

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

2006

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A. Introduction

The Czech Republic's entry into the euro area will bring numerous benefits to the Czech national economy, but also certain risks. The loss of independent monetary policy and the replacement of the local currency by the euro on joining the euro area will result in costs for the Czech economy connected with the impossibility of adjusting the exchange rate if competitiveness with key trading partners is lost and with a considerably limited influence on monetary policy interest rate levels. If the country's economic development differs from that of the overall euro area, a situation may arise where the monetary conditions do not correspond to the situation in the Czech economy. Such a development may be triggered by occurrence of economic shocks that affect the Czech economy in a manner different from the euro area average, or by other factors. At a time when the degree of real convergence and cyclical and structural alignment is still insufficient to eliminate such developments, the flexibility of the economy and its ability to adjust rapidly to economic shocks by means of other adjustment channels will be vital for maintaining good performance. The analyses presented in this document therefore examine the Czech Republic's degree of economic alignment with the euro area and the Czech economy's ability to use alternative possibilities of adjustment.

This set of analyses of the Czech economy's alignment with the euro area in 2006 is a follow-up to a similar document published by CNB last year. The studies have been updated based on the latest statistical data and their scope slightly expanded in some cases. As in the 2005 document, the analyses have been divided into two key groups according to the type of question which they try to answer. The section entitled "Cyclical and Structural Alignment" indicates the size of the risk of different economic developments in the Czech Republic compared to the euro area and hence the risk of the single monetary policy being highly suboptimal for the Czech economy. The section entitled "Adjustment Mechanisms" answers the question of to what extent the Czech economy is 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 are euro area members already (Austria, Germany and Portugal have been selected)¹, which will become members in the near future (Slovenia) or which aspire to such membership (Poland, Slovakia and Hungary). All of the analyses attempted to make comparisons with all the selected countries, but in some cases that was not possible 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 selection of the euro area countries is different from last year's; Germany has been included in the analysis, replacing Greece. This change enhances the representativeness of the selection with regard to the diversity of the economic characteristics of the euro area countries under review. The selection thus includes countries that are comparable in terms of economic level and countries with which the Czech economy has trading links. Germany, the largest trading partner of the Czech Republic, meanwhile provides a useful benchmark as a core country of the euro area, although when making comparisons with aggregate or average economic indicators the large weight of Germany in the calculation of those indicators must be taken into account. The above selection is not related to any assessment of how successfully these economies have performed in the euro area.

A. Executive Summary

Euro area entry will bring about a loss of independent monetary policy and of exchange rate flexibility vis-à-vis main trading partners and, therefore, a loss of two important adjustment channels. The negative consequences of this change will decrease with growing alignment of the Czech economy with the euro area economy and with increasing efficiency of its alternative adjustment mechanisms. This document assesses the similarity of long-term economic trends, cyclical developments and economic structure, the capacity for the adjustment of fiscal policy and the labour and product markets, and the functionality of financial markets.

The costs arising from the loss of the Czech Republic's own monetary policy will be particularly pronounced if the Czech economy is not aligned with the euro area economy and its development therefore deviates frequently from that in the euro area. The risks arising from the Czech Republic's accession to the euro area will decrease as the degree of alignment increases.

The degree of real economic convergence is an important indicator of the Czech economy's similarity to the euro area. A higher level of such convergence fosters greater similarity of long-run equilibrium development. Indirectly, it can also foster a lower likelihood of cyclical misalignment. A higher degree of convergence prior to ERM II entry and euro adoption decreases the potential future pressures for growth of the price level and equilibrium appreciation of the real exchange rate. Thanks to a pick-up in economic growth, GDP per capita in the Czech Republic has recently started to converge more quickly towards the euro area average. The current level is comparable with the other least advanced countries and higher than in most of the new EU Member States (except for Slovenia). The price level also converged in 2005, owing mainly to nominal appreciation of the exchange rate. However, the difference in price level relative to the euro area remains sizeable. Going forward, the process of real convergence, and hence also the equilibrium trend of real appreciation of the koruna against the euro, can be expected to continue. The persistence of this trend following accession to the euro area will initially engender a higher rate of inflation in the Czech Republic than in the euro area and, as a result, lower domestic real interest rates (probably even negative in the case of short-term money market rates). If this situation persists in the long term, it could be associated with certain risks.

Alignment of the business cycle and similarity of economic shocks are preconditions for a single monetary policy to have an effective and appropriate effect on an economy in a monetary union. Analyses suggest that at the level of overall economic activity the business cycle in the Czech Republic is not converging towards that in the euro area at any great rate. In contrast to the results of last year's analyses, no sign of the increase in the alignment of the cycles recorded in recent years is observed either. The analyses therefore turn out worse for the Czech Republic than for the advanced euro area countries and for Hungary and Slovenia. Nor can any alignment with the euro area be seen at the level of demand-side and supply-side macroeconomic shocks. Conversely, a relatively high degree of alignment with the euro area is observed for industrial activity. The results of an analysis of export activity suggest the possibility of significant alignment between the Czech Republic and the euro area in this area. However, these results are not robust.

A gradual increase in the **inflow of money from EU structural funds** is a specific asymmetric shock that might impact on the Czech economy. The biggest economic stimulus for domestic demand in this respect should occur in 2007 and 2008. However, the results of the analysis indicate that it will not require a significant monetary policy reaction or adjustment of the

exchange rate of the koruna that would endanger the stay in ERM II and the potential assessment of the Maastricht exchange rate criterion.

The structure of the Czech economy in terms of product creation is broadly similar to that of the euro area economy, although it retains a specific feature in the form of a higher (and, in recent years, growing) share of industry and a smaller share of services in GDP.

Another asymmetric shock that has hit some economies in the past is rapid convergence of **nominal interest rates** ahead of entry into the monetary union. For a country planning to enter, earlier gradual convergence of such rates is therefore preferable (although this simultaneously reduces the immediate benefits of joining the euro area in terms of investment support and economic growth). The difference between Czech interest rates and euro area interest rates has been zero or negative since 2002, hence the aforementioned risk is virtually non-existent at present. The Czech koruna's **exchange rate** against the dollar has been moving very much in line with the euro's exchange rate against the dollar. Among the countries under comparison, only Slovenia and Slovakia, i.e. countries participating in ERM II, have a greater alignment for this exchange rate. The macroeconomic characteristics of the Czech economy indicate the potential for broadly similar medium-term exchange rate volatility as in the other new EU Member States under comparison. The observed medium-term volatility of the Czech koruna against the euro is comparable in particular with that of the Slovak koruna, is smaller than that of the Polish zloty (and, by some measures, the Hungarian forint) and, conversely, is greater than that of the Slovenian tolar. These differences reflect, among other things, different monetary policy regimes.

The Czech economy's strong **trade and ownership links** with the euro area are the principal argument for adopting the single currency, as they increase the potential benefits arising from the elimination of potential fluctuations in the exchange rate. The euro area is the partner for 60% of Czech exports and 50% of Czech imports, and strong links with the euro area are also apparent for the other economies under comparison. The Czech economy's ownership links with the euro area on the direct investment inflow side are slightly stronger than in the other countries under comparison. The Czech economy's strong economic integration with the euro area creates conditions for increasing its cyclical alignment with this area. Another positive aspect from this perspective is the high intensity of intra-industry trade with the euro area, which is comparable with Austria and Germany.

The analysis of the Czech **financial sector**, and, within it, the banking sector, reveals that despite its relatively smaller size by comparison with the euro area, it need not be expected to have a fundamentally different effect on the economy. Moreover, the monitored indicators have recently recorded further slight convergence towards the euro area. The depth of financial intermediation in the Czech Republic is currently thus roughly one-third of the level in Germany, Austria and the euro area and 45% of that in Portugal. The Czech Republic lags behind these countries in particular in terms of lending. However, as a result of dynamic growth in loans to households and corporations in Czech Republic, client loans are rising as a percentage of both total loans and GDP. On the one hand this trend represents gradual convergence towards the corresponding shares in the euro area, but on the other hand it could pose a risk of loan defaults in the event of a further build-up in household debt. The historical experience of some current euro area countries with high growth in household borrowing suggests that such a trend does not necessarily lead to problems in the financial system. The degree of integration of the Czech stock market and the euro area markets is at a slightly lower level than the German and Portuguese markets and at a similar level as Austria. The speed of elimination of shocks on the Czech stock market has recently increased.

In the absence of independent monetary policy, the flexibility of the economy and its ability to adjust to shocks will be particularly important. The stabilisation function of public budgets, labour and product market flexibility and the ability of the financial system to absorb shocks will therefore be vital for smooth economic development.

As regards **the public finances of the Czech Republic**, the operability of the stabilisation function within the European fiscal regulations will be crucial. This operability will be proportional in particular to the current distance of the deficit from the 3% reference value. The closer the deficit is to zero in its structural part, the more room there will be at a time of economic weakening for the functioning of automatic stabilisers and, in the extreme case, for the implementation of discretionary measures. The current public finance deficits, however, are largely structural in nature and there is unlikely to be an improvement in this regard in the near future. Moreover, the public finance deficit is increasing at a time of solid economic growth, and the expected future path suggests that this trend will continue. This is at odds with the effort to pursue anticyclical fiscal policy and with the intention to consolidate public finances prior to introducing the euro. The continuing public finance imbalance could be a source of growth in nominal public debt, which will probably lead to increasing debt service costs. Another condition for maintaining fiscal policy effectiveness is to achieve long-term sustainability of public finances, especially by dealing with the effect of population ageing on social system expenditures. The contribution of public finances to the economy's ability to respond flexibly to shocks will clearly be limited until these problems are tackled.

Price and wage flexibility is an important precondition for the economy to be able to absorb shocks to which the single monetary policy cannot respond. The analyses show that no major change has occurred since last year in the outlook for real wage flexibility in the Czech Republic. This flexibility, moreover, seems to be decreasing over time. Since last year the inflation persistence indicator has fallen slightly, but it remains among the highest in the sample of countries under comparison.

The ability of the Czech **labour market** to absorb shocks is largely unchanged from last year and remains average by European comparison (the European labour market itself requires fundamental reforms and may therefore be a fairly low standard). In some areas, though, the labour market is considerably less flexible than in the countries under comparison, and no major improvement is occurring. The institutional rules do not create the right conditions for employment of people with low skills. The main risk factors are the interaction of taxes and social benefits, a rising minimum wage and the costs of terminating open-ended employment contracts.

The labour market is still characterised by relatively high long-term and structural unemployment. Although long-term unemployment is still lower than in some other countries (particularly Poland and Slovakia), it remains a major problem. Moreover, along with Germany the Czech Republic has the largest regional differences in the unemployment rate. This may be due to significant regional gaps between the demand for, and supply of, labour and the low regional mobility of the labour force. If mobility within the Czech Republic can be considered an appropriate indicator of cross-border mobility, this channel, too, will probably not be an effective adjustment mechanism in the event of economic imbalances. That said, the good news is that in 2006 several countries of the EU have opened up or partly liberalised their labour markets for citizens of the new Member States. Conversely, the inflow of foreign labour into the Czech Republic has recently been very dynamic. The vast majority of these foreign workers are in jobs requiring few, if any, qualifications. The inflow of foreign workers bears witness to some degree

of flexibility as regards international migration. On the other hand, however, it suggests that some serious problems persist in the Czech labour market.

Labour market flexibility is to a great extent determined by the institutional rules. OECD analyses and new studies have revealed that collective bargaining has a fairly small effect on wage setting in the Czech Republic. The impact of the minimum wage on the flexibility of low wages and on job creation is also rather lower on average by international comparison, although the ratio of the minimum wage to the average wage has increased sharply in recent years. High minimum wages coupled with high labour taxation can have an adverse effect on job creation. Total labour taxation has been on the rise in the Czech Republic since 2000, and this trend will not be significantly changed by the modest reduction in the tax burden on low-income groups effective since January of this year. The effect of taxation on long-term unemployment and job creation is roughly the same as in Austria, Hungary and Poland, but higher than in Poland and Slovakia. Compared with other countries, the financial incentives to accept a job given by the combination of taxes and benefits are comparable or higher for the short-term unemployed, but average for the long-term unemployed. These incentives improved slightly last year thanks to the introduction of tighter conditions for qualifying for unemployment benefit and registering at labour offices. In the area of permanent employment the degree of job protection is higher than in other countries, which may present a risk in particular as regards the entry of young people to the labour market. By contrast, the introduction of easier procedures for setting up businesses will positively affect job creation. This measure means some further partial improvement in the regulation of the business environment, which by international comparison, however, remains hampered by major administrative obstacles.

Stability and profitability of the financial sector is a precondition for the sector to be able to assist in absorbing the impacts of economic shocks. The percentage of non-performing loans in the Czech Republic has recently recorded an overall decline to a level only slightly higher than the average in the euro area countries. Capital adequacy is currently at a sufficient level comparable with the other countries monitored, but outflow of earnings abroad and the lending activity of banks are causing it to fall slightly. The sector's resilience is enhanced by its high profitability. The Czech banking sector is currently recording stability and an ability to absorb external shocks and adverse economic developments.

To sum up, numerous indicators speak in favour of relatively early adoption of the euro. These include the high degree of openness of the Czech economy, its close trade and ownership links with the euro area, and the achievement of convergence of the inflation rate and nominal interest rates. In addition, there are some indicators which have tended to be unfavourable for the Czech Republic in the past, but which have improved in recent years. The positive developments include further progress in real economic convergence in the Czech Republic, including modest convergence of the price level towards that in the euro area; a shift in the characteristics of the financial market closer to the euro area average; the achievement of a high degree of banking system stability; and a modest improvement in the conditions for business.

Insufficient alignment with the euro area economy, which could increase the costs arising from the loss of independent monetary policy, can thus be seen chiefly in a major difference between the cyclical development of Czech and euro area GDP and in a persisting difference in the price level. A traditional bottleneck as regards the economy's flexibility and ability to adjust to shocks is the labour market, which still exhibits relatively high long-term and structural unemployment and low regional mobility. Some positive changes have occurred recently, for example the introduction of tighter conditions for qualifying for unemployment benefit and registering at labour offices, and easier procedures for setting up businesses. On the other hand, the flexibility

of low wages may be adversely affected by the rising ratio of the minimum wage to the average wage. The costs of terminating an open-ended employment contract after a short period of employment remain relatively high by international comparison, and the new Labour Code effective from 2007 will not change this very much. Greater labour market flexibility is thus still one of the key challenges going forward.

Public finances have developed unfavourably since the last assessment. The medium-term outlook for public finances has recently deteriorated. Long-term stabilisation of public budgets below the 3% reference value has not been achieved either. If the euro is to be adopted, this trend has to be reversed and sustainability of public budgets must be ensured.

B. Theoretical Foundations 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 somewhat, one can say that economists agree on the set of fundamental benefits and costs of the single currency, although 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, the 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, i.e. costs which can be viewed, to a large extent, as non-recurring.⁴ The main long-term costs include 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 the economy to employ other adjustment channels.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 benefits 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 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

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 growth in GDP 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.

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) have found this effect to be economically significant for the euro area countries. Baldwin (2006), on the other hand, points out that euro area accession cannot be expected to have such an upward impact on foreign trade as implied by the results set out in the earlier literature. According to his results, the introduction of the euro itself tends to act as a non-discriminating unilateral liberalisation of the product market and could therefore have a greater impact on a country’s imports than on its exports.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 therefore 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. Moreover, an increase in trade integration can lead to greater business cycle correlation (Frankel and Rose, 1997).⁸ As regards the introduction of the euro in the new member countries, however, this channel acting via an increase in the share of mutual trade is likely to be fairly weak (Baldwin, 2006).

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

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.

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. According to Lane (2006), the introduction of the euro had a clear impact in terms of increasing the integration of the euro area financial markets; however, there was growth in foreign trade with both members and non-members of the euro area, hence it can be expected that it did not unambiguously cause a reduction in the probability of asymmetric shocks.

