic, i.e. 79,000 people, received the minimum wage in 2004. If these jobs were endangered, the average registered unemployment rate would increase from 10.2% to 11.7% under the original methodology of the Ministry of Labour and Social Affairs.

⁴⁷ In 2005, the minimum wage stands at CZK 7,185. The minimum wage as a share of the average wage is thus around 0.4 percentage points higher than in 2004 (Table 31). The implementation of the proposal of the Ministry of Labour and Social Affairs to increase the minimum wage in 2006 by CZK 950 to CZK 8,135 would mean a very significant rise in the minimum wage as a share of the average wage (another 2.6 percentage points). This would place the Czech Republic first among the countries included in the comparison. The impact on flexibility of low wages and job creation would be negative. While the minimum wage would rise by 13.2% year on year, the average wage is due to increase by 6.0% in 2006 according to the CNB's forecast (October 2005).

Table 33: Minimum wage and gross monthly wage by profession (%)

KZAM-R main employment class	Minimum wage / 1st decile	
	2003	2004
Total for the Czech Republic – business sector	63,9	66,1
Services and shop workers	87,6	89,2
Skilled agricultural and fishery workers	74,4	74,3
Elementary occupations	84,3	86,3

Note: The table only lists those professions with a ratio to the median wage of over 50% in 2004.

Sources: Average Earnings Information System (Ministry of Labour and Social Affairs), own calculation.

Employment protection

Strict **conditions for the recruitment and dismissal of employees** reduce flows on the labour market and increase long-term unemployment (OECD, 2004a). The high cost of dismissing individual employees (in particular during the period shortly after conclusion of the employment contract, once the probationary period has expired) result in lower job creation, especially for groups where a high rate of fluctuation on the labour market is to be expected (women, graduates and school-leavers). The combination of the high costs of dismissing permanent employees and inadequate regulations for temporary work strengthens the position of permanent employees against temporary workers, whose chance of gaining permanent employment is thus lower.

According to OECD data, the conditions for the dismissal of individual employees were stricter in the Czech Republic in 2003 than in the countries included in the comparison, with the exception of Portugal and Slovakia (Table 34). In the Czech Republic, the cost of dismissing employees is relatively high, especially with regard to short-term contracts (Chart 12).⁴⁸ By international comparison, job creation and long-term unemployment in the Czech Republic are negatively affected by the high cost of dismissing employees.

Table 34: Employment protection indices

	Permanent employment ^a		Temporary employment ^b		Collective dismissals ^c		Overall index ^d	
	late 1990s	2003	late 1990s	2003	late 1990s	2003	late 1990s	2003
CZ	3.3	3.3	0.5	0.5	2.1	2.1	1.9	1.9
AT	2.9	2.4	1.5	1.5	3.3	3.3	2.4	2.2
GR	2.3	2.4	4.8	3.3	3.3	3.3	3.5	2.9
PT	4.3	4.3	3	2.8	3.6	3.6	3.7	3.5
HU	1.9	1.9	0.6	1.1	2.9	2.9	1.5	1.7
PL	2.2	2.2	0.8	1.3	4.1	4.1	1.9	2.1
SK	3.6	3.5	1.1	0.4	3.3	2.5	2.5	2.0

Note: The indices take values ranging from 1 to 6, a higher value meaning greater employment protection.

a) protection against individual dismissal

b) fixed-term contracts, temporary work agencies

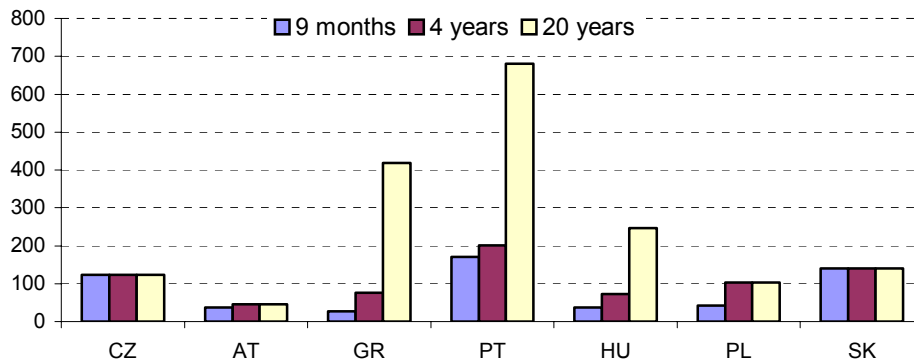
c) relative to individual dismissals

d) weighted average of indicators of permanent employment, temporary employment and collective dismissals.

Source: OECD (2004a).

⁴⁸ The 2004 labour law reform in Slovakia reduced the costs of dismissing employees. This is likely to manifest itself in a more pronounced decline in the index shown in Table 34. A slight decline in the index is likely in Portugal after 2003 in connection with the reform of its labour law.

Chart 12: Expenses related to individual termination of an open-ended contract by employment contract duration (number of days for which wage is paid)



Note: Sum of data for days of notice, severance pay and delay to start of notice.
 2003 data. CZ, SK: average for dismissals for redundancy and other reasons;
 AT,GR: average for persons with higher and lower skills.
 Sources: OECD, own calculation.

A very low index for the protection of temporary employment combined with high protection of permanent employment in the Czech Republic (Table 34) suggests the risk of labour market duality, where temporary workers have only a small chance of gaining permanent employment. In 2004, the Czech Republic introduced regulations for temporary employment which slightly increased the temporary employment index, from 0.5 to 0.8.⁴⁹ The negative impact of employment protection on job creation and long-term unemployment, which is evident in the Czech Republic from the permanent employment protection index, remains higher than in the other countries included in the comparison except Portugal.⁵⁰

Administrative barriers to entrepreneurship

The high costs and barriers involved in starting up businesses and the complicated administrative regulations governing business reduce competitive pressures on product markets. In the long run, this has a negative impact on job creation and employment (Nicoletti and Scarpetta, 2004).

The OECD index is used for the international comparison of the above-mentioned administrative barriers to entrepreneurship (Conway, Janod and Nicoletti, 2005). In 2003, administrative barriers to entrepreneurship were higher in the Czech Republic than in the countries included in the comparison except Poland (Table 35, last column). The overall index in the Czech Republic remained almost unchanged against 1998, while in other countries it fell. By international comparison, the regulatory and administrative conditions in the Czech Republic are very difficult to understand, in particular those relating to licences and permits.

⁴⁹ Since October 2004, the maximum cumulative period for which fixed-term contracts may be signed with a single employer is two years. Similarly, the maximum period of employment that can be mediated by a labour agency with a single employer is 12 months.

⁵⁰ This is not likely to be changed by the amended Labour Code that has been drafted by the Ministry of Labour and Social Affairs. The draft leaves the conditions for the dismissal of employees almost unchanged. The notice period for redundancy is reduced from three to two months, while severance payment is increased from two to three monthly salaries. The draft does not even grade these conditions according to the duration of employment. The analysis of this and other factors in the new draft Labour Code shows that the permanent employment protection index will decline only slightly, from the current 3.3 to 3.2. The temporary employment index and the index of conditions for collective dismissals will be the same as in 2004 and 2005.

Table 35: Indices of administrative barriers to entrepreneurship

	Administrative burdens on startups ^a		Regulatory and administrative opacity ^b		Barriers to competition ^c		Barriers to entrepreneurship, total	
	1998	2003	1998	2003	1998	2003	1998	2003
CZ	2,2	2,3	2,7	2,3	0,6	0,5	2,0	1,9
AT	2,6	2,8	0,6	0,4	1	0,8	1,7	1,6
GR	3	2,6	1,7	0,6	0,6	0,5	2,1	1,6
PT	2,1	1,7	1,8	1,2	1	0,5	1,8	1,3
HU	2,4	2,3	0,4	0,4	1,5	1,1	1,6	1,4
PL	3,8	3,7	2,0	1,5	1,6	0,3	2,8	2,3
SK		1,9		0,7		0,3		1,2

Note: The indices take values ranging from 1 to 6, a higher value meaning greater barriers.

The overall index is a weighted average of indicators in 7 basic areas grouped in the 3 areas given in the table:

- a) Administrative burdens for corporations, administrative burdens for sole proprietors, and sector specific administrative burdens.
- b) Licences and permits system, and communication and simplification of rules and procedures.
- c) Legal barriers to entry into the industry and antitrust exemptions for public enterprises.

Source: Conway, Janod and Nicolleti (2005).

An amended Commercial Code took effect in July 2005, simplifying and accelerating corporate registration. This makes it easier to establish businesses and is likely to decrease the index concerning startup costs. However, there has been no improvement as regards the clarity of the regulatory and administrative conditions for business. The index, which is by international comparison high in the Czech Republic, has therefore not fallen. By international comparison, the restrictions on entrepreneurship have a negative impact on labour market flexibility with regard to job creation.

Labour taxation

Labour taxation directly affects labour costs and job creation, in particular those for people with low skills and for specific groups (women, school-leavers, older people). Moreover, high labour taxation increases the proportion of entrepreneurs in the labour force and the size of the grey economy (Brandt, Burniaux and Duval, 2005). The taxation of people with high incomes is important in conditions of international competition, as persons with high skills and high incomes have a greater propensity to migrate.

Overall labour taxation in the Czech Republic is comparable to that of other countries except Greece and Portugal, where it is considerably lower (Table 36). In 2004, the Czech Republic, Poland and Hungary had the highest taxation of people with low income. The impact of labour taxation on job creation and long-term unemployment is broadly the same as in neighbouring countries. However, it is greater than in Greece and Portugal.⁵¹

⁵¹ The Czech parliament is debating an amendment to the law on personal income tax, prepared by the Ministry of Finance. The amendment slightly eases the tax burden on low-income groups.

Table 36: Overall labour taxation

	100% of average wage				67% of average wage			
	1999 ^a	2003	2004	Change ^b	1999	2003	2004	Change ^b
CZ	42,7	43,2	43,6	0,2	41,4	42,0	41,9	0,1
AT	45,9	45,0	44,9	-0,1	41,6	40,2	38,6	-0,4
GR	35,7	34,4	34,9	-0,3	34,3	34,3	34,4	0,0
PT	33,4	32,6	32,6	-0,2	30,2	29,6	29,6	-0,2
HU	50,7	45,6	45,8	-1,0	48,2	41,0	41,5	-1,4
PL	43,0	42,9	43,1	0,0	41,9	41,6	41,9	0,0
SK	41,2	41,4	42,0	0,1	42,3	40,3	38,8	-0,4

Note: Income tax and social security contributions paid by employees and employers as a percentage of total labour costs. Data for employees (individuals without children) earning 100% and 67% of the average wage in manufacturing.

a) 2000 data for Slovakia.

b) Average annual change in percentage points for 1999–2004.