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.⁹ 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 include 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 an 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 gradual 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.¹⁰ 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 compared to the euro area average because the option of a real strengthening of the exchange rate though nominal appreciation will be closed. One of the consequences will be lower (or even negative) real interest rates compared to the euro area average. That may also raise questions about the appropriateness of the single monetary policy for an accession country.

As Table 1 shows, the Czech economy has been converging towards the euro area in terms of **GDP per capita** since 2001. This process has accelerated in recent years. With this indicator

⁹ On the other hand, alignment in some areas, e.g. convergence of nominal interest rates, may reduce the benefits of the single currency.

¹⁰ The simultaneous restriction placed on the inflation differential and the appreciation of the nominal exchange rate represents an implicit restriction on the appreciation of the real exchange rate. If the equilibrium real appreciation is faster than this restriction, fulfilment of the Maastricht convergence criteria may require a temporary deviation of the exchange rate from equilibrium, with impacts on the development of the entire economy. However, this potential problem is mitigated by the fact that the exchange rate criterion is significantly more tolerant of appreciation than depreciation.

currently around 70% of the euro area level, the Czech Republic belongs to the group of countries whose standard of living is comparable with the least advanced euro area countries (Portugal). It is thus more advanced than the other new EU Member States (Hungary, Poland and Slovakia), except for Slovenia.¹¹ However, it still lags well behind the wealthier euro area countries (e.g. Austria and Germany).

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

	1998	1999	2000	2001	2002	2003	2004	2005
CZ	60.1	59.2	58.4	59.7	61.6	63.2	65.8	68.5
AT	113.0	114.5	115.3	112.5	111.3	112.5	114.8	115.6
DE	104.9	103.9	102.7	101.4	100.8	100.9	101.7	103.0
PT	71.5	73.6	73.8	73.6	73.8	67.8	67.9	67.0
HU	46.6	47.3	48.5	51.4	53.9	55.2	56.3	57.1
PL	41.3	42.0	42.9	42.5	43.0	43.7	45.7	46.8
SI	65.8	67.5	66.8	68.1	69.2	70.7	74.0	75.0
SK	43.1	42.6	43.6	44.7	47.4	48.4	49.7	51.7

Sources: Eurostat, CNB calculations.

Table 2 illustrates the **price level of GDP** compared to the euro area. In the case of the Czech Republic, this indicator showed the greatest convergence in 2001–2002 and again in 2005. In both cases, this was due to an accelerated nominal appreciation of the koruna. The distance of the Czech Republic’s price level from the old EU countries, however, remains distinctly higher than in the case of GDP. The Czech Republic in this indicator lags markedly behind not only Austria and Germany, but also Portugal and Slovenia and, in recent years, also behind Hungary.¹² 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	2005
CZ	43.7	43.2	45.7	48.7	53.0	51.8	51.9	55.0
AT	105.3	104	103.3	104.3	104.1	103.3	101.6	101.4
DE	112.6	112.2	111	110.7	109.4	108	106.2	103.6
PT	72.5	72.6	73.5	74.6	75.2	80.7	80.8	81.7
HU	43.5	44.2	46.7	48.8	53.9	54.7	57.3	59.7
PL	47.8	46.2	51.4	57.1	54.1	47.7	46.9	53.4
SI	71.6	71.6	71.0	70.9	72.9	73.1	71.1	71.5
SK	42.2	39.6	42.7	42.7	43.3	46.7	51.0	53.6

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 23% since 1998, i.e. at an average rate of 3% a year (and since 1993 by an average of 4.1% a year). Relative to the current euro area countries surveyed, the rate of real appreciation in the Czech economy has been distinctly higher since both 1998 and 1993, while in the case of Austria and Germany the real exchange rate even depreciated somewhat. A considerably lower rate of appreciation than Czech koruna has also been recorded by the Slovenian tolar, and the appreciation of the Polish zloty has also been

¹¹ Prior to entering the ERM II mechanism, Slovenia had about the same level of GDP per capita at purchasing power parity as currently recorded by the Czech Republic.

¹² The comparison with Hungary may, however, change in 2006, as the Hungarian forint has depreciated quite considerably while the koruna has remained close to its historical highs.

somewhat weaker. Slovakia, on the other hand, and since 1998 also Hungary, has been recording a faster currency appreciation than the Czech Republic.

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

	1999	2000	2001	2002	2003	2004	2005	Annual rate of appreciation		
								since 1993	since 1998	Outlook ^{a)}
CZ	98	104	111	122	115	115	123	4.1%	3.0%	(2.0; 3.5)
AT	100	100	100	99	99	98	98	-0.5%	-0.2%	(0.0; 0.7)
DE	100	100	99	98	97	97	97	-0.6%	-0.5%	(0.0; 0.2)
PT	102	102	104	106	107	107	107	0.5%	1.0%	(0.2; 0.7)
HU	104	108	117	127	125	132	135	2.8%	4.4%	(1.7; 2.0)
PL	98	112	125	119	103	101	114	3.2%	1.9%	(2.0; 2.0)
SI	100	101	101	103	103	102	102	1.2%	0.3%	(1.0; 1.4)
SK	98	111	115	118	129	140	146	5.0%	5.6%	(2.1; 2.6)

Note: a) Estimated interval of the average year-on-year appreciation for the following five years, based on international comparisons (see *Methodological Part*); in percentages.

Sources: Eurostat, CNB calculations.

Based on the results of an international comparison (see Čihák and Holub, 2003 and 2005), continued equilibrium real appreciation may be expected for the currencies of the countries striving to join the euro area (the Czech Republic, Hungary, Poland, Slovenia and Slovakia). As far as the koruna is concerned, its estimated future equilibrium real appreciation lies approximately within the range of 2%–3.5% and is higher than in the economies included in the comparison.¹³ If euro were adopted within the next five years, the Czech Republic could expect an average inflation differential relative to the euro area within the above range. Assuming average euro area inflation of around 2%, inflation in the Czech Republic could therefore increase to about 4.0%–5.5% during the initial years following euro area entry. In the other countries, given their slower equilibrium appreciation, the figure would be somewhat lower.

As a result, the Czech Republic and the other countries currently aspiring to join the euro area would face lower **real interest rates** (see Table 4) than the average for the euro area and its advanced member countries (Austria and Germany). Their short-term real money-market interest rates would quite probably be negative, in fact. The substantiation for this problem is shown, *inter alia*, by the experience of Portugal, which had negative interest rates during 2001–2004. In the Czech Republic, the real three-month interest rate would drop to around -1 to -2.5 percentage point on average, which contrasts with both its development to date and its estimated current equilibrium level.¹⁴ Compared to the other countries striving to adopt the euro, moreover, the problem of negative real rates is quantitatively the most serious for the Czech Republic and can be seen most distinctly in comparison with Slovenia. On the other hand, the Czech Republic (together with Slovakia and Slovenia) has the advantage of a lower current level of real interest rates than Hungary and Poland, thus requiring a smaller degree of adjustment before euro adoption.

¹³ This figure is broadly in line with the current estimates of the equilibrium real appreciation of the koruna vis-à-vis the effective euro area, as used in the CNB's forecasts (approximately 3.5%–4.0%, with a gradually slowing tendency).

¹⁴ The CNB's forecasts currently work on the assumption of a three-month equilibrium real money market rate within the range of 0.5%–1.0 %.

Table 4: Three-month ex-post real interest rates (in %; HICP deflated)

	1998	1999	2000	2001	2002	2003	2004	2005	Average	Outlook ^{a)}
CZ	4.2	5.0	1.4	0.6	2.1	2.4	-0.2	0.4	2.0	(-2.5;-1.0)
AT	2.8	2.4	2.3	1.9	1.6	1.0	0.1	0.1	1.5	(0.3; 1.0)
DE	2.9	2.3	2.9	2.3	1.9	1.3	0.3	0.3	1.8	(0.8; 1.0)
PT	2.1	0.7	1.5	-0.1	-0.4	-0.9	-0.4	0.1	0.3	(0.3; 0.8)
HU	3.3	4.6	1.3	1.6	3.8	3.6	4.4	3.1	3.2	(-1.0;-0.7)
PL	7.7	7.0	7.9	10.2	6.9	4.9	2.5	3.0	6.3	(-1.0;-1.0)
SI	2.2	2.4	1.9	2.1	0.5	1.0	0.9	1.5	1.6	(-0.4; 0.0)
SK	13.5	4.8	-3.2	0.5	4.1	-2.0	-2.6	0.1	1.9	(-1.6;-1.1)

Note: a) Estimated real average interest rate for the next five years based on the estimated rate of equilibrium real appreciation as set out in Table 3, assuming an unchanged nominal exchange rate.

Sources: Eurostat, CNB calculations.

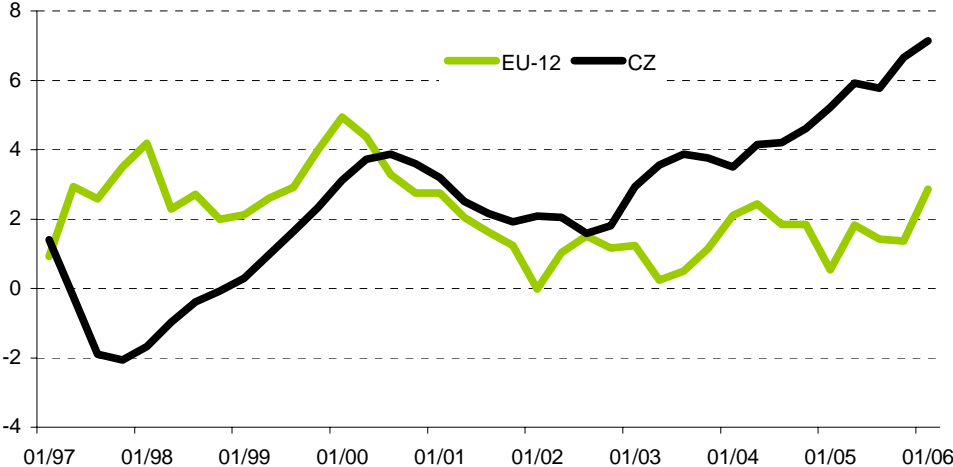
To sum up, the Czech economy is gradually converging to the euro area level in terms of GDP per capita and the price level. In particular, the convergence of real GDP has been accelerating over approximately the last three years. Going forward, however, there is still substantial room for real convergence. The equilibrium real appreciation of the koruna associated with this process may thus still pose a challenge to the fulfilment of the Maastricht criteria and the operation of the economy in the euro area, in terms of higher inflation and negative real interest rates.

1.1.2 Correlation of economic activity

Upon joining a monetary union, a country gives up its own monetary policy and from then on it becomes dependent on the monetary policy decisions taken at the union-wide level. The single monetary policy meanwhile responds to certain average economic developments in the union. If member country is in a different phase of the business cycle than the union average it becomes exposed to additional costs resulting from misalignment of the country's specific needs and the actual implementation of the single monetary policy. From the point of view of the optimum currency area theory, it is less costly for a country with a higher business cycle correlation with the euro area to stay in the monetary union. That is why the analysis below aims to identify whether there is any cyclical similarity between the Czech Republic and the other countries included in the comparison and the euro area.

Chart 1 illustrates the course of the business cycles in the Czech Republic and the euro area based on real GDP growth. The comparison shows that, up until 1999, the two cycles moved in opposite directions. The economic decline in the Czech Republic during that period was largely due to the unwinding effects of the economic transition, ongoing structural changes and the occurrence of some specific shocks (such as the financial crisis of 1997). The trend observed after 1999 suggested a possible converging of the Czech business cycle with that of the euro area, but clearly different dynamics of Czech real GDP and euro area GDP can be seen again since 2003.

Chart 1: Annual percentage changes in real GDP



Sources: Eurostat, CNB calculations.

To measure the degree of the cyclical correlation of the selected economies with the euro area, a simple correlation coefficient has been applied. At the same time, the dynamic correlation method, based on the spectral analysis of time series, was introduced. For robustness purposes, the results were compared using two different methods for detrending the underlying time series: year-on-year differences of logarithmed original time series and quarter-on-quarter (or month-on-month) differences of logarithmed seasonally adjusted time series. To allow comparison of changes in the alignment of business cycles over time, the data have been split into two periods, for which the correlation has been calculated separately. This, at the same time, takes into account the presence of the above described asymmetric shocks during the initial period and the potential presence of a structural break. The course of the business cycle is approximated by real GDP growth, which describes the evolution of the overall economic activity of the countries under review. In order to increase the flexibility of the analyses, the correlation of economic activity in industry and the correlation of export activity have also been examined. The Industrial Production Index (IPI)¹⁵ was used to compute the correlation of industrial activity. To analyse export performance, the correlation between the time series of total exports¹⁶ and the correlation of the time series of each country’s exports to the euro area with real euro area GDP were computed for the first time.

¹⁵ Owing to shorter time series, which for certain countries (the Czech Republic included) are available only since 1998, the correlation coefficients for this indicator were calculated only for the second period under review, i.e. 2001:M1–2006:M5.

¹⁶ Total exports comprise exports to the whole world; exports to the euro area also includes trade between the individual states of the euro area.

Table 5: Correlation coefficients of economic activity (expressed using real GDP and the IPI) – evolution over time ^{a)}

		1996 Q2 - 2000 Q4 ^{b)}		2001 Q1 - 2006 Q1		Jan 2001 - May 2006	
		GDP		GDP		IPI	
Method 1	CZ	0.27	(-0.18 ; 0.63)	0.29	(-0.09 ; 0.59)	0.77 **	(0.66 ; 0.84)
	AT	0.63 **	(0.27 ; 0.83)	0.52 **	(0.19 ; 0.75)	0.75 **	(0.64 ; 0.83)
	DE	0.93 **	(0.83 ; 0.97)	0.95 **	(0.90 ; 0.98)	0.90 **	(0.86 ; 0.94)
	PT	-		-		0.16	(-0.04 ; 0.36)
	HU	0.78 **	(0.53 ; 0.91)	0.81 **	(0.63 ; 0.91)	0.60 **	(0.45 ; 0.72)
	PL	0.36	(-0.08 ; 0.68)	0.28	(-0.10 ; 0.59)	0.54 **	(0.38 ; 0.67)
	SI	0.31	(-0.14 ; 0.65)	0.49 **	(0.15 ; 0.73)	0.53 **	(0.37 ; 0.66)
	SK	0.10	(-0.34 ; 0.51)	0.07	(-0.31 ; 0.43)	0.34 **	(0.15 ; 0.51)
Method 2	CZ	0.11	(-0.29 ; 0.48)	0.26	(-0.12 ; 0.57)	0.41 **	(0.22 ; 0.57)
	AT	0.39 *	(0.00 ; 0.68)	0.18	(-0.21 ; 0.51)	0.25 **	(0.05 ; 0.44)
	DE	0.74 **	(0.49 ; 0.88)	0.90 **	(0.79 ; 0.95)	0.59 **	(0.44 ; 0.71)
	PT	-		-		0.28 **	(0.07 ; 0.46)
	HU	0.55 **	(0.20 ; 0.77)	0.71 **	(0.47 ; 0.86)	0.12	(-0.09 ; 0.31)
	PL	0.36	(-0.04 ; 0.66)	0.31	(-0.07 ; 0.61)	0.36 **	(0.17 ; 0.53)
	SI	-0.10	(-0.47 ; 0.31)	0.50 **	(0.16 ; 0.73)	0.19	(-0.01 ; 0.38)
	SK	0.10	(-0.30 ; 0.47)	0.35	(-0.02 ; 0.64)	0.19	(-0.01 ; 0.38)

Notes: a) Method 1 – year-on-year differences, Method 2 – quarter-on-quarter (month-on-month) differences. The significance of the correlation coefficient is marked ** and * for the 5% and 10% significance levels respectively. The 90% confidence interval is in parentheses.
b) Method 1 for the period 1997 Q1 - 2000 Q4.