Sources: OECD, own calculation.

Work-incentive indicators

Marginal effective tax rates of the unemployed (METRs) measure the extent to which the combination of taxes and benefits affects the financial gain from work and thereby the motivation of unemployed or inactive persons to enter employment (or, in the case of marginal effective tax rates on employed persons, to increase the number of hours worked). Table 37 compares marginal effective tax rates for short-term and long-term unemployment and for two kinds of households.

Table 37: Marginal effective tax rates of the unemployed

	Initial phase of unemployment ^a				Long-term unemployment ^b			
	Individuals with no children		Family (2 children) ^c		Individuals with no children		Family (2 children) ^c	
	2002	2003	2002	2003	2002	2003	2002	2003
CZ	61	61	56	57	61	59	86	84
AT	65	65	77	77	72	75	99	99
GR	70	77	77	87	16	16	16	16
PT	87	87	85	96	42	43	55	69
HU	70	64	69	68	49	43	38	38
PL	75	83	64	73	61	62	87	88
SK	75	73	74	74	90	72	125	125

Note: Percentages of total income of persons with an initial wage of 67% of the average wage in manufacturing.

a) Unemployed persons entitled to unemployment benefits but not to social assistance benefits.

b) Unemployed persons not entitled to unemployment benefits.

c) Other adult not economically active; children of 4 and 6 years of age.

Source: OECD tax benefit models.

Data on short-term unemployment show that the incentive to accept employment is higher in the Czech Republic than in the other countries surveyed. In particular, short-term unemployed people in Greece and Portugal are less motivated to seek employment than those in the Czech Republic. In the Czech Republic, the incentive to seek employment is undermined more for the long-term unemployed, mainly low-income families with children. METRs slightly declined in this category, from 86% in 2002 to a still-high 84% in 2003. The tax and benefit system contributes to the inactivity of such people and helps to push them into the grey

economy.⁵² Poland and Austria face a similar problem.⁵³ In the Czech Republic, benefits for long-term unemployed people are based on the minimum subsistence amount, which affects the labour supply for people with low skills.⁵⁴ The conditions for qualifying for unemployment benefit and registration at labour offices were, however, tightened in October 2004 in connection with the new Act on Employment. This could partly improve the incentive to seek employment.

⁵² An analysis of the distribution of the unemployment and inactivity traps in households in the Czech Republic shows that in 2002 the incentive to seek employment was low for around 30% of unemployed people entitled to unemployment benefits and for 80% of long-term unemployed and inactive people (Galuščák and Pavel, 2005).

⁵³ Marginal effective tax rates of the unemployed probably changed following changes in the Slovak labour market in 2004.

⁵⁴ The Czech parliament is debating a bill on the minimum subsistence amount and a bill on poverty assistance drafted by the Ministry of Labour and Social Affairs. Under these bills, an unemployed person who actively seeks employment will be entitled to a higher total volume of benefits than at present. As regards the impacts on employment and unemployment, what will be important is the assessment of an applicant's activity and cooperation with labour offices in seeking employment and the penalties applied in the event of a lack of cooperation. However, the proposal as drawn up by the Ministry of Labour and Social Affairs suggests that such penalties probably will not increase the incentive to seek employment in a significant way. The method in which activity and cooperation is assessed may be problematic, too.

The Czech parliament is currently discussing a bill on personal income tax drafted by the Czech Finance Ministry, which eases the tax burden on low earners. This change will not significantly affect the marginal effective tax rates shown in Table 37. These rates are mainly affected by insurance premiums and entitlement to social benefits (Carone and Salomäki, 2005).

2.4 Flexibility and shock-absorbing capacity of the financial sector

The capacity of the financial sector to absorb shocks depends, among other things, on its performance and stability. While a profitable and sound financial sector may be effective in helping to eliminate the impact of economic shocks, unsound financial institutions may increase the unfavourable effects of negative shocks. An unstable sector may also represent a source of asymmetric shocks. The following analyses will concentrate on the banking sector, which has the greatest weight in the financial sector in the countries surveyed.

Recent years have seen state-supported clean-ups of privatised banks' balance sheets and qualitative improvements in banking credit portfolios. The Czech banking sector showed **better-quality loan portfolios** than Poland, Slovakia and Greece at the end of 2004 (see Table 38). The coverage of the weighted classification of loan receivables by reserves and provisions in line with prudential rules is above-average in the Czech Republic. Compared to other European countries, the Czech banking sector has lower, but nevertheless standard provisioning for non-performing loans (54% in the Czech Republic in 2004; in the euro area the weighted average was 73%).

Table 38: Non-performing loans/total loans in the banking sector (%)

	1996	1997	1998	1999	2000	2001	2002	2003	2004
CZ ^a	23.5	21.8	21.0	22.3	19.9	13.7	8.9	4.8	4.0
HU	6.0	5.1	6.1	3.5	2.6	3.0	5.1	3.9	3.7
PL	13.4	10.7	10.9	13.2	14.9	17.8	21.1	21.2	14.7
SK	29.1	30.6	35.0	29.0	21.7	22.0	11.2	9.2	7.2
AT							3.9	3.7	3.3
GR			8.7	11.2	7.2	5.6	5.5	5.1	5.4
PT					2.2	2.1	2.3	2.4	2.0
EU-12 ^b					3.3	4.1	3.3	3.4	3.1

Note: Data on a non-consolidated basis.

a) Data for the Czech Republic exclude Konsolidační banka and banks under conservatorship.

b) Weighted average.

Sources: CNB, central banks – exchange of data.

The capital adequacy ratio of the Czech banking sector, at an average of 12.6%, indicates sufficient coverage of potential risks as well as the less risky business activities of domestic banks (Table 39).⁵⁵ These include trading in treasury bills and mortgage loans to households. The ratio of non-performing loans to total household loans did not exceed 3.5%. However, the rapid growth in household loans and their worse quality in the consumer credit segment may indicate a certain risk.⁵⁶

⁵⁵ It rose again to 13% in 2005 H1. The temporary reduction in capital adequacy in 2004 was mainly associated with the use of retained earnings for payments of dividends and royalties, and the repatriation of earnings to foreign bank owners.

⁵⁶ The share of non-performing loans in bank consumer credit to households stood at 8.3% at the end of 2004.

Table 39: Capital adequacy of the banking sector (%)

	1996	1997	1998	1999	2000	2001	2002	2003	2004
CZ^a	9.72	9.65	11.92	13.64	14.87	15.38	14.15	14.48	12.55
HU^a	17.73	16.01	16.33	15.00	15.21	15.64	14.08	12.69	13.24
PL^a	12.30	12.50	11.70	13.20	12.90	15.10	14.20	13.80	15.06
SK^a	.	4.81	3.19	5.34	2.44	13.35	21.30	21.59	18.68
AT^b	12.3	11.5	11.6	11.0	10.6	11.48	11.28	12.10	11.87
GR^b	10.7	10.1	10.2	16.2	13.6	12.40	10.50	12.00	12.80
PT^b	11.4	11.8	11.1	10.8	9.2	9.50	9.80	10.00	10.40
EU-12^{b,c}	11.9	11.6	11.6	12.1	11.6	12.10	11.94	11.92	11.78

Note: a) Data on a non-consolidated basis; data for the Czech Republic exclude Konsolidační banka and banks under conservatorship.

b) Data on a consolidated basis.

c) Weighted average.

Sources: CNB, central banks – exchange of data.

The stability of the banking sector stems from the **prosperity of the banking business**. At the end of 2004, it was possible to attain a net interest margin of 2.36% on average in the Czech banking business (Table 40). In an environment of increasing competition and a low level of key rates, interest rates on loans and deposits have declined and the availability of loans to households and prospering businesses increased. Stable interest margins were provided by higher interest rate spreads and profits on developed retail transactions with households. Compared to the selected new EU members, banks in the Czech Republic operate in tighter economic conditions – this concerns lower margins as well as lower operating expenses. The lower margins also reflect the relatively low level of interest rates. A comparison of net non-interest income per unit of assets is shown in Table 41.

Table 40: Net interest margin (NIM, %)

	1996	1997	1998	1999	2000	2001	2002	2003	2004
CZ^a	2.15	2.19	3.47	2.83	2.53	2.47	2.35	2.25	2.36
HU^a	4.92	4.47	4.51	4.08	3.66	3.75	3.82	3.60	3.55
PL^a	5.98	5.60	4.58	4.01	4.26	3.38	3.39	3.13	3.24
SK^a	.	1.80	1.20	0.45	1.85	2.28	2.69	2.91	2.85
EU-12	.	.	.	.	.	.	.	.	.

Note: a) Data on a non-consolidated basis; data for the Czech Republic exclude Konsolidační banka and banks under conservatorship.

Sources: CNB, central banks – exchange of data.

Table 41: Net non-interest income/average assets (%)

	1996	1997	1998	1999	2000	2001	2002	2003	2004
CZ ^a	2.11	2.20	1.29	1.49	1.22	1.37	1.46	1.43	1.69
HU ^a	0.15	0.72	-1.03	0.51	1.05	1.74	1.57	1.63	1.70
PL ^a	1.81	2.04	2.01	2.48	2.73	3.05	2.73	2.52	2.52
SK ^a	2.18	1.22	1.55	1.64	1.13	1.14	1.30	1.00	1.46
AT ^b	1.59	1.65	1.68	1.62	1.59	0.89	0.75	0.83	0.84
GR ^b	1.91	1.80	1.51	3.54	1.79	1.28	0.96	1.04	1.05
PT ^b	0.77	0.78	1.19	1.04	1.07	0.88	0.88	1.02	1.06
EU-12 ^{b,c}	.	0.93	1.09	1.00	1.07	0.84	0.90	1.11	0.82

Note: Net non-interest income does not include other operating income and expense.

a) Data on a non-consolidated basis; data for the Czech Republic exclude Konsolidační banka and banks under conservatorship.

b) Data on a consolidated basis. Net non-interest income/assets as at year-end.

c) Weighted average.

Sources: CNB, central banks – exchange of data.

In 2004, the Czech banking sector showed a high pre-tax return on assets. This was enabled chiefly by interest rate and fee policies, together with a smaller need of provisioning for risks undertaken. Banks in total showed greater returns than those in other selected countries⁵⁷, reaching rates of return on assets and Tier 1 capital that in some cases were several times as high as those in euro area countries (see Table 42 and Chart 13).