Sources: Eurostat, CNB calculations.

Table 5 presents the results of the simple **correlation analysis for GDP and the IPI**. In the case of approximating the business cycle by real GDP, not a single instance is observed of statistically significant correlation coefficients for the Czech Republic which would indicate some degree of alignment of the Czech Republic's business cycle with the euro area¹⁷ or any improvement over time. In terms of alignment, these conclusions are less favourable than those arrived at in the same document in 2005. In the previous document, there was at least one method that delivered a statistically significant value at the 10% significance level for the real GDP correlation coefficient in the second period. The relatively low correlation between the domestic and euro area business cycles may also be partially due to the excessive exchange rate volatility recorded in some years, which would be eliminated by euro area entry. In recent years, the measured correlation of GDP growth has also been adversely affected by accelerated economic growth in the Czech Republic and its stagnation in the euro area at the same time. An absence of alignment is also apparent for Poland and Slovakia, which recorded not a single statistically significant value of real GDP correlation with the euro area. Slovenia, on the other hand, reported statistically significant positive values of the correlation coefficient (at the 5% significance level) for both of the above methods in the period 2001:Q1–2006:Q1, which implies an increase in cyclical alignment of this country with the euro area over time. Hungary recorded a positive correlation for both periods under review. High levels of real GDP growth correlation were found for Germany; for this country, however, account should be taken of its high share in the aggregate indicator for the euro area and the related distortion.¹⁸ In Austria, some degree of

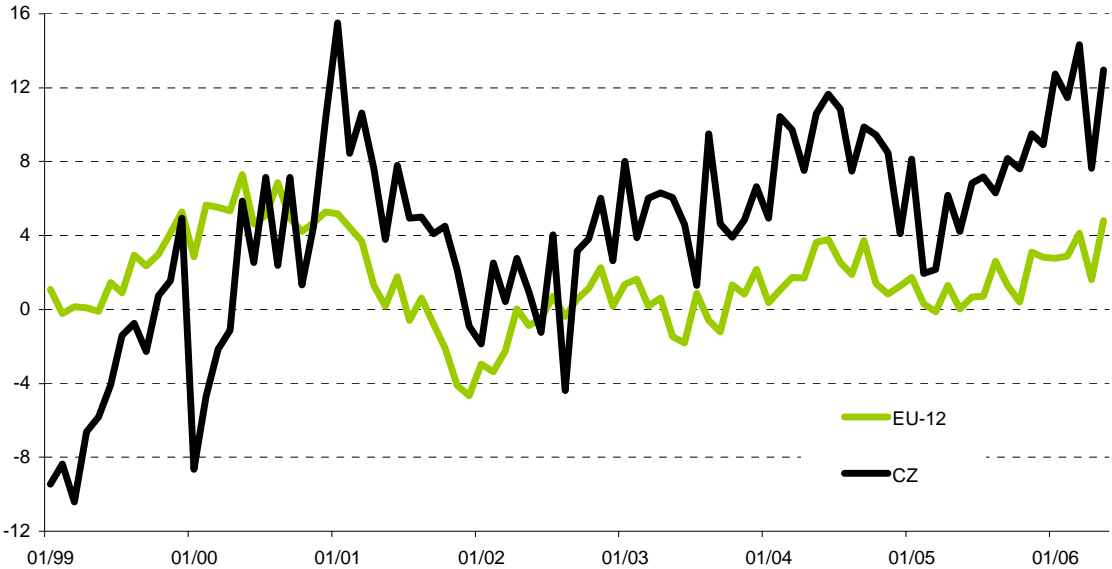
¹⁷ The overall misalignment of Czech and euro area real GDP is also reflected in the fact that for the calculations for the entire period under review (i.e. 1997:Q1–2006:Q1 or 1996:Q2–2006:Q1) the correlation coefficients fail to reach statistically significant values and are even negative.

¹⁸ The weight of Germany as measured by the share of its real GDP in the overall GDP of the euro area is around 30%. The computation of a correlation coefficient between the whole (the euro area) and a comparatively significant part thereof (Germany) is therefore not very sound in substantive terms. Despite all the reservations, however, the resulting figures may be used for illustration.

alignment of its real GDP is suggested by the statistically significant correlation coefficients for Method 1, but these are not fully supported by the results from Method 2.

The correlation analysis using the Industrial Production Index (IPI), which is shown for the Czech Republic and euro area in Chart 2, indicates, however, a high degree of alignment of industrial activity in the Czech Republic with the euro area in the period January 2001 – May 2006. The observed correlation is statistically significant at the 5% significance level for both methods. The correlation identified is higher than for most of the countries under comparison, except for Germany. However, the results based on the Industrial Production Index analysis should be interpreted as complementary only, as industrial production in the advanced nations makes up less than 30% of total output, and the structures of the economies of the countries under review also differ quite significantly (see Section 1.1.5).¹⁹

Chart 2: Year-on-year changes in the Industrial Production Index (in %)



Sources: Eurostat, CNB calculations.

The results of the export performance correlation analysis are summarised in Table 6. The conclusions on the alignment of Czech exports and euro area exports are not straightforward. The results from Method 1 suggest that a comparatively significant correlation exists between them and that this correlation is increasing over time. However, these results are not supported by Method 2. The same goes for the analysis of the interdependency of Czech exports to the euro area and euro area GDP. The Czech Republic records a statistically significant correlation coefficient only for Method 1 in the second period (and only at the 10% significance level).²⁰

¹⁹ Boone and Maurel (1999) criticise the use of the industrial production index for analysing the similarity of economies and business cycles, because of its high volatility.

²⁰ If euro area GDP is replaced in the last analysis by the Industrial Production Index of the euro area, i.e. if one concentrates on observing the correlation of exports to the euro area and the euro area IPI, the above conclusions do not change significantly.

Table 6: Correlation coefficients of overall export activity and exports to the euro area with euro area GDP– evolution over time

	Jan 1996 - Dec 2000		Jan 2001 - Feb 2006		1996 Q1 - 2000 Q4		2001 Q1 - 2005 Q4	
	EXP _{TOTAL}		EXP _{TOTAL}		EXP _{to EU-12} vs. GDP _{EU-12}		EXP _{to EU-12} vs. GDP _{EU-12}	
Method 1								
CZ	0.42 **	(0.23 ; 0.58)	0.64 **	(0.49 ; 0.75)	0.10	(-0.29 ; 0.46)	0.42 *	(0.05 ; 0.69)
AT	0.83 **	(0.75 ; 0.89)	0.80 **	(0.71 ; 0.87)	0.67 **	(0.38 ; 0.83)	0.80 **	(0.61 ; 0.91)
DE	0.92 **	(0.88 ; 0.95)	0.85 **	(0.78 ; 0.90)	0.52 **	(0.17 ; 0.75)	0.76 **	(0.54 ; 0.88)
PT	0.46 **	(0.29 ; 0.61)	0.63 **	(0.49 ; 0.74)	0.24	(-0.15 ; 0.57)	0.58 **	(0.26 ; 0.79)
HU	0.32 **	(0.12 ; 0.50)	0.65 **	(0.50 ; 0.75)	0.24	(-0.15 ; 0.57)	0.58 **	(0.26 ; 0.79)
PL	0.63 **	(0.48 ; 0.74)	0.26 **	(0.05 ; 0.45)	0.12	(-0.27 ; 0.48)	0.60 **	(0.28 ; 0.80)
SI	0.64 **	(0.49 ; 0.75)	0.47 **	(0.28 ; 0.62)	0.45 **	(0.09 ; 0.71)	0.20	(-0.19 ; 0.54)
SK	0.41 **	(0.22 ; 0.58)	0.39 **	(0.20 ; 0.56)	-0.16	(-0.51 ; 0.23)	0.13	(-0.26 ; 0.49)
Method 2								
CZ	0.18	(-0.04 ; 0.38)	0.00	(-0.21 ; 0.21)	0.01	(-0.37 ; 0.38)	0.24	(-0.15 ; 0.57)
AT	0.58 **	(0.41 ; 0.70)	0.41 **	(0.22 ; 0.57)	0.27	(-0.13 ; 0.59)	0.16	(-0.24 ; 0.51)
DE	0.48 **	(0.29 ; 0.63)	0.54 **	(0.37 ; 0.67)	0.10	(-0.29 ; 0.46)	0.68 **	(0.40 ; 0.84)
PT	0.20	(-0.01 ; 0.40)	0.44 **	(0.25 ; 0.59)	0.15	(-0.24 ; 0.50)	-0.05	(-0.42 ; 0.34)
HU	0.29 **	(0.08 ; 0.48)	0.37 **	(0.18 ; 0.54)	0.15	(-0.24 ; 0.50)	-0.05	(-0.42 ; 0.34)
PL	0.08	(-0.13 ; 0.29)	0.39 **	(0.20 ; 0.56)	0.16	(-0.23 ; 0.51)	0.44 *	(0.07 ; 0.70)
SI	0.32 **	(0.11 ; 0.50)	0.03	(-0.18 ; 0.24)	0.39 *	(0.02 ; 0.67)	0.04	(-0.34 ; 0.41)
SK	0.03	(-0.18 ; 0.25)	0.10	(-0.11 ; 0.31)	-0.31	(-0.61 ; 0.08)	-0.23	(-0.56 ; 0.17)

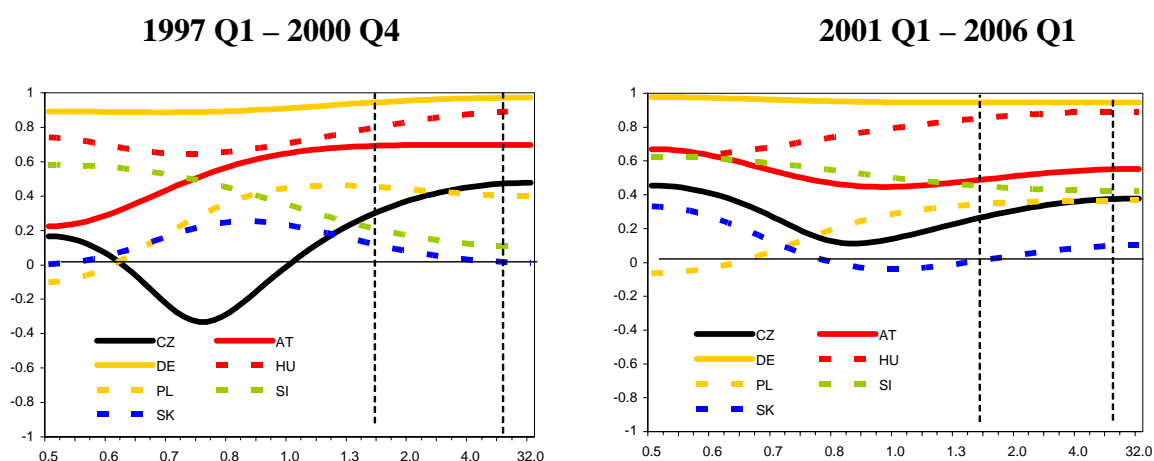
Note: Method 1 – year-on-year differences, Method 2 – quarter-on-quarter (month-on-month) differences.

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: IMF, CNB calculations.

All the above results are supported by the application of **dynamic correlation** using the spectral analysis of time series. Using an assumed business cycle length ranging between one and a half years to eight years, the correlation coefficients take on slightly higher values on average in most cases than in case of the simple static correlation analysis. Application of the method to the time series of real GDP, however, again showed no significant alignment of the Czech Republic in terms of overall economic activity. The correlation coefficients of real GDP for the countries under review with the euro area across the entire spectrum of the considered cycle length are shown in Chart 3.

Chart 3: Dynamic correlation of economic activity measured on the basis of year-on-year changes in real GDP – evolution over time



Note: The interval marked with the two vertical dashed lines indicates the assumed cycle duration of 1.5 - 8 years.

Sources: Eurostat, CNB calculations.

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 a unanimous opinion on the need for the alignment of supply shocks.²¹

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 1996:Q1–2006:Q2. 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 7 contains a summary of the results for 1996–2006 and for 1996–2000 and 2001–2006.

Based on the above results, we can say that the measured correlation of **demand shocks** identified for the Czech Republic in relation to the euro area has been moving close to zero both for the overall period 1996–2006 and for the two sub-periods. So far, then, there has been no statistically significant change in the correlation of this type of shock. The analysis of the above results implies that in 1996–2006, the demand shocks affecting the Czech Republic and the other countries under review, except for Hungary and Poland, were not statistically significantly correlated with the demand shocks affecting the euro area. Hungary and Poland record the most significant demand shock correlation, lying in the range of 0.26–0.28 over the entire period under review. The low synchronisation of shocks on the demand side in the Czech Republic is in line with the average for the selected three current members of the euro area, while the low (or even negative in the first period) correlation measured in the case of Germany is somewhat surprising. This 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** changed from -0.14 in 1996–2000 to -0.01 in 2001–2006, but even here the correlation coefficients are not statistically significantly different from zero, nor are the changes therein statistically significant. A more significant decrease in the correlation of supply shocks was recorded for Hungary (from 0.37 to 0.24) and Germany (from 0.70 to 0.50), and a more modest decrease occurred in Austria and Portugal. The analysis did not reveal any statistically significant differences in 1996–2006 in the correlation of demand shocks in the Czech Republic and the other countries included in the comparison, except for Hungary (0.29), Slovenia (-0.28) and Germany (0.64).

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.

²¹ 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 7: Correlation of economic shocks vis-à-vis the euro area**Demand shocks**

	1996-2006		1996-2000		2001-2006	
CZ	-0.04	(-0.35; 0.27)	-0.04	(-0.47; 0.41)	-0.05	(-0.48; 0.40)
AT	-0.07	(-0.37; 0.25)	0.04	(-0.41; 0.47)	-0.18	(-0.58; 0.29)
DE	0.07	(-0.25; 0.37)	-0.21	(-0.60; 0.26)	0.34	(-0.12; 0.68)
PT	0.03	(-0.28; 0.34)	0.09	(-0.37; 0.51)	-0.06	(-0.49; 0.39)
HU	0.28 *	(-0.03; 0.54)	0.28	(-0.19; 0.64)	0.38 *	(-0.08; 0.70)
PL	0.26 *	(-0.06; 0.53)	0.19	(-0.28; 0.58)	0.32	(-0.14; 0.67)
SK	0.01	(-0.30; 0.32)	-0.07	(-0.50; 0.38)	0.04	(-0.41; 0.47)
SI	-0.23	(-0.51; 0.09)	-0.39 *	(-0.71; 0.06)	-0.08	(-0.50; 0.38)

Supply shocks

	1996-2006		1996-2000		2001-2006	
CZ	-0.14	(-0.43; 0.18)	-0.14	(-0.55; 0.32)	-0.01	(-0.45; 0.43)
AT	0.22	(-0.10; 0.50)	0.16	(-0.30; 0.56)	0.08	(-0.38; 0.50)
DE	0.64 **	(0.41; 0.79)	0.70 **	(0.37; 0.87)	0.50 **	(0.07; 0.77)
PT	-0.09	(-0.39; 0.23)	0.10	(-0.36; 0.52)	0.02	(-0.43; 0.46)
HU	0.29 *	(-0.02; 0.55)	0.37 *	(-0.09; 0.70)	0.24	(-0.23; 0.62)
PL	-0.09	(-0.39; 0.23)	-0.33	(-0.67; 0.13)	0.10	(-0.36; 0.52)
SK	0.09	(-0.23; 0.39)	-0.11	(-0.53; 0.35)	0.25	(-0.22; 0.62)
SI	-0.28 *	(-0.54; 0.03)	-0.19	(-0.58; 0.28)	-0.23	(-0.61; 0.24)

Note: 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 calculations.