Table 42: Pre-tax profit/average assets (%)

	1996	1997	1998	1999	2000	2001	2002	2003	2004
CZ ^a	0.37	-0.17	-0.34	-0.21	0.56	0.93	1.59	1.64	1.76
HU ^a	1.95	0.96	-2.19	0.55	1.23	1.68	0.18	1.80	2.32
PL ^a	3.77	3.00	1.75	1.60	1.51	1.36	0.82	0.95	1.57
SK ^a	-0.34	0.01	-0.23	-3.88	0.63	1.05	1.20	1.17	1.32
AT ^b	1.45	1.26	1.25	1.21	1.39	1.25	0.53	0.60	0.96
GR ^b	0.49	0.70	0.75	2.41	1.38	1.00	0.65	0.98	1.00
PT ^b	0.77	0.88	1.09	1.05	1.05	0.96	0.78	0.89	0.84
EU-12 ^{b,c}	.	0.49	0.69	0.73	0.83	0.47	0.40	0.47	0.58

Note: a) Data on a non-consolidated basis; data for the Czech Republic exclude Konsolidační banka and banks under conservatorship.

b) Data on a consolidated basis. Pre-tax profit/assets as at year-end.

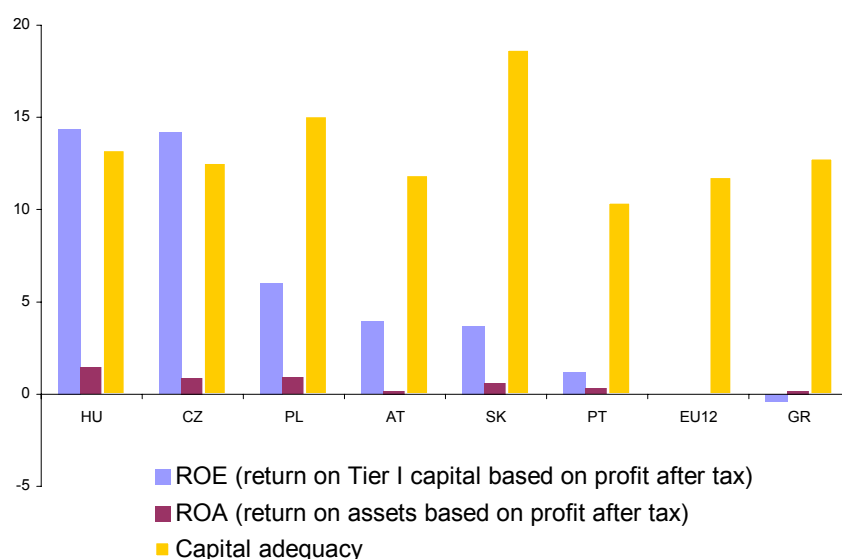
c) Weighted average.

Sources: CNB, central banks – exchange of data.

⁵⁷ Except Hungary, which showed higher pre-tax and after-tax returns on assets and capital.

Chart 13: Profitability and capital adequacy of banks

(profitability – difference from EU-12 average in pp; capital adequacy in %)

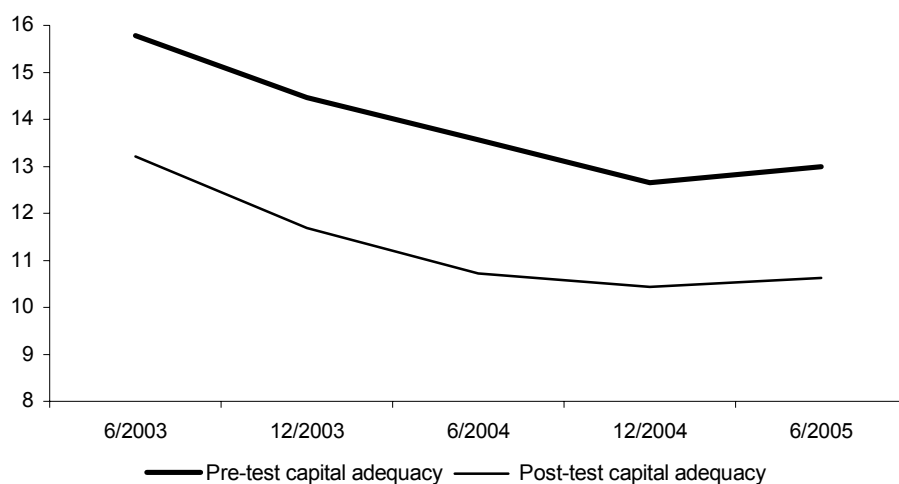


Note: Data for all banks, 2004. EU-12: ROE = 10.5, ROA = 0.4.

Sources: CNB, central banks – exchange of data.

The banking sector as a whole secured stability for both the given and following years and maintained its ability to absorb potential external shocks and unfavourable factors in the economy. This was indicated by the **results of stress tests**. The banking sector was stress-tested by adverse changes in interest rates, the exchange rate and loan quality. This stress stemmed from the scenario of a hypothetical 2 percentage point rise in interest rates, a 20% depreciation of the exchange rate and a 3 percentage point rise in the ratio of non-performing loans to total loans. The effects of combinations of these shocks were assessed by comparing the capital adequacy ratio before and after the shocks affected banks' portfolios. The banking sector did well as a whole, with a capital adequacy ratio of 10.4% after significant adverse shocks affecting the data at the end of 2004, or 10.6% in respect of the data for 2005 H1 (see Chart 14).

Chart 14: Stress test results for the Czech banking sector
(capital adequacy in %)



Source: CNB – unified stress test methodology 2005.

In conditions of domestic growth and economic recovery in EU countries, the banking sector as a whole meets the capital, profit and prudential prerequisites for further development of lending to the corporate sector and households, even though bank loans to households are increasing by 32% year on year.

In the context of structural changes, and with the depth of financial intermediation achieved, the financial system of the Czech Republic has created suitable conditions for coping with potential economic shocks. In this respect, the 2004 situation is acceptable.

3 CONCLUSIONS

This set of analyses provides an insight into the current state of the Czech economy's alignment with the euro area economy and its capacity to absorb economic shocks without the possibility of nominal exchange rate adjustment and without the use of an independent monetary policy. An overview of the results of the analyses is given in Table 43.

The Czech economy is seeing a gradual convergence of real variables and, to a certain extent, its economic cycle with the corresponding characteristics of the euro area. GDP per capita is slowly approaching that of the least advanced countries of the monetary union; however, the difference in the price level still remains considerable. Further real economic convergence prior to ERM II entry and the adoption of the euro will decrease the pressures stemming from price level convergence and the appreciation of the real exchange rate. Going forward, we can expect a real appreciation of the koruna against the euro of 2%–3% year on year, with a gradually declining tendency. The statistical calculations for 1995–2004 show that although the alignment of the business cycle of the Czech economy with the euro area seems to have increased since 1999, this trend is not yet robust. No statistically significant trend can be observed in the correlation of demand and supply shocks with the shocks in the euro area.

A relatively significant positive economic shock for the Czech economy could be the short-term fiscal impulse for domestic demand arising from increased inflow of money from EU structural funds. According to current forecasts, this impulse should peak in 2007 and 2008. The analysis reveals that monetary policy, if coordinated with other macroeconomic policies, can help to deal with the macroeconomic impacts of this inflow using standard instruments, and that the risk of large movements in interest rates, exchange rate and inflation might arise only in the event of other simultaneous shocks acting in the same direction.

The likelihood of greater unbalanced pressures arising from a different economic structure or interest rate differential is relatively small. The structure of the Czech economy in terms of capital formation is broadly similar to that of the euro area economy, although it has a higher share of industry and a lower share of services. In comparison with some countries (e.g. Hungary, Portugal and Austria), the extent of structural similarity is smaller and falling slightly. Nominal interest rates do not differ significantly between the Czech Republic and the euro area. Czech interest rates have been close to, or lower than, euro area rates since 2002. Transition to a single monetary policy will not be thus associated with a shock in the form of a rapid downward adjustment of interest rates. In the other new Member States surveyed, the difference in interest rates is greater. The absence of pronounced asymmetric pressures has been reflected in the relatively high similarity between the exchange rates of the koruna and the euro against the dollar in recent years. Of the other Central European countries surveyed, only Slovakia has a similarly strong linkage of its domestic currency to the euro.

The Czech economy's high degree of openness to the euro area seems to be the principal argument for adopting the single currency. The share of exports and imports of goods and services from the euro area in total Czech exports and imports has been fluctuating around 60% since the end of the 1990s. All countries included in the comparison apart from Greece have a similar degree of openness to the euro area. The Czech economy's ownership links with the euro area are also relatively high by comparison with other countries. The existence of these strong economic links increases the potential benefits arising from the elimination of exchange rate fluctuations vis-à-vis the Czech Republic's main trading partners and, at the same time, creates conditions for future convergence of the business cycles in the Czech

economy and the euro area and for a decline in the probability of asymmetric shocks. Another positive aspect is the share of intra-industry trade, which is quite high relative to the EU Member States included in the comparison.

Analyses of the financial and banking sectors show that no significantly different effect on the economy is to be expected, despite their relatively small size in the Czech Republic. The relative size of the financial sector in the Czech Republic, as measured by the ratio of assets to GDP, is roughly two-fifths of that in Austria and Portugal and the euro area average. It is mainly in lending that the Czech Republic lags behind the euro area countries, with the volume of loans in relative terms (including the government sector) up to three times lower than in Austria and Portugal. However, the Czech Republic has the most developed financial intermediation system of the new Member States included in the comparison. The rapid increase in lending and in particular the fast growth in loans to households are attracting attention as regards financial stability, but the banking sector should be capable of handling these processes provided that the related risks are managed in a prudent manner, in particular with respect to the rate of growth of total household debt.

A bigger problem for successful operation in the euro area will be the functioning of adjustment mechanisms, which will be subject to increased demands once the single currency has been adopted and independent monetary policy lost. If there is no significant decrease in the budget deficit that would include a decrease in the structural effects on the budget balance while maintaining a relatively low debt to GDP ratio, fiscal policy will not have much room to manoeuvre in terms of its stabilising effect. Compliance with the Maastricht criteria on the government deficit and debt is only one dimension in assessing whether the public finances of the Czech Republic are capable of functioning effectively within the European fiscal regulations. To maintain operational ability, challenges relating to the long-term sustainability of public finances must be met, in particular the effect of population ageing on the sustainability of the social system.

Relatively high levels of inflexibility were also found for prices and the labour market. The analysis of price and wage flexibility shows that Czech inflation returns to equilibrium relatively slowly after a shock and that wage flexibility seems to have been on the decline recently. The ability of the Czech labour market to absorb shocks is average by European comparison (this, however, may be a fairly low standard, because the European labour market is itself going through a period where there is a need for structural reforms). The Czech labour market is still characterised by relatively high long-term and structural unemployment, which is rather growing. Although long-term unemployment is still a smaller problem than in some other countries, the regional differences in unemployment are quite large in the Czech Republic. The relatively low mobility within the Czech Republic suggests the likelihood of low international mobility, so it cannot be relied on as an adjustment mechanism. Moreover, for the new Member States international mobility within the European Union is limited by the administrative restrictions issued by most older Member States.