1.1.4 Macroeconomic effects of EU fund inflows

The increased inflow of money from EU funds due to the country's membership of the European Union will provide an additional stimulus to the Czech economy, probably with respect to investment activity in particular. In terms of analysing the impacts of this stimulus, which can be regarded as an asymmetric shock, the important factor will be whether the inflow of EU funds is gradual or whether significant year-on-year changes can be expected, which could significantly affect the Czech Republic's macroeconomic development.

The **financial flows** between the Czech Republic and European Union have so far been steady. This is due mainly to very low levels of drawdown of financial assistance from the structural funds and cohesion funds, i.e. for structural operations projects, mainly because of an inadequate institutional environment and a lengthy project selection process. Nowadays, drawdown of EU funds is gradually increasing and is expected to continue increasing. However, no abrupt change has been recorded so far. The net position²² was CZK 6.4 billion in 2004, mostly due to receipt of advance payments for structural operations and comparatively high compensation; however, there was practically no actual drawdown of EU funds for structural operations. In 2005, the country's net position was quite close to zero. The following are the key reasons for the deterioration in the net position: a decrease in advance payments for structural operations (6% of the total allocation for the programme period 2004–2006, as compared to 10% in 2004); a simultaneous decrease in compensation and increase in Czech contributions of own funds to the EU; and, insufficient implementation of structural operations projects. As shown in Table 8, the situation as regards drawing down EU structural funds for projects under operational

²² The net position is defined as the difference between the country's total income from the EU and its contributions to the EU.

programmes and single programming documents recorded a significant improvement in 2006, with expenditure of CZK 4.3 billion realised in the first six months of the year, as opposed to only around CZK 2.1 billion in 2005 as a whole.²³

Table 8: Drawdown of financing from EU structural funds in the Czech Republic (CZK millions)

	2005					2006		
	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q1-Q2 Total
realised expenditure	154.7	537.4	273.6	1113.3	2079.0	1921.6	2418.8	4340.4
drawdown	170.7	141.5	417.8	820.6	1550.6	678.9	2372.9	3051.8

Note: Drawdown for projects under operational programmes and individual programme documents. Cofinancing excluded.

Source: Ministry for Regional Development.

The 2006 net position will reach around CZK 3.5 billion, according to the preliminary estimates of the Czech Ministry of Finance, and will continue to increase over the years that follow. The largest leap in the inflow of finances from the EU sources is likely to occur in 2008, when the country's net position vis-à-vis the EU should reach approximately 1.3 % of GDP (i.e. CZK 49 billion). Up until 2013, the net position should then gradually increase to more than 2% of GDP (see Table 9). The Czech Republic will obtain the most funding for projects from the structural funds and cohesion fund. The main beneficiary should be the private sector. Large infrastructure projects and environmental protection projects financed from the cohesion fund will, however, be implemented in large part by the public sector, which will also participate to some extent in structural funds projects. In addition, payments to the EU and cofinancing of projects under the structural funds and cohesion fund will affect the expenditure side of the public budgets.

Table 9: Estimated financial flows resulting from the Czech Republic's EU membership (in CZK billion) and their assessed impact on the economy

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Pre-accession instruments	2.1	1.0	-	-	-	-	-	-	-
Agriculture	11.8	14.4	19.2	24.3	26.5	28.0	30.3	32.8	34.2
Structural operations	6.3	13.5	36.5	64.5	59.4	64.3	78.3	96.8	117.3
Internal policies	1.1	1.1	0.3	0.1	.	.	.	.	.
Compensation	8.9	5.7	-	-	-	-	-	-	-
EEA financial instrument	-	-	0.1	0.3	0.3	0.3	0.3	0.3	0.2
Bilateral aid from Norway	-	-	0.1	0.2	0.3	0.3	0.3	0.3	0.2
Total income from EU	30.4	35.8	56.2	89.4	86.5	92.9	109.1	130.1	151.9
Own funds	28.6	31.3	37.8	38.2	34.8	35.6	34.2	34.8	34.5
Payments to EIB	0.8	0.8	1.6	1.5	0.7	.	.	.	.
Total payments to EU	29.4	32.3	39.6	40.2	36.1	35.9	34.5	35.2	34.9
Net position	1.0	3.5	16.6	49.3	50.4	57.0	74.6	94.8	117.0
Net position in % of GDP	0.03	0.11	0.49	1.33	1.26	1.31	1.59	1.87	2.14
Impulse in pp of GDP	0.17	0.09	0.22	0.20	0.02	-0.02	0.07	0.08	0.05

Note: 2005 data = reality; an outlook for the CZK/EUR exchange rate according to the CNB's macroeconomic forecast (July 2006) is used to translate the source data stated in EUR to CZK. "-" indicates that the instrument did not or will not operate at the given time. "." means that no data are available.

Sources: Ministry of Finance (working estimates in EUR) and CNB calculations.

The expected increased inflow of funds for the private sector will imply an additional impulse for economic activity. **The impacts of this increased drawdown of EU funds on the macroeconomic stability** of the Czech Republic are examined in the analysis below.

The positive net position, or the increased inflow of finances from the EU into Czech Republic, does not itself necessarily mean that these funds will immediately boost domestic demand (see, for example, the receipt of advance payments for structural operations in 2004, which are being

²³ "Realised expenditure" refers to funds requested by final beneficiaries in the payment requests sent to the intermediating entity.

drawn down only gradually from the National Fund accounts), hence the derivation of the economic impulse is based on an expert estimate of the real drawdown of funds from the EU and not on the expected financial flows between the Czech Republic and EU. The estimate of the impacts of the rise in financial flows from the EU into the Czech economy uses the standard method applied in the forecasting system of CNB to calculate the fiscal impulse (see the methodology section for details). The estimated impulse stemming from the inflow of EU funds peaks in 2007 and 2008 and will be relatively close to zero in other years. This fact results from the expected gradual inflow of funds from the EU. Beyond 2008, the rate of growth of these flows will not diverge substantially from the rate of growth of nominal GDP (i.e. the year-on-year change in these flows of funds from the EU for the private sector, expressed as a percentage of GDP, will be low).

A simulation of the effects of this impulse on the economy has been conducted using the CNB's quarterly forecast model. It concentrates on tracking the deviations in inflation, the output gap, the exchange rate of the Czech koruna against the euro and the consistent path of interest rates (see Table 10). The baseline scenario against which the deviations are defined is the CNB's macroeconomic July 2006 forecast. The analysis takes account in particular of the short-term and medium-term demand impacts of this impulse; the impacts on the supply side of the economy are expected more in the long term. 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 koruna²⁴ and that the scenario for the drawdown of EU funding is generally expected.

Table 10: 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)

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

Source: CNB calculations.

The simulation shows that the most significant additional impulses that the Czech economy will experience in connection with fund inflows from the EU in 2007 and 2008 will be reflected to a small extent in the output gap. As a result of the monetary policy response, inflation will move in line with the baseline scenario. The intensity of the response of interest rates and the exchange rate is also low. The impact on the koruna's participation in the ERM II system and the fulfilment of the convergence criteria will thus probably be very limited as a result. The results of the simulation should, however, be taken as tentative and conditional on the methodology used.

1.1.5 Assessment of the economies' structural similarity

Greater similarity of the structure of economic activity between the acceding economy and the other economies of the currency area decreases the risk of occurrence of an asymmetric economic shock.

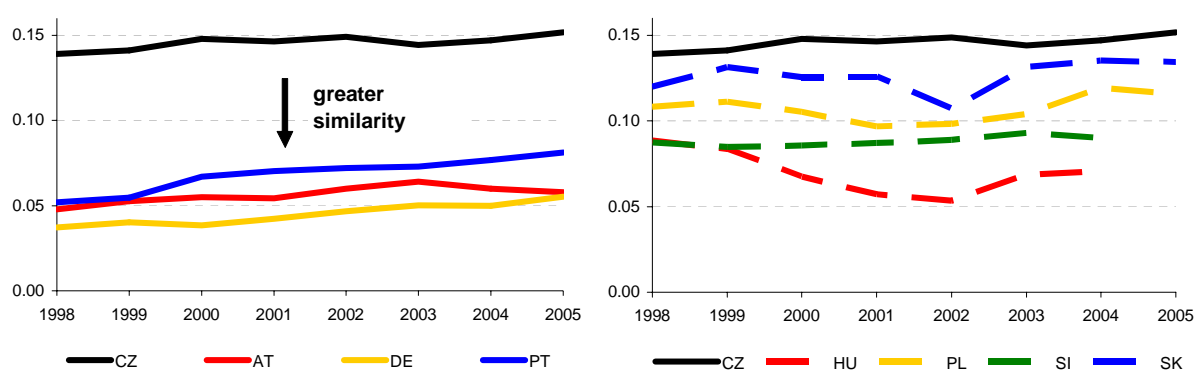
The structural similarity of the economies of the countries included in the comparison and the euro area is expressed using the Landesmann structural coefficient, which compares the shares of six sectors of the economy in total value added in the countries included in the comparison and

²⁴ The assumption is derived from the fact that financial transactions in relation to the EU are mostly carried out via CNB accounts and converted directly into foreign exchange reserves.

euro area. The 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 4 illustrates that the Landesmann index for the Czech Republic is the highest of all the selected countries. The structure of economic activity is therefore more similar to the euro area average for all the countries under review as compared to the Czech Republic. However, the Landesmann index for the Czech Republic is still relatively close to the lower boundary of the interval [0, 1] and only slightly higher than that for Slovakia. 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 11).

Chart 4: Structural similarity vis-à-vis the euro area



Sources: Eurostat, CNB calculations.

Table 11: Shares of economic sectors in GDP in 2005 (%)^a

	A,B	C,D,E	F	G, H, I	J, K	L to P
EU-12	2	20	6	21	28	23
CZ	3	31	7	25	17	17
AT	2	22	8	24	23	21
DE	1	25	4	18	29	22
PT	3	18	6	25	21	27
HU^{b)}	4	26	5	21	21	24
PL	5	25	6	27	18	20
SI^{b)}	3	29	6	21	20	21
SK	4	28	7	27	20	16

Notes: a) 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.
b) 2004 data.

Sources: Eurostat, CNB calculation.

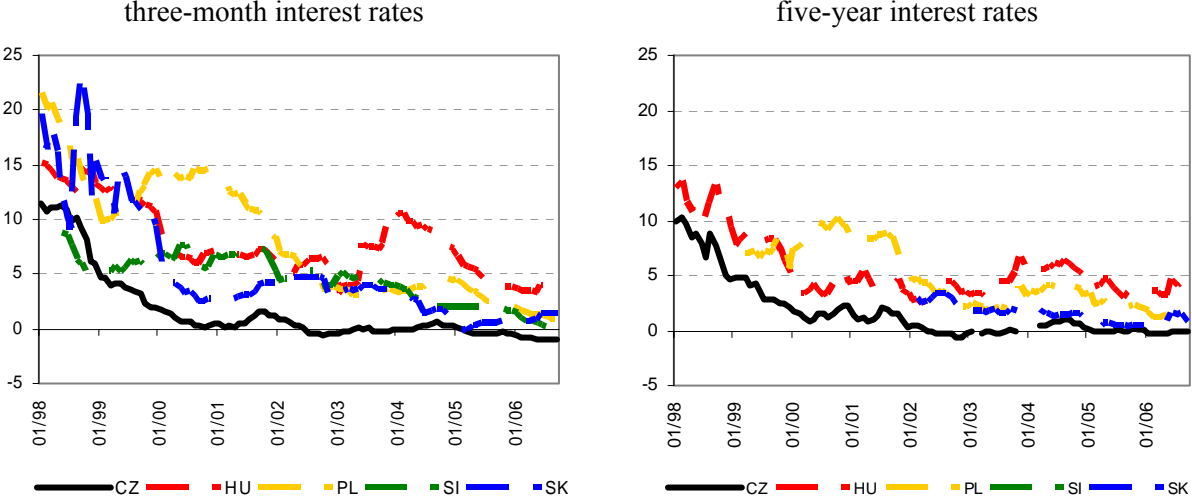
1.1.6 Convergence of the interest rate differential

Differing inflation in regions or countries of a monetary union, given unified nominal interest rates, will result in differing real interest rates. Some countries entering the currency area in the past faced fast nominal interest rate convergence to the union level, which acted 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 eliminate the additional asymmetric shock associated with euro adoption.²⁵

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 5 illustrates the interest rate differentials in the Czech Republic, Hungary, Poland, Slovenia and Slovakia vis-à-vis the euro area for three-month rates on the interbank market and five-year government bonds.

Chart 5: Differences in interest rates vis-à-vis the euro area 1998-2006 (percentage points)



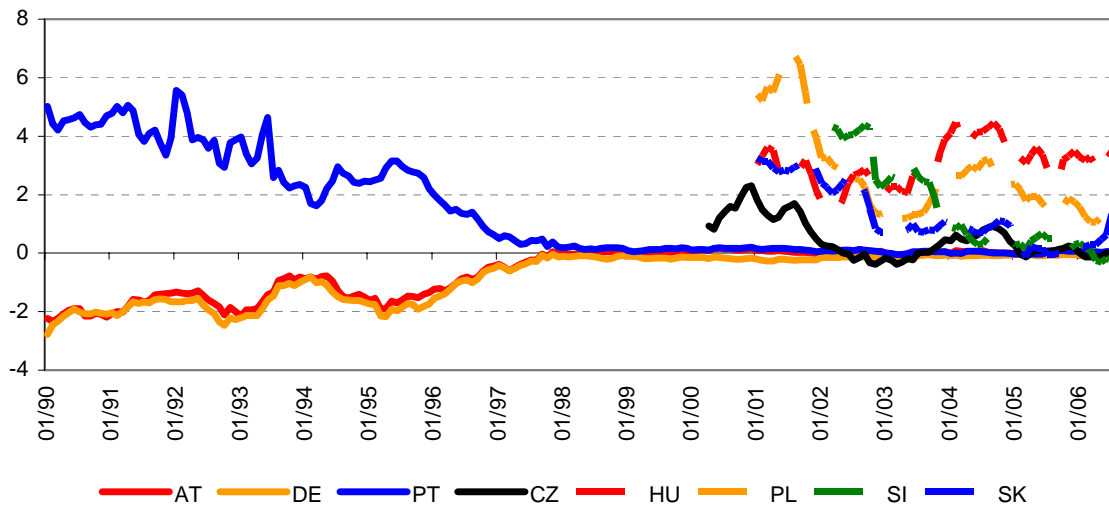
Sources: Bloomberg, CNB calculations.

Interest rate convergence is observable for all the selected countries, and the compared maturities and interest rate differentials have both declined in recent years. However, apart from the three-month and five-year interest rates in the Czech Republic, and recently also the three-month rate in Slovenia, a significant interest rate difference remains. Since the end of 2005, Slovakia’s interest rate differential towards the euro area has increased, which can be explained by the pace of inflation. The three-month rate in the Czech Republic has been moving at the euro area interest rate level, or even below it, since mid-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 6 sets out, for all the countries under review, the trend in the differential of ten-year government bond yields, which are monitored as one of the Maastricht convergence criteria against the euro area average. For Austria, Germany and Portugal, 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.

²⁵ See also section 1.1.1.

Chart 6: Differences in interest rates vis-à-vis the euro area 1990-2006, long-term interest rates (percentage points)



Sources: Eurostat, CNB calculations.