Labour market flexibility is to a great extent determined by institutional rules. The effect of collective pay agreements on wage setting in the Czech Republic is somewhat lower than in the other countries included in the comparison, as is the impact of the minimum wage on the flexibility of low wages and job creation. Employment protection can have an adverse effect on the demand for labour. In particular, the costs of terminating an open-ended employment contract after a short period of employment are relatively high. The Czech Republic also has a high level of overall labour taxation, which poses another risk factor for labour market flexibility should the cost of labour rise to the level usual in EU countries. Compared to other

countries, the Czech Republic also continues to have relatively high taxation of people with low skills. The incentive to seek and accept employment for short-term unemployed people is higher in the Czech Republic than in other countries included in the comparison. However, such incentive is lower in the Czech Republic than in Greece, Portugal and Hungary for the long-term unemployed, mainly low-income families with children. Thanks to a tightening of the conditions for qualifying for unemployment benefit and social benefits in 2004, the motivation to seek employment seems to have improved slightly, although the system of taxes and social benefits has not been fundamentally changed. Some improvement has been recorded in the regulation of the business environment, with the introduction of easier procedures for setting up businesses in 2005. This may positively affect job creation and thereby improve labour market flexibility. However, by international comparison, entrepreneurship in the Czech Republic is still hampered by major administrative obstacles.

The banking sector has in place the prerequisites for sustained stability, including the capacity to absorb adverse shocks. Recent years have seen privatisation-related and state-supported clean-ups of banks' balance sheets and improvements in their credit portfolios. As of the end of 2004, the Czech banking sector had better-quality loan portfolios than Poland, Slovakia and Greece. The coverage of non-performing loans by provisions in the Czech banking sector is comparable to that in the euro area. The capital adequacy ratio of the Czech banking sector indicates sufficient coverage of the potential risks. The sector's resilience is enhanced by its high profitability. The stability of the Czech banking sector and its capacity to absorb shocks was confirmed by stress tests using statistical simulations.

Table 43: Analyses of alignment of the Czech Republic with the euro area (showing the most recent values available)

Analysis	Method/ Category	Section	Value	Commentary
CYCLICAL AND STRUCTURAL ALIGNMENT				
Direct alignment indicators				
Real economic convergence	GDP per capita, PPP, EU-12=100	1.1.1	65.6	The Czech Republic is converging, approaching the level of PT.
	The price level of GDP, EU-12=100	1.1.1	52.4	Slower convergence, a greater lag behind AT, GR, PT.
	Real exchange rate against the euro, 1998=100	1.1.1	115	Real appreciation is present (higher than AT, GR, PT and PL, lower than SK and HU).
Correlation coefficients of real economic activity (CZ and EU-12) Period: 2000q1-2004q4	Method 1 (annual GDP growth)	1.1.2	0.44	An increase in the correlation values over time (however, the correlation is not yet statistically significant). Alignment similar to Greece.
	Method 2 (seasonally adjusted quarterly GDP growth)	1.1.2	0.27	
	Method 3 (cyclical component determined by the HP filter)	1.1.2	0.25	
Synchronisation of demand shocks	Structural vector autoregression, correlation	1.1.3	convergence	The change in the indicator is not statistically significant.
Synchronisation of supply shocks	Structural vector autoregression, correlation	1.1.3	divergence	The change in the indicator is not statistically significant.
Structural similarity of the Czech economy and the euro area economy	Landesmann index	1.1.4	0.17	The Czech Republic has the highest structural discrepancy among the countries compared, and it is also slightly increasing.
Convergence of the interest rate differential	Difference in one-year and five-year interest rates	1.1.5	convergence	The Czech Republic has a zero interest rate differential.
Convergence of exchange rates to the euro	Bivariate GARCH	1.1.6	high correlation	The correlation rose significantly.

Analysis	Method/ Category	Section	Value	Commentary
The effect of international economic relations				
Imports and exports to/from the euro area as a share of total imports/exports, in %	Exports	1.2.1	58.3	The high level of trade links remains broadly unchanged.
	Imports	1.2.1	60.3	
Direct investment from/in the euro area as a share of total direct investment in/from the Czech Republic, in per cent	Inflow of direct investment	1.2.1	79	A high level of ownership links, particularly on FDI inflow side.
	Outflow of direct investment	1.2.1	25	
Share of intra-industry trade	Grubel-Lloyd index	1.2.2	0.80	The high share of intra-industry trade remains broadly unchanged.
Financial market				
Financial system assets	% of GDP	1.3	129.3	The gradually declining ratio of financial system assets to GDP and the essentially flat ratio of loans to GDP are substantially lower than those in AT, PT and GR and higher than those in SK and PL.
Bank loans to non-bank clients	% of GDP	1.3	40.0	
Banking sector/financial system assets	In per cent	1.3	74.1	
Bank loans to households	% of total loans	1.3	29.6	
ADJUSTMENT MECHANISMS				
Fiscal policy				
Government deficit (estimate for the current year)	Convergence Programme % of GDP, ESA 95	2.1.1	-4.7	Although the Czech Rep. is the slowest consolidating country in comparison with other countries, it is converging. The deficit remains above 3% of GDP (SGP).
Public debt (estimate for the current year)	Convergence Programme % of GDP, ESA 95	2.1.1	38.3	
Wage and price flexibility				
Real wage flexibility 1995–1999 and 2000–2004	Phillips curve	2.2.1	-0.028	The elasticity is statistically significant; however, a decline is likely.
Real wage flexibility 1993–2001	Wage curve	2.2.2	-0.09	The elasticity is statistically significant
Price flexibility 1998–2004	Inflation persistence	2.2.3	0.95	Inflation persistence is relatively high compared to other countries.

Analysis	Method/ Category	Section	Value	Commentary
Labour market flexibility				
Long-term unemployment	Long-term unemployment rate, in per cent	2.3.1	4.2	Growth in long-term unemployment, higher levels than AT, PT and HU.
	Long-term unemployment as a share of total unemployment, in %	2.3.1	51.0	
Regional differences in unemployment	Coefficient of variation in the unemployment rate	2.3.1	45	Together with AT, the highest levels among the countries included in the comparison; a slight decline.
Structural unemployment index	Share in total unemployment	2.3.1	39.4	Growth in structural unemployment, higher than AT. In 2004, higher than SK (other countries are not included in the comparison).
	Share in the labour force	2.3.1	2.0	
Internal labour mobility	Internal migration – volume per 1,000 population	2.3.1	21.2	Internal mobility is likely to be lower than in AT and higher than in SK.
International migration	Emigrants per 10,000 population	2.3.2	34	A likely slight rise over time; the level is lower than in AT and higher than in HU.
Institutional environment	Trade unions and collective bargaining (2000)	2.3.3		Collective bargaining has a relatively low effect on wage setting by international comparison.
	Minimum wage as % of the average wage in industry and services	2.3.3	38.8	Growth over time, lower than PT and HU, higher than PL and SK.
	Employment protection index – permanent employment (2003)	2.3.3	3.3	Higher than in the countries included in the comparison except PT and SK.
	Index of administrative barriers to entrepreneurship (2003)	2.3.3	1.9	The highest except PT. A partial improvement is likely in 2005.
	Overall labour taxation (persons at the average wage level, in per cent)	2.3.3	43.6	Lower than AT and HU, higher than in other countries included in the comparison.
	Marginal effective tax rate when starting a job, in per cent ^a	2.3.3	84	A slight decrease. The level is higher than GR, PT and HU.

Analysis	Method/ Category	Section	Value	Commentary
Flexibility and shock-absorbing capacity of the financial sector				
Non-performing loans in the banking sector	Percentage share of total loans	2.4	4.0	Improved since 2003. Slightly higher than PT, AT, HU.
Net interest margin	In per cent	2.4	2.4	The interest margin is broadly stable, lower than HU, PL, SK (there is no comparison for other countries).
Net non-interest income	Percentage of average assets	2.4	1.7	Slight growth; higher than SK, AT, GR, PT.
Pre-tax profit/average assets	In per cent	2.4	1.8	Growth. Higher than other countries except HU.
Capital adequacy in banks	In per cent	2.4	12.6	Lower than SK, PL, GR; however, it is considered sufficient.
Capital adequacy in banks after stress tests	In per cent	2.4	10.4	A sufficient level.

^a Marginal effective tax rate on the unemployed at a wage of 67% of the average wage in industry. Relates to a person with an unemployed partner and two children and who is not entitled to unemployment benefit.

D. Methodological Part

1 CYCLICAL AND STRUCTURAL ALIGNMENT

1.1 Direct alignment indicators

1.1.1 Real economic convergence

The comparison of GDP per capita in purchasing power parity and the average price level of GDP is based on Eurostat data, derived from the International Comparison Program (ICP).

The real exchange rate against the euro is based on the consumer price index. The Harmonised Index of Consumer Prices (HICP) is used wherever possible; where data are missing, the HICP is extrapolated using national price indices. The annual rate of appreciation is calculated as the geometrical average of the appreciation since 1993 or 1998. The estimate of future appreciation over the next five years is based on an analysis by Čihák and Holub (2003), which used international comparisons to estimate the relationship between GDP per capita in purchasing power parity and the average price level of GDP as:

$$\mu(GDP) = 8.02 + 0.90 \text{ } GDP_{PPP},$$

where $\mu(GDP)$ is the price level of GDP and GDP_{PPP} is GDP per capita in purchasing power parity (EU-15 = 100 in both case). The simulations of the rate of equilibrium appreciation assume beta-convergence of GDP towards the level of the EU-15 at rate of 2% a year. Alternatively, convergence of the individual countries towards the estimated international relationship (i.e. a decline in the residual in the regression) at a rate of 2.5%, 5% and 10% per year is also considered; this results in the range of estimates presented.

1.1.2 Correlation of economic activity

The cyclical alignment of economic activity in the selected countries with the euro area is analysed using the coefficient of correlation between real GDP time series. The correlation coefficient is calculated for the entire period (1995–2004) as well as for two subperiods (1996–2000, 2000–2004). The decomposition into five-year periods provides a suitable method for demonstrating the evolution of the correlation coefficient over time.

Detrended and seasonally adjusted quarterly GDP time series expressed as natural logarithms are used to calculate the correlation coefficients. As the literature does not offer a consensus on the optimal detrending method, the analysis applies three detrending methods for comparison, namely year-on-year differences between the original time series, quarter-on-quarter differences between the seasonally adjusted time series and removal of the trend from the seasonally adjusted time series using the Hodrick–Prescott filter. In the second and third cases, seasonal adjustment is done using the TRAMO/SEATS method. The source of GDP data at constant 1995 prices in national currenciesⁱ is Eurostat. Portugal was omitted from the analysis because the relevant data are not available.