The current average level in the new Member States is broadly comparable to the time-corresponding level of the interest differential in Portugal. However, the Czech Republic, and also Slovenia in 2006, show a differential of almost zero, which means that they have progressed the furthest in terms of interest rate convergence.²⁶

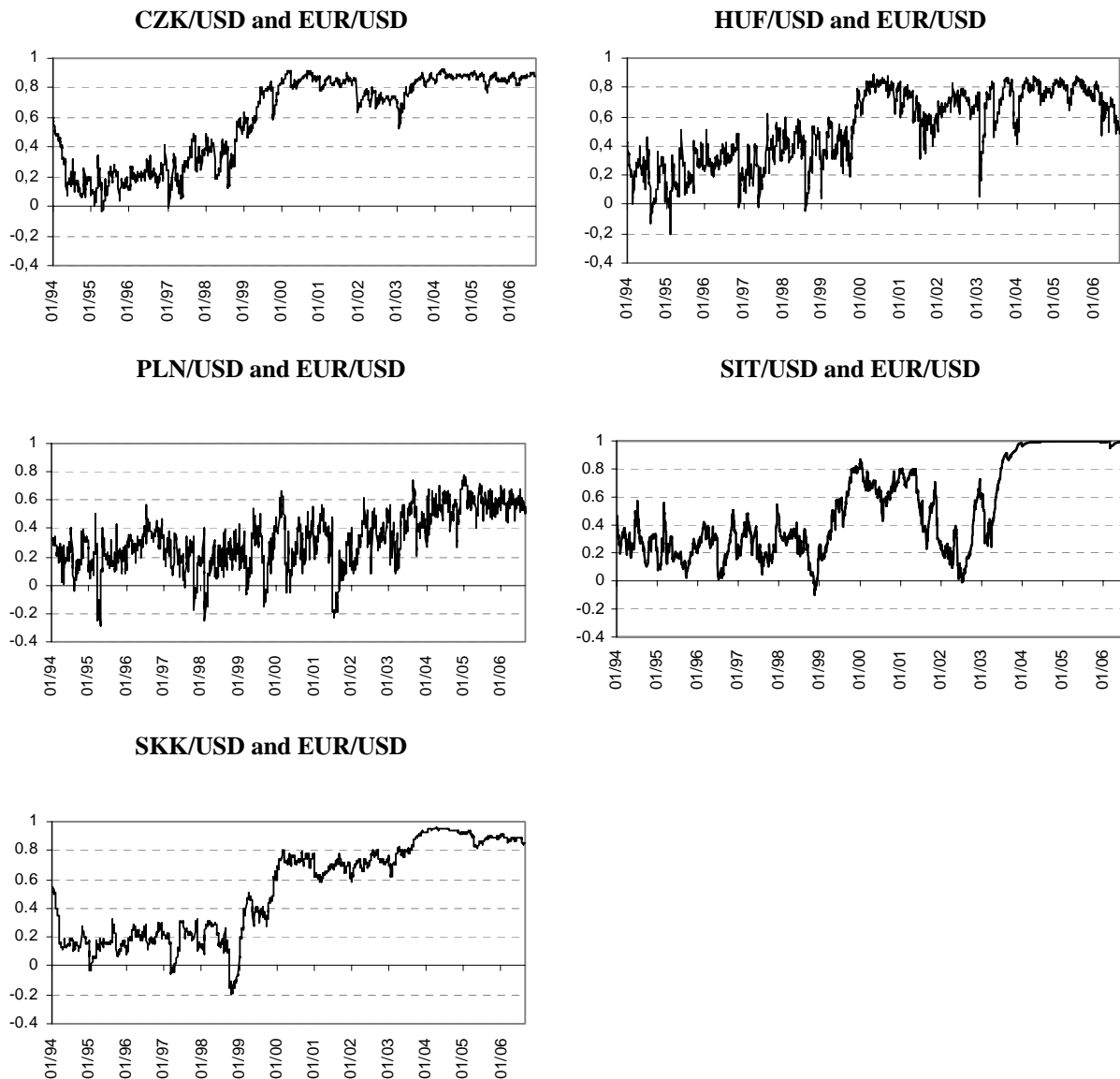
1.1.7 Exchange rate convergence

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). 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, the Slovenian tolar 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 7 illustrates the development of the correlation coefficients.

²⁶ Holinka (2005) uses data for 1999-2004 and explains the decrease in the differential of five- and ten-year interest rates in the Czech Republic vis-à-vis the euro area over the period under review in terms of expectations of a lower short-term rate due to a decrease in inflation expectations in the Czech Republic and the inflation premiums. However, the impact of expectations becomes lower for ten-year interest rates.

Chart 7: Correlation coefficient of exchange rates against the US dollar



Sources: Bloomberg, CNB calculations.

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 exceeded 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. The Slovenian tolar currently has a correlation with the euro close to zero.

Slovenia and Slovakia currently participate in ERM II. It can be seen from the chart that the correlation coefficient for the Slovak koruna shows a larger degree of similarity to the correlation coefficient for the Czech Republic than that for Slovenia. The observed difference in the convergence of the exchange rates of Slovenia and Slovakia reflects in particular differences in the foreign exchange regimes and the fact that Slovakia has continued to pursue implicit inflation targeting since it joined ERM II (see NBS, 2004).

To assess the importance of exchange rate convergence it would be useful to compare the aforementioned results with the exchange rates correlation of the Austrian and Portuguese

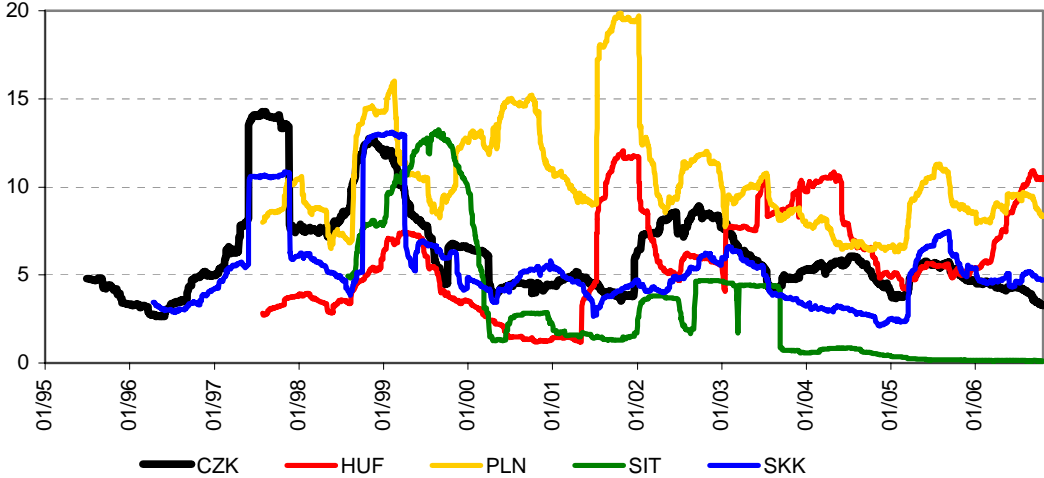
currencies and the Deutsche Mark before they adopted the euro. However, the direct comparison unfortunately has a limited information value, owing to the different exchange rate regimes in these countries. The Austrian and Portuguese currencies were in essence pegged to the Deutsche Mark since 1985,²⁷ so the observed correlation should be very close to one, as the data confirm.

1.1.8 Analysis of exchange rate volatility

Another way of assessing the risk of occurrence of asymmetric shocks in the Czech economy vis-à-vis the euro area is to analyse the determinants of exchange rate volatility. Low volatility of the exchange rate between two countries may be regarded, in the case of a floating exchange rate regime, as an indicator of their potential to share a single currency (see also section 1.1.7).

Chart 8 describes the historical evolution of the volatility of the exchange rates of the new EU Member States vis-à-vis the euro between 1995 and 2006. The measure of historical volatility is based on the annualised standard deviation of daily returns for the last six months. The chart shows that the Czech koruna was among the currencies with average to lower volatility with the exception of 1997. Recently the volatility of the Czech koruna has been second lowest, the lowest being the Slovenian tolar whose daily changes are negligible due to a different exchange rate regime. The Slovak koruna has been reaching similar volatility levels, even following a similar moderate downward trend. The Hungarian forint has been more volatile in the recent period. The volatility of the Polish zloty has long tended to be higher than that of other currencies.

Chart 8: Historical volatility of exchange rate vis-à-vis the euro (%)



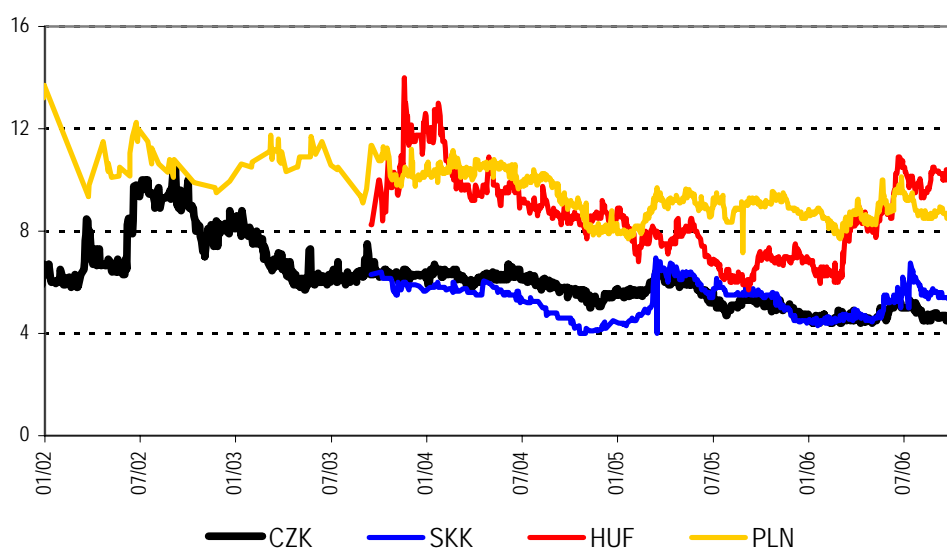
Source: CNB.

Note: Six-month annualised historical volatility of daily returns.

An outlook for exchange rate volatility can also be derived from financial markets data. Chart 9 shows movements in the volatility of the exchange rates under comparison, which is expected by the financial markets and reflected in the prices of options for the individual currencies. Implied volatility has been falling moderately for all currencies and has been lower for the Czech Republic and Slovakia than for Hungary and Poland throughout the period under review.

²⁷ From 1985 on, these countries essentially had a fixed rate, a crawling peg or a moving band of up to ±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 9: Implied volatility of exchange rates vis-à-vis the euro (%)



Source: Bloomberg.

In addition to changes in historical exchange rate volatility or volatility expected by the markets, their determinants can also be monitored and used to compile an indicator of fundamental-based (i.e. theoretically expected) exchange rate volatility. It can be said that the lower the fundamental-based exchange rate volatility, the higher the ability of two countries to share a common currency.²⁸ This concept of exchange rate volatility is more general and may also be applied to the case where a country does not have a floating rate.

Table 12 provides a comparison of historical and fundamental-based exchange rate volatility for the Czech and Slovak koruna, the Hungarian forint, the Polish zloty and the Slovenian tolar vis-à-vis the euro based on data from the period 1999–2005. For the purposes of comparison with fundamental-based exchange rate volatility, historical volatility is calculated as an annualised standard deviation of quarterly returns for the whole period under review.

Table 12: Historical and fundamental-based volatility of exchange rates vis-à-vis the euro (%)

Exchange rate volatility	CZ	HU	PL	SK	SI
Historical	3.8	3.6	8.6	3.8	1.4
Fundamental-based	6.0	6.2	7.0	6.0	6.2

Source: CNB calculation.

Historical volatility of the exchange rate of the Czech koruna in 1999-2005 so defined was similar to that of the Hungarian forint and Slovak koruna, which is consistent with the aforementioned results based on high-frequency data. Fundamental-based exchange rate volatility is similar for all the currencies analysed except the Polish zloty. The macroeconomic characteristics of the Czech economy therefore suggest potential for exchange rate volatility that is roughly similar to that in the new EU Member States included in the comparison.

²⁸ Horváth (2005) shows that exchange rate stability of two currencies is greatly affected by the extent to which those countries meet the criteria for optimum currency areas.

1.2 The effect of international economic relations

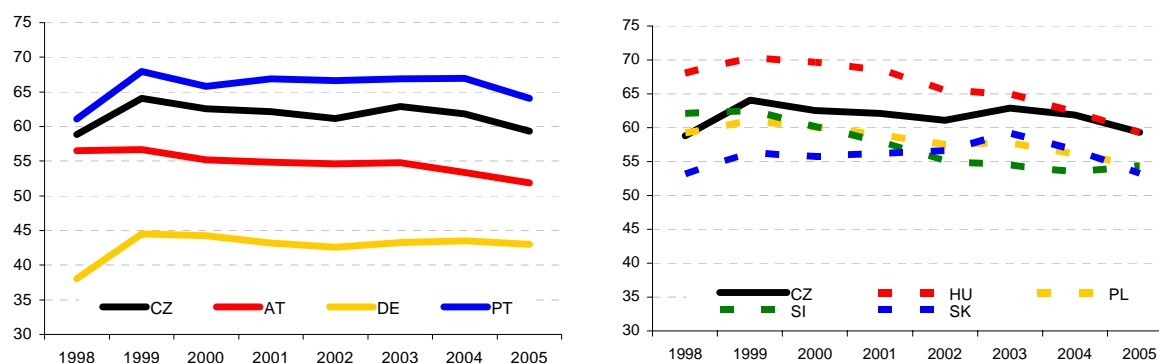
The integration of an economy into international economic relations has an influence on the effectiveness of independent monetary policy and the probability of asymmetric shocks. Similarity of economic developments can be fostered both by trade links and by ownership relationships.

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 sides, 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).²⁹ 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 Chart 10 and Chart 11. 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 very close trade links with the euro area, which is its partner for approximately 60% of the country's total exports and 50% of total imports.³⁰

Chart 10: Share of exports to the euro area in total exports (%)

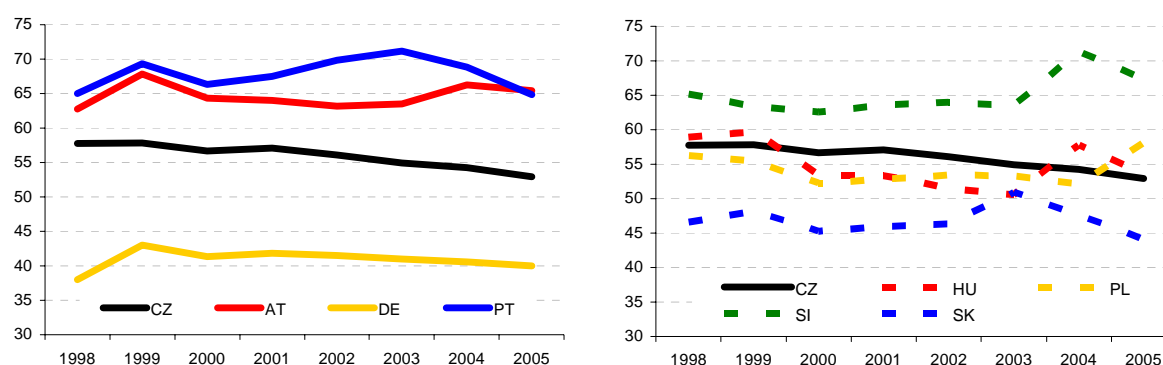


Sources: IMF, CNB calculations.

²⁹ On the other hand, higher trade intensity may lead to growing specialisation and thus to less economic symmetry (Krugman, 1993).

³⁰ The main determinants of the dynamics and structure of Czech foreign trade are analysed in the paper by Benáček et al. (2005).

Chart 11: Share of imports from the euro area in total imports (%)



Sources: IMF, CNB calculations.

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.³¹

Ownership links with the euro area are measured by the share of foreign direct investment (FDI) from the euro area in the surveyed countries in GDP (Table 13) and by the share of direct investment (DI) from the surveyed country in the euro area in GDP (Table 14).

Table 13: Share of FDI from the euro area in GDP (%)

	1998	1999	2000	2001	2002	2003	2004
CZ	17	24	30	34	38	35	38
AT	7	7	11	12	11	11	.
DE	5	7	16	14	15	15	.
PT	12	13	17	19	19	.	.
HU	.	.	.	.	.	.	37
PL	.	12	14	16	16	17	23
SI	.	.	.	11	12	13	14
SK	6	.	.	.	23	21	.