Method 1

Simple year-on-year difference between the original time series ($\ln y_k$):

$$\ln y_t - \ln y_{t-s},$$

ⁱ Frankel and Rose, 1997.

where y is the variable under investigation (GDP at constant 1995 prices), t is the time period and s is seasonality ($s = 4$ for quarterly GDP data). Year-on-year changes in real GDP are examined in this case.

Method 2

The correlation of economic activity can also be analysed using quarter-on-quarter changes in the seasonally adjusted GDP time series ($\ln y_{sa,t}$):

$$\ln y_{sa,t} - \ln y_{sa,t-1}$$

Method 3

The last of the detrending methods used is the Hodrick–Prescott (HP) filter applied to the seasonally adjusted time series. The HP filter determines the long-term trend components of the time series according to the following formula:

$$HP = \text{Min} \left[\sum (\ln y_{sa,t} - s_t)^2 + \lambda \sum \left((s_{t+1} - s_t) - (s_t - s_{t-1}) \right)^2 \right],$$

where $\ln y_{sa,t}$ denotes the original time series, s_t the long-term trend and λ the smoothing constant. For quarterly time series, λ equals 1600. The cyclical component is determined by subtracting the estimated trend component from the original time series.

The comparability of the results with those from the same document last year is limited owing to revisions to the GDP time series and the adoption of several changes in the treatment of the time series. By contrast with the last year's document, all the analyses use the TRAMO/SEATS seasonal adjustment method.ⁱⁱ The calculation of the correlation coefficient for the individual five-year subperiods is based on the seasonally adjusted time series for the whole period (i.e. the relevant short time series is not seasonally adjusted separately). Finally, the GDP data are in national currencies, as converting them into EUR would incorporate the effect of the evolution of their exchange rates against the euro, which is not desirable for the purposes of this analysis.

1.1.3 Synchronisation of economic shocks

A two-variate structural vector auto regressive (SVAR) procedure is applied to identify the demand and supply shocks (see Blanchard and Quah, 1989; Bayoumi and Eichengreen, 1993; and Babetskii, 2005). Quarterly seasonally adjusted GDP series at constant prices and the GDP deflator in selected new EU countries (the Czech Republic, Hungary, Poland and the Slovak Republic) and current euro area members (Portugal, Austria and Greece) are the inputs for the SVAR model. The sources of the data are OECD, Main Economic Indicators, and the CZSO for the Czech Republic (revised GDP). The calculation of the correlation of shocks between the group of new EU Member States and the current euro area members and the whole EU-12 indicates the degree of asymmetry of shocks vis-à-vis the euro area.

As the mean correlation of the shocks for the whole estimated period (1995–2004) represents a simplified view for the new Member States and may have been affected by their transition to a market economy and the EU accession negotiations, the correlation was also calculated for an earlier and a later period, namely 1995–1999 and 2000–2004.

ⁱⁱ The Census X11 multiplicative method had been used previously.

1.1.4 Assessment of the economies' structural similarity

The economies' structural similarity is compared using the Landesmann structural coefficient. The coefficient is calculated by comparing the shares of individual sectors, e.g. industry or construction, in total value added in country A (in our case the Czech Republic, Austria, Portugal and Hungary)ⁱⁱⁱ vis-à-vis country B (the EU-12). The difference between the shares is weighted by the share of the sector in country A in the total, and the weighted shares are then summed.

The calculation of the coefficient can be expressed formally as follows:

$$SL = \sum_{i=1}^n \sqrt{(sh_A^i - sh_B^i)^2} \cdot \left(\frac{sh_A^i}{100} \right)$$

where sh_A^i is the percentage share of the i -th sector in value added as a whole in country A and sh_B^i is the percentage share of the i -th sector in value added as a whole in country B. The calculation is performed separately for each selected period. In our case, it is based on annual data. The structure of the coefficient is described in detail in Landesmann and Székely (1995) and Flek *et al.* (2001).

For the purposes of the analysis the coefficient was modified to $SL/100$.^{iv} Adjusted in this way, the coefficient takes a value in the range of [0, 1]. The closer the coefficient is to zero, the more similar in structure are the economies.

1.1.5 Convergence of the interest rate differential

Interest rate convergence can be examined using the unit root test (see, for example, Lee and Wu, 2004, and Kočenda, 2001). However, the relatively short length of the available time series must be taken into account when analysing the convergence of interest rates in the Czech Republic, Hungary, Poland and Slovakia. The simple method of a chart showing the interest rate differentials vis-à-vis the euro area is therefore used.

Bloomberg data were used to measure the interest rate differentials between one-year (1Y) and five-year (5Y) rates in the euro area and the Czech Republic, Hungary, Poland and Slovakia. Instruments with a maturity of one year are compared using the Euro Area Interbank Offered Rate (EURIBOR), the Prague Interbank Offered Rate (PRIBOR), the Budapest Interbank Offered Rate (BUBOR), the Warsaw Interbank Offer/Bid Rate (WIBO) and the Bratislava Interbank Offered Rate (BRIBOR). The interest rate on five-year government bonds is used to compare longer-term interest rates.^v

The time series of 1Y interest rates starts on 30 December 1998 for the euro area and the Czech Republic, 22 January 2001 for Poland, 19 November 2001 for Slovakia and 2 May 2002 for Hungary. The time series of 5Y interest rates starts on 30 December 1998 for the euro area, the Czech Republic and Hungary, 4 March 1999 for Poland and 3 February 2003

ⁱⁱⁱ Comparable data were not available for Greece, Poland and Slovakia.

^{iv} $SL = \sum_{i=1}^n \sqrt{(I_{sh_A^i} \cdot 100 - I_{sh_B^i} \cdot 100)^2} \cdot \left(\frac{I_{sh_A^i} \cdot 100}{100} \right) = 100 \sum_{i=1}^n \sqrt{(I_{sh_A^i} - I_{sh_B^i})^2} \cdot I_{sh_A^i} = 100 \cdot I_{SL}$

In this case, indices are used rather than the percentage shares of individual sectors in the total.

^v The codes in the Bloomberg system are as follows: EUR012M Index, PRIB01Y Index, BUBOR01Y Index, WIBO1Y Index, BBOR1Y Index, and GECU5YR Index, CZGB5YR Index, GHGB5YR Index, POGB5YR Index, and CTSKK5YR Corp. 1Y interbank rates strongly correlate with rates on 1Y government bonds (at 0.96–0.99), but the data on the interbank rates are more complete. Data on rates on Slovak 1Y government bonds are not available.

for Slovakia. All the time series end on 14 or 16 September 2005. 5Y interest rates are not available for the Czech Republic for the periods between 29 July and 8 August 1999, 30 January and 6 March 2003 and 22 October 2003 and 21 March 2004. The other periods for which data are missing are no longer than 1 or 2 days.

The time series “EMU convergence criterion bond yields” from the New Cronos database (Eurostat) were used to compare 10Y government bond yields. These time series are based on the gross yield on government bonds on the secondary market with approximately ten years to maturity. A weighted yield is created by Eurostat for the EU-12, in which the weights applied are the nominal stocks of government bonds in each country. For the period before 1999, the weights are based on national GDP in purchasing power parity.

The compared data cover the period between January 1990 and August 2005 and are published monthly.

1.1.6 Exchange rate convergence

Aguilar and Hördahl (1998) express the probability of adoption of the euro by eleven EMU candidate countries using the correlation of the exchange rates of their currencies and the Deutsche Mark (as a substitute for the euro) vis-à-vis the US dollar.^{vi} The exchange rates of the two currencies are thus expressed in terms of the currency of a third country which is not an EMU member. The correlation between the movements of two currencies in a monetary union should by definition equal 1; therefore, a higher correlation means higher probability of participation in the EMU since its creation.

The analysis in this document uses the same method to assess how close the Czech Republic, Hungary, Poland and Slovakia are to adopting the euro.

The correlation coefficient is based on a bivariate GARCH estimate and is calculated according to the following formula:

$$corr = \frac{\text{cov}(NC/USD, EUR/USD)_t}{\sqrt{\text{var}(NC/USD)_t * \text{var}(EUR/USD)_t}}, \text{ where } NC \text{ represents the national currencies.}$$

This method returns a correlation coefficient which changes over time and therefore provides more information than a simple correlation coefficient of the exchange rate of the national currency against the euro. Moreover, the use of the GARCH technique allows all the information in the data to be utilised. A higher GARCH correlation means similar developments in exchange rate volatility, which can be interpreted as synchronisation of exchange rate shocks in the countries under review.

The analysis covers the period from 1 January 1994 to 30 August 2005 and uses daily Bloomberg data.

1.2 The effect of international economic relations

1.2.1 The openness of the economy and its links with the euro area

The data for the calculation of the shares of exports to and imports from the euro area in total exports and imports are taken from the Direction of Trade Statistics database of the International Monetary Fund (IMF).

^{vi} The same method is used in Castrén and Mazzotta (2005).

The on-line OECD International Direct Investment Statistics Yearbook is the source of the data for the analysis of the regional structure of direct investment. Data on the inflow of foreign direct investment (FDI) from euro area countries and on the outflow of direct investment (DI) to euro area countries were used. The GDP data in this analysis are taken from the Economist Intelligence Unit database.

1.2.2 Intra-industry trade

The Grubel-Lloyd index (GLI) was used to analyse intra-industry trade. The GLI is the ratio of the absolute value of intra-industry trade to foreign trade turnover. X_{it} and M_{it} denote total exports and imports of the i -th commodity at time t . The index takes values ranging from 0 to 1. A value of 0 indicates that all trade is inter-industry trade and that there is specialisation in different commodities. A value of 1 indicates that all trade is inter-industry trade (Flek *et al.*, 2001).

$$GLI_t = 1 - \frac{\sum_i |X_{it} - M_{it}|}{\sum_i |X_{it} + M_{it}|}$$

The GLI is calculated using data on total exports and imports in the countries under review, broken down according to the two-digit SITC classification (the commodities are thus given by SITC groups at the two-digit level).

1.3 Financial market

Financial system assets/GDP (ratio of net book value of financial sector assets to GDP at current prices) – expresses the asset strength of intermediation by banks and non-bank financial institutions: insurance corporations, pension funds, credit unions, investment companies and investment funds (unit trusts), financial leasing corporations and other financial corporations (forfeiting and factoring companies, securities dealers, bureaux de change, etc.). Generally speaking, the more advanced the market, the larger the assets and the deeper the financial intermediation relative to GDP.

The inclusion of assets provided to both residents and non-residents is a methodological problem. For the purposes of economic interpretation, it is appropriate also to analyse the share of residents assets alone.

Bank loans to non-bank clients/GDP (ratio of gross book value of loans to non-bank clients, corporations and households to GDP at current prices) – expresses the depth of financial intermediation by banks. Loans to both residents and non-residents present the business dimension of financial intermediation.

For the purposes of economic interpretation it would be more appropriate to use the ratio of loans granted to residents, which forms part of the monetary survey and macroeconomic analyses. However, it is sometimes difficult to exclude loans to the government, which are usually included in client loans.

Banking sector assets/financial system assets – expresses the share of the banking sector in the financial system of the country and at the same time banks' financial intermediation potential. In general, the more advanced the market, the larger the assets and the deeper the financial intermediation by non-bank financial institutions, which at the same time are usually internalised in strong bank and non-bank financial groups.

Structural change over time is important for economic interpretation – the share of banks in the financial system usually declines in developing market economies (unless one takes into account the formation of bank financial groups).

2 ADJUSTMENT MECHANISMS

2.1 Fiscal policy

2.1.1 The stabilisation function of public budgets

Decomposition of the fiscal deficit into the cyclical and structural component

The government sector's fiscal balance (deficit or surplus) inherently reflects both the intended effects of fiscal policy and the effect of the business cycle. The effect of the current phase of the business cycle manifests itself in the collection of direct and indirect taxes and some cycle-sensitive expenditure items, such as unemployment-related outlays. The assessment of fiscal policy therefore usually focuses on the cyclically adjusted component of the government sector's balance, as that component is fully controlled by the public sector.

The overall balance of the government sector can therefore be divided into a cyclical component and a structural component (sometimes referred to as the cyclically adjusted component, depending on the treatment of one-off fiscal measures). We have applied the ESCB method^{vii} for estimating the cyclical component, which uses a higher level of disaggregation compared to the alternative approaches of the European Commission, the International Monetary Fund and the OECD. Thus, the cyclically adjusted component is a residual indicating the impact of fiscal policy alone. Using the cyclically adjusted balance, we can answer the question of what the government sector's performance would be if the economy were at its potential.

2.1.2 Government deficit and debt and the scope for active fiscal stabilisation policy

All the debt and deficit figures are based on ESA 95 methodology, which is the key methodology with regard to considerations of EMU accession.

2.1.3 Long-term sustainability of public finances

The extrapolation of long-term sustainability was taken from the publication entitled Public Finance in EMU (European Commission, 2005). This extrapolation, performed by the European Commission, was based on several assumptions: data from the updated Convergence Programmes and Stability Programmes of autumn 2004 were used and it was assumed that the tax quota will not change in the period under investigation, expenditure related to population ageing will develop in line with the available predictions, the ratio of other expenditure to GDP will remain at the expected 2008 level, the GDP deflator will be 2% throughout the period, and real GDP growth varies across the individual countries and is based either on the Convergence Programmes and the Stability Programmes or on EPC assumptions.

2.1.4 Macroeconomic effects of EU fund inflows

Changes in the evolution of the selected macroeconomic indicators are simulated using the CNB's quarterly prediction model. Net position estimates until 2013 are taken from the documents of the Ministry of Finance, which in its estimates abides by the relevant methodology for the commencement of drawing on EU funds. The calculations do not take into account the delay between the implementation of projects and their financing.

^{vii} See Bouthevillain *et al.* (2001).

To calculate the economic impulse arising from the increase in financial flows from the EU, this analysis uses the method applied within the CNB's forecasting system to calculate the fiscal impulse. In this case, the impulse is derived from the year-on-year change in the Czech Republic's net position vis-à-vis the EU budget expressed as a percentage of GDP, with the multiplier estimated at 0.61. Hence, a year-on-year change in the net position of 1% of GDP leads to a stimulation of the economy equal to 0.61 percentage point of real GDP. The calculation of the impulse is based on GDP at current prices according to the CNB's July forecast and on the assumption that the GDP deflator index will be broadly consistent with the inflation target.

The simulation of the macroeconomic effects of inflows from the EU budget is performed on the basis of the CNB's macroeconomic forecast of July 2005. Newly identified impulses arising from the inflow of EU funds are inputted into the quarterly prediction model in the same way as the fiscal impulse is inputted into the CNB's forecasting exercise, i.e. as a residual in the output gap equation.^{viii}

2.2 Wage and price flexibility

2.2.1 The degree of adjustment of real wage growth to the unemployment rate – the Phillips curve

A basic one-equation Phillips curve is used to estimate the elasticity of wages to the national unemployment rate (see, for example, Alogoskoufis and Smith, 1991, or Hycklak and Johnes, 1992).

$$\Delta w_t = c_1 + c_2 u_t + c_3 \Delta p_{t-1} + \varepsilon_t$$

where $\Delta w_t = \ln(w_t) - \ln(w_{t-1})$, $\Delta p_{t-1} = \ln(p_{t-1}) - \ln(p_{t-2})$, w_t is the nominal monthly wage (average for the economy), p_t is the CPI index, and u_t is the natural logarithm of the standardised unemployment rate. The coefficient c_2 represents the elasticity of wages to the unemployment rate, i.e. it characterises wage flexibility. In spite of the fact that the left-hand side of the equation contains nominal wages, the coefficient c_2 in fact assesses the flexibility of real wages, because price inflation is also present on the right-hand side of the equation. The rest of the variation in wages (e.g. as a result of changes in productivity, growth in import prices, etc.) is included in the constant c_1 . The sources of the data (quarterly, seasonally adjusted time series) are OECD, Main Economic Indicators, IMF, International Financial Statistics, Eurostat and New Cronos. To assess its evolution over time, wage elasticity is calculated for the whole estimated period (1995–2004) and for two subperiods, namely 1995–1999 and 2000–2004.

2.2.2 The degree of adjustment of regional real wages to the regional unemployment rate – the wage curve

This analysis uses the results from a paper by Galuščák and Münich (2005a). The authors estimate the wage curve using annual data on wages and unemployment for individual districts in the Czech Republic between 1993 and 2001. The wage curve equation can be written as follows:

$$w_{rt} = \alpha_r + \beta u_{rt} + \delta_t + \varepsilon_{rt}, \quad (1)$$

^{viii} See Beneš *et al.* (2003) for more information on the CNB's quarterly prediction model.

where w_{rt} is the logarithm of the nominal wage in region r and at time t , and u_{rt} is the logarithm of regional unemployment. Regional (α_r) and time (δ_t) fixed effects capture differences in the regional price levels and price changes over time. The equation assumes that regional differences persist, whereas time fixed effects (annual dummy variables) measure aggregate shocks which affect all regions in the same way. Fixed effects also substitute for deflating nominal wages. The coefficient β measures the elasticity of real wages.

The first-order difference of equation (1) removes regional fixed effects:

$$w_{rt} - w_{r,t-1} = \beta(u_{rt} - u_{r,t-1}) + \delta_t'' + \varepsilon_{rt} - \varepsilon_{r,t-1}. \quad (2)$$

Equation (2) is estimated by the least squares method using the instruments for the unemployment rate on the right-hand side of the equation. For example, the evolution of real wage flexibility can be seen from estimates for two-year periods between 1993 and 2001. The shortness of the time series of annual data is the limiting factor.^{ix}

2.2.3 Price flexibility

We use the non-parametric technique proposed by Marques (2004) to estimate inflation persistence. This approach defines inflation persistence, γ , as $\gamma = 1 - n/T$, where n is the number of times actual inflation crosses the equilibrium inflation value and T is the number of observations. Equilibrium inflation is approximated using the Hodrick–Prescott (HP) filter. Monthly data on HICP inflation (annual changes) from January 1997 to July 2005 are used for the calculation; the source of the data is Eurostat. As the HP filter gives a biased trend estimate at the beginning and the end of the sample, the data for January 1998 to December 2004 were used for the actual calculation of inflation persistence.

2.3 Labour market flexibility

2.3.1 Unemployment and internal labour mobility

Long-term unemployment is analysed by comparing the long-term unemployment rate (the share of those unemployed for 12 months or more under ILO methodology in the labour force) and the proportion of the long-term unemployed (the share of those unemployed for 12 months or more in all the unemployed under ILO methodology). The source of the data is Eurostat.

Regional differences in unemployment are measured by the coefficient of variation. The coefficient of variation in the regional unemployment rate is the ratio of the standard deviation weighted by the district size to the average unemployment rate. The size of the coefficient of variation depends on the degree of disaggregation. Data for similar region sizes (e.g. NUTS 2 or NUTS 3) and the evolution of the coefficient of variation over time can be used for comparison. The source of the data is Eurostat.

Structural unemployment indices express regional gaps between the number of unemployed persons and the number of vacancies (Boeri and Scarpetta, 1996). The indices are defined using the following relationships:

^{ix} Wages were monitored by district at individual workplaces in 1993–2001. Since 2002, the CZSO has monitored wages by district only for whole businesses, aggregating the data for their branches under the district of their headquarters. For this reason, the analysis of the wage curve cannot be updated for the post-2001 period.

$$I_1 = \frac{1}{2} \sum_i \left| \frac{u_i}{u} - \frac{v_i}{v} \right|,$$

$$I_2 = \frac{1}{2} \sum_i \frac{p_i}{p} \left| \frac{u_i - v_i}{p_i} - \frac{u - v}{p} \right|,$$

where p_i , u_i and v_i are, respectively, the labour force, the number of unemployed and the number of vacancies in the district, and p , u and v are the labour force, the number of unemployed and the number of vacancies at the national level. The two indices measure the number of unemployed as, respectively, a share of all unemployed persons (I_1) or as a share of the labour force (I_2). Structural equilibrium between the number of unemployed and the numbers of vacancies in the districts would be achieved if these unemployed persons moved to other districts. Unlike index I_1 , index I_2 is not sensitive to changes in the total number of unemployed persons. It is assumed that an unemployed person can fill any vacancy in the region. Boeri and Scarpetta (1996) give structural unemployment indices for Central European countries. The indices for the following period can be calculated using data from labour offices. Data are available for the Czech Republic, Austria and Slovakia.

Aggregate fixed effects of the matching function are an indicator of the degree of mismatch in filling vacancies. The matching function is:

$$\log o_{it} = \beta_1 \log U_{i,t-1} + \beta_2 \log V_{i,t-1} + \gamma_1 \log u_{it} + \gamma_2 \log v_{it} + \alpha_i + \varepsilon_{it}$$

where o_{it} is the number of persons leaving the labour office register in district i in period t , $U_{i,t-1}$ and $V_{i,t-1}$ are the stocks of unemployed persons and vacancies, u_{it} is the number of newly registered job seekers, v_{it} is the number of newly reported vacancies and α_i are regional fixed effects. The equation is estimated in first-order differences using the instruments for $U_{i,t-1}$ and $V_{i,t-1}$ (Galušćák and Münich, 2005b). Aggregate fixed effects are obtained by aggregation weighted by district size.