Sources: Eurostat, CNB calculations.

The Czech Republic, together with Hungary, has the highest share of foreign direct investment in the euro area in GDP among the countries under review.³² The ownership links of the countries under review with the euro area has grown gradually over time, testifying to an increasingly important role played by multinational companies and the external environment in the economies of the countries surveyed.

³¹ 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).

³² Approximately 30% of the 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 5%–23%, except for Slovenia (1%).

Table 14: Share of DI in the euro area in GDP (%)

	1998	1999	2000	2001	2002	2003	2004
CZ	0.3	0.2	0.2	0.2	0.2	0.5	1.0
AT	2.6	2.8	4.0	4.4	5.4	5.3	.
DE	6.0	7.1	9.8	10.5	11.3	11.5	.
PT	3.9	2.6	5.3	8.9	10.4	10.1	.
HU	.	.	.	.	.	.	0.6
PL	.	0.2	0.2	0.2	0.3	0.4	0.5
SI	.	.	.	0.8	1.2	1.4	1.8
SK	0.1	.	.	.	0.3	0.3	.

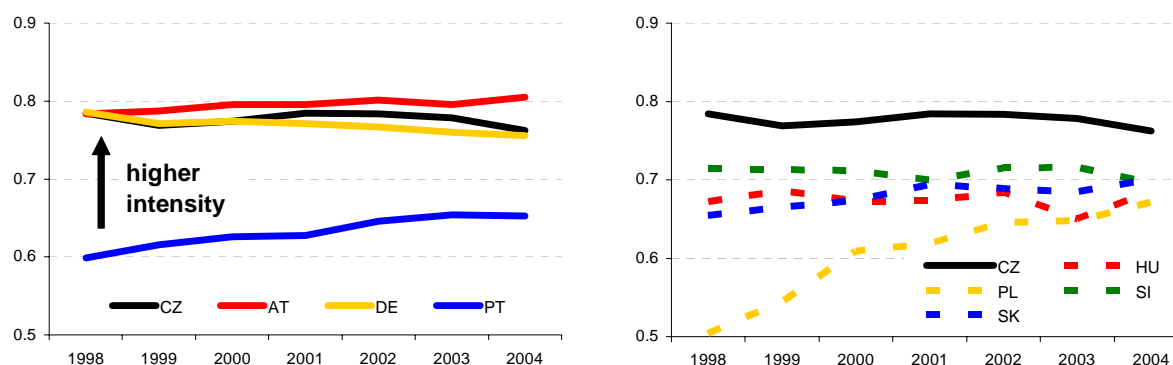
Sources: Eurostat, CNB calculations.

Ownership links the other way round, i.e. direct investment from the surveyed countries in the euro area as a percentage of their GDP, are insignificant, particularly in the case of the new EU members. Increasing ownership links over time can, however, be observed in these countries as well. In conclusion it can be stated that ownership links with the euro area via foreign direct investment are 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.³³ 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 12 illustrates the evolution of this indicator in the countries included in the comparison.

Chart 12: Intensity of intra-industry trade with the euro area

Sources: OECD, CNB calculations.

³³ 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.

Intra-industry trade in the Czech Republic is high in comparison with the selected EU Member States, and even greatly exceeds some of them.³⁴ The share of Czech intra-industry trade is comparable with that of Austria and Germany throughout the period under review. 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 how similar the financial sectors and capital markets of the countries considering participation in a monetary union are to the markets within that union. The financial sector and capital market play an important role in the functioning of transmission mechanisms, and at the same time they can be a source of asymmetric shocks. Their structural similarity and their integration into European markets will be a positive signal.

1.3.1 Financial sector

A similar level of financial sector development and functioning increases the probability that the financial sectors in conditions of a monetary union will transmit external economic shocks and monetary policy impulses in the same way.³⁵ The main characteristics under review include the depth and structure of financial intermediation.

The **depth of financial intermediation** in the Czech Republic, as measured by the ratio of financial system assets to GDP, is approximately one-third of the value for the euro area, Germany and Austria, and around 45% compared to Portugal. The ratio of Czech financial system assets to GDP is, however, greater than that in some of the other central European countries, especially in comparison with Poland. Nonetheless, the financial sector's assets as a percentage of GDP have gradually fallen in the Czech Republic, from 147% in 1996 to 129% in 2004, as a result of their slower pace of absolute growth in past years (see Table 15). In 2005, the year-on-year rate of growth of financial system assets accelerated to 12%, which was reflected in an increase in their percentage of GDP.

Table 15: Financial system assets/GDP (%)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005 ^a
CZ	146.8	145.5	136.6	138.6	140.1	137.1	133.8	132.5	128.8	134.8
AT ^c	.	276.8	295.7	317.4	332.5	341.2	327.8	339.6	354.7	392.6
DE ^c	.	.	337.9	363.8	379.2	378.9	382.9	389.2	397.1	413.8
PT ^c	.	286.7	342.6	338.7	329.7	282.6	281.2	309.7	299.1	311.7
HU	70.5	77.9	78.1	80.0	80.6	82.3	85.1	94.5	101.4	115.7
PL	49.4	51.6	57.4	60.4	65.6	71.0	72.2	76.0	78.8	86.4
SI ^b	93.3	93.2	97.3	100.5	104.8	113.7	118.5	121.2	129.4	149.3
SK ^b	117.8	114.9	108.0	97.1	96.5	98.6	100.5	92.6	100.5	110.9
EU12 ^{c,d}	.	278.3	331.7	357.2	364.8	348.4	341.7	353.1	370.6	406.6

Notes: a) Preliminary data.

b) Excluding pension funds.

c) Total assets of credit institutions, insurance companies, pension funds and investment funds.

d) Weighted average.

Sources: CNB, national central banks. Unconsolidated data.

The ratio of credit to GDP is lower in the Czech Republic than in the euro area countries surveyed (Table 16). Compared to Germany, Austria and Portugal, the volume of loans (including the government sector) is more than three times lower in relative terms. Of the new

³⁴ Our conclusions in this respect are identical to those of Fidrmuc (1999).

³⁵ 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.

EU Member States, Slovenia has the highest ratio of loans to GDP. Hungary, too, has a higher share than the Czech Republic. On the other hand, bank loans in the Czech Republic are rising fast – both loans to corporate clients (14% year on year as at the end of 2005, and 16% as at 30 June 2006) and loans to households (34% and 33% respectively).

Table 16: Bank loans to non-bank clients/GDP (%)

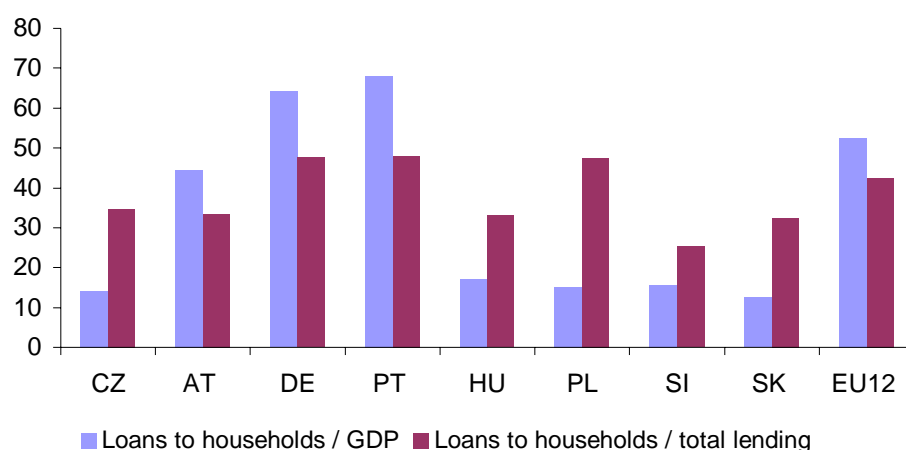
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005 ^a
CZ	58.8	61.1	55.2	50.6	48.1	41.4	38.5	39.8	39.6	40.5
AT	117.2	116.1	117.6	119.8	125.4	124.3	123.6	122.5	125.3	133.7
DE	.	132.6	138.2	141.0	143.6	144.4	140.9	139.9	135.8	134.5
PT	66.5	78.5	93.5	113.9	132.8	131.9	135.3	135.1	136.2	142.0
HU ^b	22.1	24.3	24.2	26.0	30.4	29.9	33.2	38.4	41.2	46.1
PL ^b	16.8	19.2	20.9	23.7	24.9	25.5	25.5	26.3	24.7	26.7
SI ^b	26.6	27.4	31.7	35.5	37.9	39.9	40.1	42.6	47.4	56.2
SK ^b	58.5	54.7	51.8	48.7	43.7	33.5	31.2	32.9	33.4	38.0
EU12 ^c	101.2	104.9	107.9	111.6	116.1	113.4	112.7	113.9	116.1	123.5

Notes: a) Preliminary data.
b) Loans to the non-financial sector (excluding general government).
c) Weighted average.

Sources: CNB, national central banks. Unconsolidated data.

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**.³⁶ The share of bank loans to households in total lending is currently almost 35% in the Czech Republic, while the share for the euro area is about 42%. The ratio of bank loans to households to GDP is currently around 14% in the Czech Republic and is considerably lower than the corresponding figure for the euro area (roughly 52%, see Chart 13). Both these indicators, however, have risen sharply in the Czech Republic in recent years. High growth in lending to the household sector has occurred previously in some of the current euro area countries (e.g. Portugal and Austria) and has not generated any problems in their financial systems.³⁷

Chart 13: Bank loans to households (share in GDP and in total bank lending in 2005, %)



Sources: CNB, national central banks.

The banking sector accounts for 74% of the Czech Republic's total financial system assets. This ratio is only slightly less than those for Slovenia (72%) and Poland (70%). The structure of the Czech financial system is approaching that of other European countries; banking assets account

³⁶ Loans extended to households by non-banking institutions are not taken into consideration.

³⁷ See also **Table 42**.

for about 75% of financial system assets in euro area countries on average, and the situation is similar in Germany and Austria (Table 17).

Table 17: Banking sector assets/financial system assets (%)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005 ^a
CZ	78.8	82.1	81.4	80.0	81.0	77.5	75.9	74.0	73.6	73.6
AT ^c	.	82.3	81.0	78.0	77.5	77.8	76.6	76.3	76.0	74.9
DE ^c	.	.	80.1	78.4	78.4	78.3	77.6	75.9	74.8	73.4
PT ^c	.	82.6	83.8	83.0	83.2	81.7	81.5	81.9	80.7	78.4
HU	93.5	89.5	88.0	85.7	83.7	82.2	80.6	82.1	81.0	78.3
PL	94.5	93.1	92.4	90.3	87.7	84.9	79.9	76.4	74.1	70.2
SI ^b	73.5	70.0	69.9	69.7	71.5	72.9	73.2	73.1	70.7	71.7
SK ^b	95.3	94.9	94.3	93.9	93.9	93.3	91.8	88.6	87.3	86.0
EU12 ^{c,d}	.	.	.	.	74.5	72.0	72.9	71.7	71.1	69.7

Notes: a) Preliminary data.

b) Excluding pension funds.

c) Total assets of credit institutions, insurance companies, pension funds and investment funds.

d) Weighted average.

Sources: CNB, national central banks. Unconsolidated data.

The Czech financial sector can be described as relatively similar to that of the euro area from the structural point of view, despite its smaller depth of financial intermediation relative to the euro area countries surveyed. It can be assumed on this basis that the sector operates in a standard manner and is able to ensure a monetary policy transmission process comparable with that in the euro area.

1.3.2 Stock market integration

Stock market integration takes place when shares having the same risk factor and yield are priced identically by the markets no matter where they are traded. This follows from the law of one price.³⁸ The more the Czech stock market becomes integrated with the European market, the more share prices will be affected by global (European) factors associated with symmetric shocks rather than by local (national) effects associated with asymmetric shocks. Such shocks may be due to any factors capable of affecting share prices (yields). It can be assumed that with increasing integration the stock market will become a less likely source of asymmetric shocks.

The influence of local risk factors is reduced by the options available to investors to diversify their (stock) portfolios internationally. This will lead to a fall in the cost of capital and has a favourable effect on the amount of productive investments and economic growth. As the stock market expands, the effect of wealth on consumption gains in importance, which leads in turn to a stronger relationship between stock market fluctuations and fluctuations in real variables. Growth in the options available for diversifying internationally therefore reduces the sensitivity of national consumption to national economic shocks, which should foster lower divergence of cycles. These reasons make it desirable for monetary policy makers to know the degree of integration of the stock market.

Adam et al. (2002) used the beta- and sigma-convergence concepts to demonstrate the process of financial market integration in the euro area countries, and Komárková (2006)³⁹ applied the technique to the Czech Republic, Hungary, Poland and Slovakia. The concept of beta convergence enables identification of the speed at which stock markets achieve integration over time. A negative beta coefficient signals the existence of convergence, and the magnitude of the

³⁸ If the law of one price did not apply, there would be room for arbitrage. If we assume a fully integrated market with no barriers (economic, legal, cultural, etc.), then any investor will be able to use this arbitration opportunity, causing the law of one price to apply again.

³⁹ The terms beta-convergence and sigma-convergence originate from the literature on economic growth and its dynamics; see, for example, Barro and Sala-i-Martin (1992, 1995).

beta coefficient expresses the speed of convergence, i.e. the speed of elimination of shocks to the yield differential vis-à-vis the euro area. The concept of sigma convergence identifies the degree of convergence achieved between stock markets at a given point in time. Sigma convergence arises if and when the sigma coefficient falls to zero. Beta convergence may be accompanied by sigma divergence, so both concepts must be tracked concurrently in order to prove financial integration.

The results of a beta convergence analysis, as applied to stock markets, are given in Table 18. All the values in the table are negative; hence there is convergence of stock market yields. The absolute values of the beta coefficient are close to one for all the countries except Slovenia, which means that the levelling of newly arising differences in yield differentials between the relevant national economy and the euro area can be labelled as fast. A comparison of the periods 1995–2000 and 2001–2006 reveals that the pace of beta convergence of the stock markets of the new EU Member States under review has increased, except for Slovakia.⁴⁰ The largest progress in that respect has been recorded by Slovenia (from -0.14 to -0.41), followed by the Czech Republic (from -0.69 to -0.90). The fall in speed in some of the countries should be seen in the light of information on the degree of integration already achieved (the sigma value), as can be seen in the case of Germany (from -0.95 to -0.71) or Austria (from -0.96 to -0.91). These two countries have already achieved a high degree of integration, so the speed of adjustment of their yields can be expected to fall gradually.

Table 18: Beta coefficients

	1995-2006	1995-2000	2001-2006
CZ	-0.72	-0.69	-0.90
AT	-0.85	-0.96	-0.91
DE	-0.82	-0.95	-0.71
PT	-0.77	-0.76	-0.77
HU	-0.78	-0.72	-0.95
PL	-0.92	-0.91	-1.00
SI	-0.23	-0.14	-0.41
SK	-0.71	-0.73	-0.72

Note: All estimates were statistically significant at the significance level of 1%.