The CZSO publishes the volume of **internal migration**. Data on internal migration in other countries are published in statistical yearbooks. Since 2001, migration of foreigners with long-term residence (over 1 year) has been included in the statistics, whereas before 2001 only migration of Czech citizens and foreigners with permanent residence permits was monitored. Consequently, the pre-2001 data are not comparable with the more recent data. Another reason for this non-comparability is that the data for 2001 onwards include the results of the 2001 census.

The published data on internal migration are based on registered mobility. An indirect CZSO survey reveals that not all those who change their permanent address report such a change and not all municipalities send in change of permanent address reports for all migrants.

2.3.2 International labour mobility

International mobility. The data on registered international mobility for individual countries are not fully comparable (OECD, 2005c, national statistics institutes). The data on attitudes to international mobility from the 2002 Eurobarometer survey are taken from Krieger (2004).

2.3.3 Institutional environment

Labour market flexibility is determined to a great extent by institutional factors, among which we examine the role of trade unions and collective bargaining, the minimum wage, the degree of job protection, administrative barriers to entrepreneurship, the taxation of labour and marginal effective tax rates. The methodology for assessing labour market flexibility is based largely on the recommendations included in the OECD Jobs Strategy (OECD 1994, OECD 1995). The assessment of fulfilment of these recommendations (see, e.g., OECD 1998, 2000, 2004a and 2005a, and Brandt, Burniaux and Duval, 2005) is based on international evidence on the impact of institutional factors on macroeconomic variables.^x

Trade unions and collective bargaining. The relevant indicators in the area of the institutional arrangements for collective bargaining are trade union density, collective bargaining coverage, the centralisation of collective bargaining and the degree of coordination of wage bargaining. Taken from OECD (2004a).

Minimum wage. The relationship of the minimum wage to the average wage, the wage median and to the wage in the first decile of the wage distribution, and the share of employees earning the minimum wage. The data used are from Eurostat and the Average Earnings Information System (Ministry of Labour and Social Affairs).

The **employment protection index** is taken from OECD (2004a). It relates to the late 1990s and to 2003 and consists of 18 items assessed according to the Labour Code. These items are aggregated for the areas of permanent employment, temporary employment and collective dismissals. The 2004 and 2005 data for the Czech Republic were updated according to the Labour Code in force or to draft changes in the legislation.

Administrative barriers to entrepreneurship. The index of barriers to entrepreneurship is taken from a paper by Conway, Janod and Nicoletti (2005), where it is a part of a broader OECD indicator assessing the degree of regulation on product markets. The index consists of seven items aggregated in three areas: Administrative burdens on startups (Administrative burdens for corporations, Administrative burdens for sole proprietors, and Sector specific administrative burdens), Regulatory and administrative opacity (Licences and permits system, and Communication and simplification of rules and procedures) and Barriers to competition (Legal barriers to entry into the industry – limitations on the number of entities, and Antitrust exemptions for public enterprises).

The 2004 and 2005 data for the Czech Republic were updated according to amendments to the Commercial Code and the Trades Licensing Act.

Overall labour taxation is defined as social security contributions paid by employees and employers and income taxes relative to overall labour costs (OECD, 2005b).

Work-incentive indicators. Data on marginal effective tax rates (METRs) of the unemployed are taken from OECD (2004b) and are updated using the OECD tax benefit models for individual types of households, persons in the initial phase of unemployment who are entitled to unemployment benefits^{xi} and persons not entitled to unemployment benefits (inactive or long-term unemployed).

^x Freeman (2005) casts doubt on the robustness of these conclusions and calls for evidence based on microanalysis of firms and individuals and experimental methods.

^{xi} In this case we assume that unemployed persons claiming unemployment benefits do not usually receive regular social assistance benefits, which top up households' income to the minimum subsistence amount. An analysis of the Mikrocensus 2002 data confirms this hypothesis.

METRs measure the extent to which the combination of taxes and benefits affects the financial gain from work and thereby the motivation of unemployed or inactive persons to enter employment (or, in the case of METRs on employed persons, to increase the number of hours worked).

If a person moves from state A to state B, the benefits lost must be included in his/her additional tax burden. The marginal effective tax rates are defined as:

$$METR = 1 - \frac{\Delta y_{net}}{\Delta y_{gross}},$$

where Δy_{gross} is the change in gross income, while the change in net income Δy_{net} is defined as

$$\Delta y_{net} = y_{netB} - y_{netA} = (y_{grossB} - t_B + b_B) - (y_{grossA} - t_A + b_A),$$

where t denotes total taxes and b denotes total benefits. The formula for METR can be rewritten as follows:

$$METR = \frac{(t_B - t_A) - (b_B - b_A)}{y_{grossB} - y_{grossA}}.$$

For the transition from unemployment to employment, $y_{grossA} = 0$ and $t_A = 0$. In this case, the METRs are the marginal effective tax rates for unemployed or inactive persons (the unemployment or inactivity traps, see OECD 2005a).

METRs reflect financial entitlement to social benefits only. If the activity of the unemployed in seeking jobs is monitored sufficiently, even high METR values can be associated with sufficient motivation to seek employment.^{xii}

2.4 Flexibility and shock-absorbing capacity of the financial sector

Indicators reflecting the size of credit risk and the extent of control over credit risk through the creation of reserves and provisions, and indicators showing business success in the banking sector were selected to assess the stability and shock-absorbing capacity of the banking sector.

Non-performing loans (NPLs)/total loans (%)

NPLs (in gross book value) in the banking sector (“ohrožené úvěry” in Czech accounting terminology) divided by total loans in gross book value show how large or how concentrated is the credit risk faced by the country’s banking sector.

Capital adequacy (%)

The indicator of capital adequacy expresses a bank’s internal resources relative to the structure of risk-weighted assets and selected off-balance sheet assets and market risks. It is an aggregate indicator reflecting all activities of the bank (both balance sheet and off-balance sheet) as well as the potential losses (reducing profit) which a bank may incur from the risks it undertakes and the depreciation of assets through the creation of provisions and reserves. A bank’s capital adequacy should exceed the solvency threshold of 8% under the relevant CNB Decree and CNB Provision.

^{xii} METR data are calculated for model types of households. As regards the possible impact of these indicators on employment and unemployment, their distribution for households is of key importance. The occurrence of unemployment traps and inactivity traps in the Czech Republic is described in Galuščák and Pavel (2005).

Capital adequacy expressed as the ratio of a bank's capital to the corresponding coverage of potential losses from risks it undertakes assesses the outlook for the bank's financial situation. Capital adequacy indicates its ability to cover potential future losses with capital. A positive capital adequacy ratio means that the bank is solvent, assuming that all potential future losses connected with present risks will be or should be covered by shareholders' equity.

In addition to this prudential function, capital is used to develop future business activities. The higher the capital adequacy, the better the bank is protected against risks, but the less it is using its potential earnings per unit of capital. By developing the bank's business, shareholders – represented by management – increase the profit while retaining capital coverage of risks, i.e. within the limits of appropriate use of capital.

Pre-tax profit/average assets (%)

This indicator can be viewed as a synthetic measure of banking business, aggregating the results of the extent and diversification of banks' activities and the business risks undertaken. Under less stable conditions, the profitability indicator is more volatile; the negative values of this indicator in some countries reflect losses caused mostly by a failure of the business risk management system, inefficiency and other factors.

Net interest margin (NIM) (%)

$NIM = (\text{interest income} - \text{interest costs}) / \text{interest bearing assets}$. The indicator shows the rate of profitability and business success in banking. If rates on the interbank market fall, the margin on loans and deposits usually also decreases. This is a sensitive and less available indicator.

Net non-interest income/average assets (%)

The ratio of net non-interest income (from fees and commissions and other financial operations) to average assets. Banks generally show a tendency towards rising non-interest income if the margin on interest-bearing bank operations declines, primarily through rising fees and commissions. The conduct of competitors is a significant corrective factor.

It is difficult to determine from the available data on net non-interest income whether other operating costs and revenues were included in addition to fees and commissions and other net income on financial operations. For technical reasons, the indicators for the EU and the euro area are usually calculated relative to assets at the year-end rather than to average assets. The ratio to average assets provides a clearer picture of the distribution of costs and revenues per unit.

Basic stress test scenarios

To estimate the resilience of the Czech banking sector, stress tests are performed which subject banks to hypothetical changes in key macroeconomic variables. The proposed scenarios consist of combinations of adverse changes in interest rates, the exchange rate and loan quality.^{xiii}

The selected baseline scenario assumes significant adverse changes and consists in a combination of a 2 percentage point increase in interest rates, a 20% depreciation of the exchange rate and a 3 percentage point increase in the ratio of NPLs to total loans. The effects of combinations of these shocks were assessed by comparing the capital adequacy ratio before and after the shocks affected banks' portfolios. The calculations assume that had no shocks occurred, banks would be generating the same profits as they averaged over the last five

^{xiii} Summaries of stress test results are included in the Financial Stability Reports published by the Czech National Bank.

years; otherwise profits in the stress situation are lower than usual. In the case of insufficient profits, the impacts of the shock are subtracted directly from capital.

The scenarios are based on extreme historical shocks. In the Czech economy they relate to the mid-1997 experience of a depreciation of the exchange rate and a rise in interest rates. The scenario of a rise in the NPL ratio is based on developments in 1997–1999. The model situations will not necessarily repeat – the scenarios are of a cautionary nature and will not necessarily materialise.