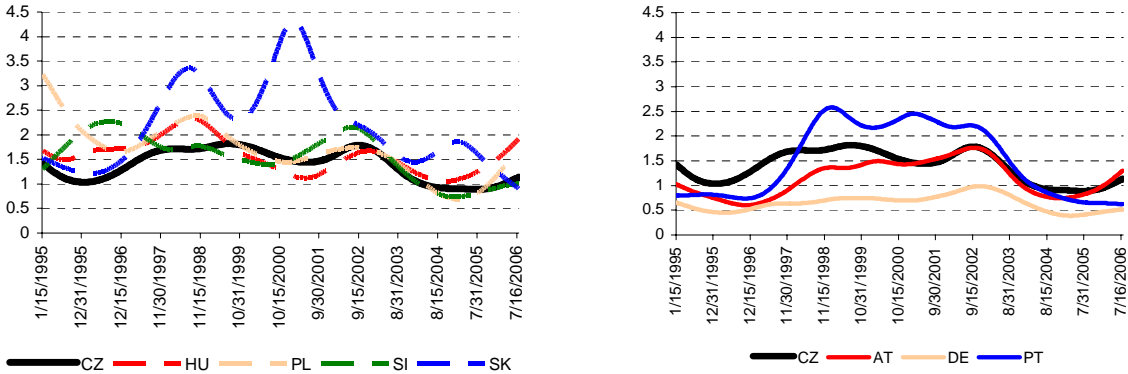
Source: CNB calculations.

Chart 14 illustrates the sigma convergence analysis for each country vis-à-vis the euro area. Germany – followed by Portugal and Austria – had the highest degree of stock market integration with the euro area at the end of the period under review.⁴¹ The stock markets of Slovenia, the Czech Republic and Slovakia display an equal degree of integration. Nonetheless, in 2006 a decreasing level of stock market integration with the euro area can also be observed among the surveyed countries, except for Portugal. The Czech Republic and Austria have been following very similar stock market integration paths since 2001.

⁴⁰ The Slovak stock market is much smaller (as measured, for example, by market capitalisation) and, from the perspective of investors and stock issuers, may seem less attractive than the markets of the new EU Member States under review.

⁴¹ As in section 1.1.2, for example, any interpretation of the values for Germany should take into account the fact that the data for German have a significant weight in the calculation of the data for the euro area. For details, see methodological part.

Chart 14: Developments of sigma coefficient values



Note: Lower standard deviation values (vertical axis) correspond to a higher convergence level.
 Source: CNB calculations.

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

Built-in fiscal stabilisers or discretionary fiscal policy measures may to some extent substitute for missing adjustment channels in the event of asymmetric shocks and thus contribute where necessary to stabilisation of the economy. The current condition of, and in particular the outlook for, public finances is therefore an important factor that must be taken into account when considering the preparedness of the Czech economy to join the euro area.

2.1.1 Stabilising function of public budgets

From the perspective of the stabilising function of public 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").

Fiscal policy affects the economy via automatic stabilisers and discretionary measures. The present economic knowledge and business practice in advanced countries is, however, steering the majority of economists to a pessimistic view as regards the possibility and appropriateness of active discretionary fiscal policy (i.e. policy freely changeable by the government). This is primarily because various types of lags mean that fiscal policy measures planned by the government usually start to take effect with a lag, for instance just as the given shock stops having an effect. Discretionary fiscal policies can thus often destabilise the economic environment.⁴²

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 discretionary 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. In order for the automatic function to work, while avoiding breaches of the maximum allowed deficits, public finances must be balanced or in surplus during a growth phase of the business cycle.⁴³

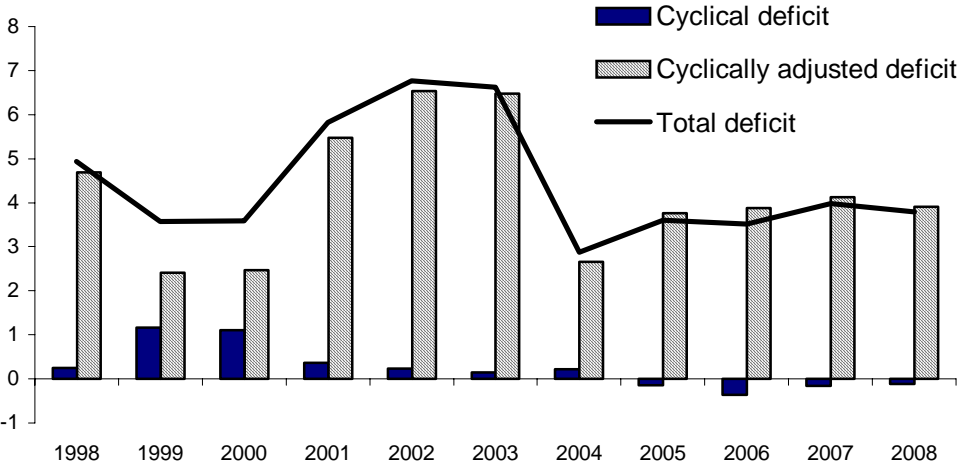
The influences of the macroeconomic environment and of interventions by the government on public budgets can be differentiated by decomposing the fiscal balance into the part that results

⁴² A typical example of this problem is the risk of "pro-cyclical" fiscal policy, i.e. fiscal 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 and thus acts pro-cyclically.

⁴³ The requirement of balanced government finances has been relaxed somewhat under the new European fiscal rules by the introduction of the fiscal medium-term objective (MTO), which differs from economy to economy depending on the existing level of public debt and the prospects for economic growth. Fast-growing economies with a low level of public debt may, instead of maintaining balanced public sector accounts, reach a deficit of up to 1% of GDP, which is also the medium-term objective for the Czech Republic.

from the economic cycle or from extraordinary one-off measures, and the other part consisting in the “cyclically adjusted” (structural) balance, which yields information on how the fiscal balance would look if the economy were at its potential. Chart 15 illustrates the CNB’s current estimates of **the Czech Republic’s government sector balance broken down into its cyclical and cyclically adjusted components**.⁴⁴ As can be seen from the chart, the cyclical component played a negligible role in the past and the total fiscal deficit was practically identical to the cyclically adjusted component. The effects of automatic stabilisers, i.e. the various elements built into the tax and expenditure rules which respond automatically to the business cycle and dampening its fluctuations, are still quite limited in the Czech Republic.⁴⁵ This is primarily due to the fact that additional tax receipts are not consistently employed to reduce the fiscal deficit, but rather to generate new (and permanent) public expenditures; tax cuts are not accompanied by corresponding measures on the public expenditure side; and expenditure ceilings are exceeded even during years of solid economic growth. In other words, the current deficit nature of the government sector in the Czech Republic is due mainly to structural effects and is not cyclical in nature. Unfortunately, the forecast for the near future shows no improvement, and in 2007 the structural deficit is expected to increase to approximately 4.1% of GDP. The removal of these non-cyclical effects is an important precondition for the ability to fulfil the Stability and Growth Pact in the long term and to make use of the stabilising function of public budgets.

Chart 15: Decomposition of the history and outlook of the fiscal deficit into its cyclical and cyclically adjusted components, based on CNB analyses (% of GDP)



Source: CNB calculation.

2.1.2 Government deficit and debt and the scope for stabilising fiscal policy

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. The fiscal policy objective in the run-up to euro area accession should be to take the public budgets close to a zero balance so that sufficient room is left for

⁴⁴ The CNB’s estimates were prepared in accordance with the ESCB method on data according to the ESA methodology, while 19 on page 39 contains a prediction by the European Commission and the cyclical adjustments are carried out using the European Commission’s method.

⁴⁵ Automatic stabilisers act in the direction of a deterioration in the fiscal balance at a time of economic recession and in the direction of an improvement in years of economic growth.

stabilising fiscal policy in less favourable times. Table 19 sums up the spring 2006 figures and forecasts of the European Commission regarding the **fiscal balance** for a selected sample of countries; the left-hand part of the table provides information on the unadjusted public sector balance, while the right-hand side contains the structural balance, i.e. the fiscal balance adjusted for cyclical, one-off and temporary effects.⁴⁶

Table 19: Government sector deficit (ESA95), European Commission estimate (% of GDP)^a

	2004	2005	2006	2007	2004	2005	2006	2007
	not adjusted				cyclically adjusted balance			
CZ	-2.9	-2.6	-3.2	-3.4	-1.3	-1.4	-3.4	-4.0
AT	-1.1	-1.5	-1.9	-1.4	-0.8	-1.0	-1.7	-1.2
DE	-3.7	-3.3	-3.1	-2.5	-3.5	-3.1	-3.0	-2.3
PT	-3.2	-6.0	-5.0	-4.9	-4.8	-5.2	-4.1	-3.9
HU	-5.4	-6.1	-6.7	-7.0	-5.5	-6.3	-6.7	-6.9
PL	-3.9	-2.5	-3.0	-3.0	-4.2	-2.6	-3.3	-3.5
SI	-2.3	-1.8	-1.9	-1.6	-1.8	-1.5	-1.8	-1.7
SK	-3.0	-2.9	-2.7	-2.1	-2.3	-1.6	-2.4	-2.2
CZ ^b	-2.9	-3.6	-3.5	-4.0	-2.7	-3.8	-3.9	-4.1

Notes: a) Cyclical adjustment using the European Commission method.

b) Current CNB estimate, cyclical adjustment using the ESCB method. The difference in the cyclically adjusted balance for the Czech Republic consists in a different method of cyclical adjustment, the level of the unadjusted balance used (the last line in the table includes the most recent information of this autumn's notification), the level of GDP trend growth and one-off and other temporary measures deducted from the unadjusted balance prior to its cyclical adjustment. For 2008, the CNB expects a public finance deficit of the Czech Republic of 3.7% of GDP and a cyclically adjusted deficit of 3.9% of GDP.

Sources: European Commission (2006), CNB.

Table 19 shows that the European Commission expects worsening fiscal developments in 2006 in the Czech Republic, Austria, Hungary, Poland and Slovenia. The Czech Republic, Germany, Portugal, Hungary are expected to exceed a 3% deficit in 2006, and the same is expected for the Czech Republic, Portugal and Hungary in 2007. By contrast, Germany, Austria, Slovenia and Slovakia should, according to the European Commission's prediction, improve their fiscal management by 2007 and comply with the Maastricht criterion for the maximum allowed deficit (or achieve compliance with the Stability and Growth Pact). The Polish public finance deficit, in the European Commission's opinion, should be around 3% of GDP in both 2006 and 2007.

In addition to other effects, the government's room for manoeuvre is determined by the **nature of fiscal expenditure**. While a change to a government resolution or statutory instrument is sufficient to allow a change in some expenditures, changes to other expenditures require time-consuming amendments to laws or international treaties. From the economic perspective, the classification into mandatory, quasi-mandatory and non-mandatory expenditures is just a classification of the speed at which the government is able to alter the such expenditures if the need arises. Mandatory expenditures are the least flexible; nevertheless, most of them can be modified by means of suitable legislative amendments. Table 20 summarises the evolution of mandatory state budget expenditures over time in relation to total state budget revenue and expenditure and total public sector revenue and expenditure.

⁴⁶ The development of the public budget deficits since 1998 is also shown in Chart 1515. It shows that the high deficits from 2001 to 2003, fluctuating around 6%–7% of GDP, were successfully reduced below 3% of GDP in 2004 and the Czech Republic complied with both of the Maastricht criteria applicable to public finances in that year. In 2005, however, the deficit indicator deteriorated. Since last year's analysis was drawn up, the time series of the general government balance have been revised; the most important change is a revision of the government guarantees, which used to be included under 2003 (the 2003 fiscal deficit was more than 12% of GDP). In 2006, a decision was made to exclude the guarantees from the 2003 deficit, as a result of which the 2003 deficit decreased to 6.6% of GDP.

Table 20: Shares of mandatory state budget expenditure (%)

	2003	2004	2005	2006	2007
- in state budget revenue	61	59	54	57	66
- in state budget expenditure	53	53	51	53	60
- in general government revenue (ESA95)	40	39	39	39	42
- in general government expenditure (ESA95)	31	37	36	36	39

Note: Data for 2003-2005 are actual results, 2006 data corresponds to the adopted state budget and 2007 is an estimate based on the first version of the 2007 draft state budget (with the expected deficit of CZK 88 billion). Estimated developments in public sector revenue and expenditure have been adopted from the European Commission document.

Sources: European Commission (2006), CNB calculations.

The 2005 share of mandatory expenditures amounted to 54% of state budget cash revenues, or 39% of general government revenues (ESA methodology). Table 20 also documents the expected increase in mandatory expenditure in 2007, caused mainly by an expansion in social expenditure. The expected growth in the share of mandatory expenditures in 2007 contradicts the declared objectives of the fiscal consolidation defined in the official government document “Draft Strategy for Public Finance Reform until 2006” (issued in 2002), as well as with the plans to consolidate public finances as repeatedly stated in the Convergence Programmes of the Czech Republic.

The individual countries under review do not monitor their mandatory expenditures in a comparable form, as there is no harmonised definition of the term.⁴⁷ However, some inter-country comparison of the structure of general government revenue and expenditure is possible. Such a comparison is given in Table 21; “mandatory expenditures” consist mainly of social transfers and debt service. The Czech Republic ranked among the countries with the lowest figures among the selected sample. In terms of government investment in 2005, by contrast, the Czech Republic was among the EU members with the largest capital formation.

Table 21: Shares of public revenue, expenditure and tax burden in GDP in 2005 (%)

	CZ	AT	DE	PT	HU	PL	SI	SK
Total revenue	41.1	48.0	43.4	41.8	44.5	40.8	45.5	33.9
Total expenditure	43.7	49.5	46.7	47.8	50.6	43.3	47.3	36.8
- collective consumption	11.2	7.0	7.8	21.1	10.5	8.7	7.8	10.4
- social transfers	22.9	29.8	30.0	.	27.9	25.9	28.8	19.0
- debt service	1.2	2.8	2.8	2.7	3.8	2.4	1.6	1.7
- gross capital formation	4.5	1.1	1.3	3.1	3.4	3.1	3.3	2.1

Source: European Commission (2006).

The current stock of, and outlook for, **government debt** may also become factors limiting the ability of fiscal policy to play a stabilising role in the economy. Table 22 provides a comparison of the outlook for the share of gross consolidated debt in GDP. For the sake of comparability, the data are again taken from the European Commission’s spring prediction.

⁴⁷ This is due, for example, to the different legislation processes in each country.

Table 22: Public debt (ESA95), European Commission estimate (% of GDP)

	2004	2005	2006	2007
CZ	30.6	30.5	31.5	32.4
AT	63.6	62.9	62.4	61.6
DE	65.5	67.7	68.9	69.2
PT	58.7	63.9	68.4	70.6
HU	57.1	58.4	59.9	62.0
PL	41.9	42.5	45.5	46.7
SI	29.5	29.1	29.9	29.7
SK	41.6	34.5	34.3	34.7
CZ ^a	30.8	30.4	30.6	30.5

Note: a) The 2004 and 2005 data are from the Czech Statistical Office (CZSO) notification made in autumn 2006. The 2006 and 2007 data represent an updated forecast of the CNB. For 2008, the CNB currently forecasts a public debt of the Czech Republic of 30.6% of GDP.

Source: European Commission (2006).

In 2005, the gross consolidated debt of the Czech government sector amounted to 30.4% of GDP and was the second lowest among the countries included in the comparison, immediately behind Slovenia. A revision of the time series and a reassessment of the amounts of government guarantees implemented in 2003 had, in addition to decreasing the fiscal deficit, a favourable effect on the total gross debt of the Czech Republic, which was reduced for 2004 and subsequent years (for 2004 by 6.8 percentage points from the original figure of 37.4% of GDP). The country's outlook for 2007 remains stabilised. The threat does not consist in the amount of the public debt as a percentage of GDP, but in its recent growth rate. In 1995, the general government debt was only 14.9% of GDP, but in the following ten years it almost doubled to its current level of 30% of GDP. The continuing public finance imbalance will be the main determinant of the growth in debt in absolute terms.⁴⁸

Thanks to the lower public debt and low interest rates, the debt service as a percentage of GDP estimated for the Czech Republic is relatively favourable (see Table 23). Debt service will increase in the future as a result of the rising debt volume and the probable increase in interest rates. In 2005, debt service was at about 1.2% of GDP, with the debt amounting to 30.4% of GDP and historically very 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). The consolidation of public finances should also be accelerated in order to prevent further increases in mandatory expenditure connected with debt service.