E. References

- Aguilar, J., and Hördahl, P. (1998): “Exchange Rates and Currency Options as EMU Indicators”, *Sveriges Riksbank Quarterly Review*, 2, pp. 58–81.
- Alogoskoufis, G. S., and Smith, R. (1991): “The Phillips Curve, the Persistence of Inflation, and the Lucas Critique: Evidence from Exchange-Rate Regimes”, *American Economic Review*, 81(5), pp. 1254–1275.
- Alvarez-Plata, P., Brucker, H., and Siliverstovs, B. (2003): “Potential Migration from Central and Eastern Europe into the EU-15 – An Update”, Report for the European Commission, DG Employment and Social Affairs, Berlin: DIW.
- Babetskii, I. (2005): “Trade Integration and Synchronization of Shocks: Implications for EU Enlargement”, *Economics of Transition*, 13(1), pp. 105–138.
- Bayoumi, T., and Eichengreen, B. (1993): “Shocking Aspects of European Monetary Integration”, in Torres, F., and Giavani, F. (eds.), *Growth and Adjustment in the European Monetary Union*, pp. 193–230. Cambridge, UK, Cambridge University Press and CEPR.
- Beneš, J., Hlédik, T., Vávra, D., and Vlček, J. (2003): “The Quarterly Projection Model and its Properties”, in: Coats, W., Laxton, D., and Rose, D. (eds.), *The Czech National Bank’s Forecasting System*, Czech National Bank.
- Blanchard, O. J., and Perotti, R. (2002): “An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output”, *Quarterly Journal of Economics*, 117(4), pp. 1329–1368.
- Blanchard, O. J., and Quah, D. (1989): “The Dynamic Effects of Aggregate Demand and Supply Disturbances”, *American Economic Review*, September, pp. 655–673.
- Blanchflower, D. G. (2001): “Unemployment, Well-Being and Wage Curves in Eastern and Central Europe”, *Journal of the Japanese and International Economies*, 15(4), pp. 364–402.
- Blanchflower, D. G., and Oswald, A. J. (1994): *The Wage Curve*, Cambridge: MIT Press.
- Boeri, T., and Scarpetta, S. (1996): “Regional Mismatch and the Transition to a Market Economy”, *Labour Economics*, 3(3), pp. 233–254.
- Bouthevillain, C., Cour-Thimann, P., van de Dool, G., Hernández de Cos, P., Langenus, G., Mohr, M., Momigliano, S., and Tujula, M. (2001): “Cyclically Adjusted Budget Balances: An Alternative Approach”, ECB Working Paper No. 77.
- Brandt, N., Burniaux, J. M., and Duval, R. (2002): “Assessing the OECD Jobs Strategy: Past Developments and Reforms”, OECD Economics Department Working Paper No. 429.
- Bulíř, A., and Šmídková, K. (2004): “Exchange Rates in the New EU Accession Countries: What Have We Learned from the Forerunners?”, CNB Working Paper No. 10/2004.
- Calmfors, L., and Driffill, J. (1988): “Bargaining Structure, Corporatism and Macroeconomic Performance”, *Economic Policy*, 6, pp. 13–61.
- Carone, G., and Salomäki, A. (2005): “Indicators of Unemployment and Low-wage Traps”, in Carone, G., and Salomäki, A. (eds.): *Indicators and Policies to Make Work Pay*, Proceedings of the workshop organised by the European Commission, European Economy – Special Report, No. 2, forthcoming.

- Castrén O., and Mazzotta, S. (2005): “Foreign Exchange Rate Option and Returns Based Correlation Forecasts Evaluation and Two Applications”, ECB Working Paper No. 447.
- Conway, P., Janod, V., and Nicoletti, G. (2005): “Product Market Regulation in OECD Countries, 1998 to 2003”, OECD Economics Department Working Paper No. 419.
- Čihák, M., and Heřmánek, J. (2005): “Stress Testing the Czech Banking System: Where Are We? Where Are We Going?”, CNB Research and Policy Note No. 2/2005.
- Čihák, M., and Holub, T. (2003): “Price Convergence to the EU: What Do the 1999 ICP Data Tell Us?”, CNB Working Paper No. 2/2003.
- De Grauwe, P. (2003): *Economics of Monetary Union*, Fifth Edition, Oxford University Press, New York.
- De Grauwe, P., and Mongelli, P. F. (2005): “Endogeneities of Optimum Currency Areas: What Brings Countries Sharing a Single Currency Closer Together?”, European Central Bank Working Paper No. 468.
- Eichengreen, B. (1997): *European Monetary Unification: Theory, Practice, and Analysis*. Massachusetts Institute of Technology, MIT Press, Cambridge.
- European Commission (2005): *Public Finances in EMU*.
- Engel, C., and Rogers, J. (2004): “European Product Market Integration After the Euro”, *Economic Policy*, pp. 347–384.
- Feldstein, M. (2002): “The Role for Discretionary Fiscal Policy in a Low Interest Rate Environment”, NBER Working Paper No. 9203.
- Fidrmuc, J. (1999): “Determinants of EU’s Intra-industry Trade with CEECs”, CERGE–EI Discussion Paper No. 6/99.
- Flanagan, R. J. (1999): “Macroeconomic Performance and Collective Bargaining: An International Perspective”, *Journal of Economic Literature*, 37(3), pp. 1150–1175.
- Flek *et al.* (2001): “Výkonnost a struktura nabídkové strany”, Výzkumná práce ČNB č. 27.
- Frankel, J. A., and Rose, A. K. (1997): “Is EMU More Justifiable Ex Post than Ex Ante?”, *European Economic Review*, 41, pp. 753–760.
- Frankel, J. A., and Rose, A. K. (1998): “The Endogeneity of the Optimum Currency Area Criteria”, *The Economic Journal*, pp. 1009–1025.
- Freeman, R. B. (2005): “Labour Market Institutions Without Binders: The Debate Over Flexibility and Labour Market Performance”, NBER Working Paper No. 11286.
- Galuščák, K., and Münich, D. (2005a): “Regional Wage Adjustments and Unemployment: Estimating the Time-varying Wage Curve”, *Czech Journal of Economics and Finance* 55(1–2), pp. 68–81.
- Galuščák, K., and Münich, D. (2005b): “Structural and Cyclical Unemployment: What Can We Derive from the Matching Function?”, Czech National Bank Working Paper No. 2.
- Galuščák, K., and Pavel, J. (2005): “Does Work Pay? Incidence of Unemployment and Inactivity Traps in the Czech Republic”, in Carone, G., and Salomäki, A. (eds.): *Indicators and Policies to Make Work Pay*, Proceedings of the workshop organised by the European Commission, European Economy– Special Report, No. 2, forthcoming.
- Gregg, P. (2000): “The Use of Wage Floors as Policy Tools”, OECD Economic Studies No. 31.

- Hoekman, B., and Djankov, S. (1996): “Intra-industry Trade, Foreign Direct Investment and Reorientation of East European Exports”, CEPR Discussion Paper No. 1377.
- Horváth, J. (2003): “Optimum Currency Area Theory: A Selective Review”, BOFIT Discussion Paper No. 15.
- Horváth, R. (2005): “Exchange Rate Variability, Pressures and Optimum Currency Area Criteria: Evidence from the 1990s”, *Applied Economics Letters*, forthcoming.
- Hughes-Hallett, A., and Piscitelli, L. (2002): “Does Trade Integration Cause Convergence?”, *Economic Letters*, 75(2), pp. 165–170.
- Hycklak, T., and Johnes, G. (1992): “Wage Flexibility and Unemployment Dynamics in Regional Labor Markets”, W.E. Upjohn Institute for Employment Research, Kalamazoo, Michigan.
- Jurajda, Š., and Münich, D. (2003): “Understanding Long-Term Unemployment in the Czech Republic”, *Finance a úvěr*, 53(1), pp. 11–30.
- Kalemlı-Ozcan, S., Sorensen, B. E., and Yosha, O. (2003): “Risk Sharing and Industrial Specialization: Regional and International Evidence”, *American Economic Review*, 93(3), pp. 903–918.
- Kenen, P. B. (1969): “The Theory of Optimum Currency Areas: An Eclectic View”, in Mundell and Swoboda (eds.), *Monetary Problems in the International Economy*, University of Chicago Press.
- Kenen, P. B. (2000): “Currency Areas, Policy Domains and the Institutionalisation of Fixed Exchange Rates”, CEP Discussion Papers.
- Krieger, H. (2004): “Migration Trends in an Enlarged Europe”, Report on the Quality of Life in Europe, Dublin: European Foundation for the Improvement of Living and Working Conditions.
- Krugman, P. (1993): “Lessons of Massachusetts for EMU”, in Torres, F., and Giavazzi, F. (eds.), *Adjustment and Growth in the European Monetary Union*, Cambridge University Press, pp. 241–261.
- Kočenda, E. (2001): “Macroeconomic Convergence in Transition Countries”, *Journal of Comparative Economics*, 29, pp. 1–23.
- Krugman, P. (1981): “Intraindustry Specialization and the Gains from Trade”, *Journal of Political Economy*, 89(5), pp. 959–973.
- Landesmann, S., and Székely, I. (1995): “Industrial Restructuring and Trade Reorientation in Eastern Europe”, Cambridge (UK): Cambridge University Press.
- Lee, H.-Y., and Wu, J.-L. (2004): “Convergence of Interest Rates around the Pacific Rim”, *Applied Economics*, 36, pp. 1281–1288.
- Marques, C. R. (2004): “Inflation Persistence: Facts or Artefacts?”, European Central Bank Working Paper No. 271.
- McKinnon, R. I. (1963): “Optimum Currency Areas”, *The American Economic Review*, 53(4), pp. 717–725.
- Micco, A., Stein, E., and Ordonez, G. (2003): “The Currency Union Effect on Trade: Early Evidence from EMU”, *Economic Policy*, 18, pp. 315–343.

- Mongelli, P. F. (2002): “‘New’ Views on the Optimum Currency Area Theory: What is EMU Telling Us?”, European Central Bank Working Paper No. 138.
- Mundell, R. A. (1961): “A Theory of Optimum Currency Areas”, *The American Economic Review*, 51(4), pp. 657–665.
- Nicoletti, G., and Scarpetta, S. (2004): “Do Regulatory Reforms in Product and Labor Markets Promote Employment? Evidence from OECD Countries”, paper presented at the ECB/CEPR Conference on “What Helps or Hinders Labour Market Adjustments in Europe”, Frankfurt, 28–29 June.
- Nickell, S. (1997): “Unemployment and Labor Market Rigidities: Europe versus North America”, *Journal of Economic Perspectives*, 11(3), pp. 55–74.
- OECD (1994): *The OECD Jobs Study: Facts, Analysis, Strategies*, Paris: OECD.
- OECD (1995): *The OECD Jobs Study: Implementing the Strategy*, Paris: OECD.
- OECD (1998, 2000, 2004a, 2005a): *Employment Outlook*, Paris: OECD.
- OECD (2004b): *Benefits and Wages*, Paris: OECD.
- OECD (2004c): *Economic Surveys 2004: Czech Republic*, Paris: OECD.
- OECD (2005b): *Taxing Wages 2003–2004*, Paris: OECD.
- OECD (2005c): *Trends in International Migration: SOPEMI 2004 Edition*, Paris: OECD.
- Reinhart, C. M., and Rogoff, K. S. (2004): Background material to “The Modern History of Exchange Rate Arrangements: A Reinterpretation”, *The Quarterly Journal of Economics*, 119(1), pp. 1–48.
- Roisland, O., and Torvik, R. (2003): “Optimum Currency Areas Under Inflation Targeting”, *Open Economies Review*, 14, pp. 99–118.
- Rose, A. (2000): “One Money, One Market: Estimating the Effect of Common Currencies on Trade”, *Economic Policy*, 15, pp. 7–45.
- Shapiro, C., and Stiglitz, J. E. (1984): “Equilibrium Unemployment as a Worker Discipline Device”, *American Economic Review*, 74(3), pp. 433–444.
- Vaubel, R. (1990): “Currency Unification, Currency Competition, and the Private ECU: Second Thoughts”, in *International and European Monetary Systems*, Emil-Maria Claassen (ed.), Praeger, pp. 171–187.