⁴⁸ The deficit and debt are connected vessels, and the fiscal deficit can be viewed as the key factor of change in the public debt. This linkage is partly relaxed in practice by one-off transactions (repos, UMTS licence sales, exchange rate changes, privatisation proceeds, the difference between public sector cash and accrual revenues and expenditure, etc.), as a result of which the change in government debt may not be exactly equal to the amount of the government deficit.

Table 23: Debt service, European Commission estimate (% of GDP)

	2004	2005	2006	2007
CZ	1.2	1.2	1.4	1.4
AT	2.8	2.8	2.7	2.6
DE	2.8	2.8	2.8	2.8
PT	2.6	2.7	2.9	3.1
HU	4.2	3.8	3.7	3.7
PL	2.6	2.4	2.5	2.6
SI	1.9	1.6	1.5	1.4
SK	2.2	1.7	1.8	1.7

Source: European Commission (2006).

The scope for an active fiscal policy able to respond to unexpected exogenous shocks is limited in the Czech Republic largely by the fact that the government has not been reducing the fiscal deficit at sufficient pace at a time of favourable economic growth. In addition, new measures have been introduced that continue to increase government spending. The flexibility and long-term growth of the economy, on the other hand, is likely to be aided by the policy of reducing direct taxes (corporate and personal income tax), made up for by rises in indirect taxation. The introduction of expenditure ceilings in the past was a significant help in raising favourable perceptions of the Czech Republic's fiscal policy internationally. This was reflected, in turn, in favourable conditions for financing the Czech public debt on the capital markets. Non-compliance with the set expenditure ceilings in times of solid economic growth, which could be the case in 2007, leads to pro-cyclical fiscal policy, poses a threat to the fiscal consolidation process and undermines the credibility of the commitments made by the Czech Republic.⁴⁹

2.1.3 Sustainability of public finances

Long-term sustainability of public finances is a key prerequisite for them to have a 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 24 shows a long-term extrapolation of government debt (up to 2050) carried out by the European Commission.

Table 24 : Gross public debt (% of GDP)

	2010	2030	2050
CZ	39.6	79.0	280.2
AT	54.9	15.0	-21.2
DE	65.6	57.9	99.4
PT	64.4	89.2	262.5
HU	62.5	76.0	119.3
PL	51.3	6.2	-76.3
SI	28.4	76.3	302.7
SK	35.9	48.1	130.4

Source: European Commission (2006).

⁴⁹ A persistent problem on the expenditure side of the Czech budget is the absence of performance budgeting, which would serve as a tool for cutting non-priority and inefficient public expenditure. Currently, the government unfortunately has no functional tool that it can use to rein in inefficient public expenditures. The generation of new expenditure needs is thus accompanied by pressure for public expenditure growth and deficit growth, instead of incentives to look for reserves within the existing, inefficient expenditures.

Although this is a simplified simulation, it points to a serious rise in fiscal uncertainty during 2030–2050 related to demographic changes in the Czech Republic, Portugal and Slovenia. By contrast, Poland and Austria may achieve a pension system surplus, as well as a reduced ratio of gross public debt to GDP, 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. The Czech Republic, Hungary, Portugal and Slovenia are classified as countries with the highest risk to sustainability of public finances in the European Union.

2.2 Wage and price flexibility

Adjustment of real wages and prices is another mechanism, in addition to stabilising fiscal policy, that should aid in efficient absorption of shocks. Changes in real wages act 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 periods 1996:Q1–2000:Q4 and 2001:Q1–2006:Q1. Table 25 sums up the results.⁵⁰

Table 25: Elasticity of wages to the unemployment rate

	1996-2000	2001-2006
CZ	-0.021 ***	-0.008
AT	-0.026 *	0.003
DE	-0.027 *	-0.013
PT	0.006	-0.021 *
HU	0.037	-0.110 *
PL	-0.001	-0.013
SI	-0.025	0.053
SK	-0.026 ***	0.055

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 -0.021 in 1996–2000 to a statistically insignificant value close to zero in 2001–2006). The situation is very similar in Austria, Germany and Slovakia (elasticity down from -0.026, -0.027 and -0.026 respectively to insignificant values); recently, wage elasticity has been insignificant in all the countries surveyed, except for Portugal and Hungary (elasticity up

⁵⁰ 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.

from insignificant values to -0.021 and -0.110 respectively). In the cases of Poland and Slovenia, wages probably failed to play an adjusting role throughout the period under review.⁵¹

2.2.2 Price flexibility – inflation persistence

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

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 persistent is inflation.

Table 26 shows the inflation persistence indicators for 1998–2005. The results suggest that inflation persistence in the Czech Republic is the highest among the countries under review. This means that inflation in the Czech Republic returns to equilibrium relatively slowly after a shock. Compared to the previous assessment in 2005, only a very slight fall in the monitored indicator of inflation persistence has been recorded in the Czech Republic.

Table 26: Inflation persistence (1998–2005)

CZ	AT	DE	PT	HU	PL	SK	SI
0.93	0.82	0.82	0.88	0.95	0.87	0.91	0.73

Source: CNB calculation.

⁵¹ 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). An estimate of the wage curve for the Czech Republic (Galuščák and Münich, 2005a) in 1994–2001 was published in last year's Alignment Analyses and suggested that wages in the Czech economy are dependent on regional, and especially short-term, unemployment, and the elasticity coefficient is similar to that found by Blanchflower and Oswald (1994) for a number of advanced and transition countries. Recently, however, wage flexibility may have decreased somewhat, probably due to increasing long-term unemployment. This analysis has not been updated owing to a change in data collection methodology since 2002.

2.3 Labour market flexibility

Labour market adjustment is a significant equilibrating process which, like wage and price adjustment, increases in importance after euro area entry. Changes in employment, as well as wage adjustment, may dampen the negative impacts of asymmetric shocks. Labour market flexibility is defined by labour force flexibility and 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 27 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. In 2005, the long-term unemployment rate was higher than in Austria, Portugal, Hungary and Slovenia. 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 28).⁵² The increase in long-term unemployment is chiefly due to declining outflows from unemployment (Galuščák and München, 2005b), which may be connected, for example, with the configuration of the tax and benefit system, which probably does not sufficiently motivate job-seeking (see Section 2.3.3).⁵³

Table 27: Long-term unemployment rate (%)

	1998	1999	2000	2001	2002	2003	2004	2005
CZ	2.0	3.2	4.2	4.2	3.7	3.8	4.2	4.2
AT	1.3	1.2	1.0	0.9	1.1	1.1	1.3	1.3
DE	4.5	4.1	3.7	3.7	3.9	4.5	5.4	5.0
PT	2.2	1.8	1.7	1.5	1.7	2.2	3.0	3.7
HU	4.2	3.3	3.1	2.6	2.5	2.4	2.7	3.2
PL	4.7	5.8	7.4	9.2	10.9	11.0	10.3	10.2
SI	3.3	3.3	4.1	3.7	3.5	3.5	3.2	3.1
SK	6.5	7.8	10.3	11.3	12.2	11.4	11.8	11.7

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

Source: Eurostat.

⁵² 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).

⁵³ Persons with lower educational attainment are more prone to long-term unemployment in the Czech Republic. CZSO data for 2005 show that while 72.6% of the unemployed have basic or secondary education, this share among the long-term unemployed was 79.3% in 2005. At the same time, persons with lower educational attainment move house less frequently (World Bank 2006). Social benefits increase the reservation wage of the unemployed, which reduces their job-seeking motivation (see also section 2.3.3).

Table 28: Shares of the long-term unemployed (%)

	1998	1999	2000	2001	2002	2003	2004	2005
CZ	31	37	49	52	50	49	51	53
AT	30	30	28	24	27	26	28	25
DE	51	51	51	50	48	50	56	53
PT	43	39	42	38	35	35	44	48
HU	50	48	48	45	43	41	44	45
PL	47	43	46	50	55	56	54	58
SI	45	45	61	60	56	53	52	47
SK	52	48	55	59	65	65	65	72

Note: Shares of long-term unemployed (12 months or more) in all the unemployed under ILO methodology.

Source: Eurostat.

Regional differences in unemployment can be quantified using a coefficient of variation for areas (NUTS 2) and regions (NUTS 3). Table 29 shows that the regional differences in the unemployment rate in the Czech Republic are high compared to other countries. They increased in 1999–2002, then decreased slightly in 2003 and 2004.⁵⁴ The long-lasting high regional differences in unemployment in the Czech Republic point to low labour market flexibility in the area of population mobility.⁵⁵

Table 29: Coefficients of variation of the unemployment rate

	NUTS 2 regions						NUTS 3 regions					
	1999	2000	2001	2002	2003	2004	1999	2000	2001	2002	2003	2004
CZ	33	39	39	44	42	42	39	44	45	48	45	44
AT	29	33	36	43	43	41	31	36	39	44	44	42
DE	51	59	62	55	48	46	.	.	66	58	51	.
PT	31	30	29	31	30	25	31	30	29	31	30	25
HU	35	32	30	32	33	28	37	36	34	36	37	32
PL	23	19	18	17	16	16	36	38	36	27	26	23
SI	.	.	.	.	.	.	.	33	34	35	34	32
SK	27	27	24	23	27	31	31	29	28	31	36	37

Note: Ratios of the standard deviation weighted by region size and the average unemployment rate. Labour Force Survey data.

The coefficients of variation depend on the degree of disaggregation.

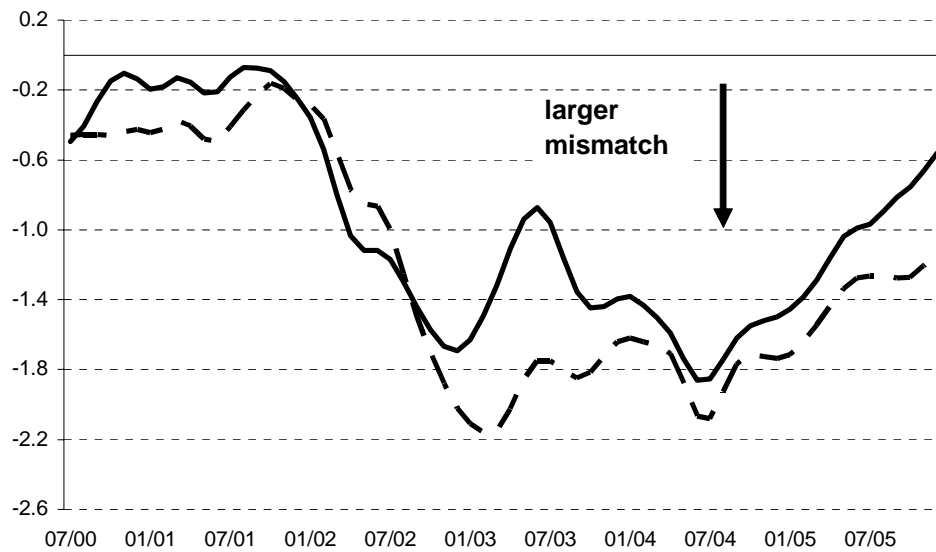
Source: Eurostat.

Changes in structural unemployment can be examined using the aggregate fixed effects of the matching function, which expresses the degree of mismatch in filling vacancies. The development of the aggregate fixed effects of the matching function for the Czech Republic (Chart 16) indicates a sharp deterioration in the mismatch between vacancies and the unemployed in the period since 2001. This signals an increase in the structural component of unemployment. During 2004 and 2005, even after the new Employment Act came into force in October 2004, no improvements were noted in the mismatch. The improvement in 2006, reflected in the chart in the figures for the second half of 2005, may be related to the imposition of penalties for failing to report vacancies to labour offices, effective since January 2006. Reported vacancies, however, are not filled easily, and this is reflected in the matching function estimates (Galuščák and München, 2005b). This probably indicates lower labour market flexibility with regard to population mobility.

⁵⁴ The significant regional differences in unemployment in Germany are due to large differences in unemployment levels between the western and eastern federal states.

⁵⁵ A major part of the regional differences in unemployment is explained by differences in the education of the workforce (OECD 2000, Jurajda and Terrell 2006). According to OECD (2005a), in addition to demographic factors, regional differences in unemployment are significantly affected by demand for labour, initial sector specialisation and housing policy (rent regulation, support for private ownership, see also OECD 2006a).

Chart 16: Aggregate fixed effects of the matching function for the Czech Republic



Note: Smoothed fixed effects for the period from January 2000 to June 2006.

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.

Source: CNB calculation according to 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 30) in the Czech Republic is greater than in Slovakia and Poland, it is lower than in Austria and Germany. In the Czech Republic this indicator has remained almost unchanged, and has not changed significantly since accession to the EU.⁵⁶

Table 30: Internal migration (per 1,000 inhabitants)

	1999	2000	2001	2002	2003	2004	2005
CZ	19.6	19.4	20.0	21.9	20.7	21.2	20.9
AT	32.6	31.9	34.4	.	.	.	.
DE	48.3	.	47.1	46.6	46.1	.	.
HU	.	22.4	21.3	22.9	23.9	21.6	.
PL	11.2	10.2	9.6	.	.	.	.
SK	14.6	14.2	14.8	16.7	15.7	15.8	.

Note: The time series are affected by the censuses that took place in these countries in 2001.

Sources: Statistical yearbooks, CNB calculation.

⁵⁶ Fidrmuc (2004) examines the level to which migration responds to idiosyncratic shocks. It is clear from the results for the Czech Republic, Hungary, Poland and Slovakia that the impact of migration in terms of reducing regional differences in unemployment is limited in these countries. While prosperous regions have relatively high numbers of emigrants and immigrants, less advanced regions have a comparatively immobile population. According to a World Bank report (World Bank 2006), young people and people with higher education move more frequently. This may widen the regional gaps. Important reasons for moving include family reasons, housing, standard of living and traditions, while economic motives, according to the report, have only a limited effect on moving (see also Erbenová 1997, Fidrmuc 2005). Commuting to work is more significant in terms of smoothing regional differences in these countries, and has been increasing in recent years. The high level of commuting as compared to migration, on the other hand, indirectly suggests deficiencies on the housing market.

2.3.2 International labour mobility

According to the theory of optimum currency areas, **international mobility** may be an important channel for the economy's ability to absorb asymmetric shocks, in particular those of a long-term nature, through changes in labour supply.

2.3.2.1 Migration abroad

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 et al. (2003)).⁵⁷

Sociological surveys confirm that Czechs, Hungarians and Slovaks have on average a smaller **inclination to move abroad** than Poles (Table 31). 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.⁵⁸ A simulation of the impact of transition periods (conducted in the period prior to the accession of the new Member States to the European Union) suggested that the restricted free movement of persons in the old EU countries was likely to have only a very small impact on migration in the initial period after EU enlargement in 2004 (Alvarez-Plata et al., 2003). Typical potential migrants are young individuals with higher education (Krieger, 2004).

Table 31: 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).

The **number of immigrants** is an important indicator of international mobility and the ability of an economy to absorb shocks.⁵⁹ The data on recorded mobility show that the number of immigrants coming to the Czech Republic is lower than in Austria and Germany (Table 32). International mobility as regards immigrants is at a level similar to Slovenia and higher than in Hungary, Poland and in Slovakia.⁶⁰ The increase in the immigrant numbers to the Czech Republic in the post-2002 period may be related to a partial relaxation of the administrative requirements applicable to immigrants in 2002 and to the development of demand for labour. The data on international mobility correspond with the data on the numbers of foreigners within the population. According to Eurostat data, foreigners made up 2.5% of the population in the Czech Republic in 2005. This figure is comparable with Slovenia (2.2%) and higher than in Hungary

⁵⁷ This involves persons from the abovementioned countries dwelling in selected EU member countries as follows: 2001 Austria, Finland, Germany, Sweden; 2002 Italy, Netherlands; 2003 Denmark, Luxembourg.

⁵⁸ Alvarez-Plata, Brucker, Siliverstovs (2003).

⁵⁹ High numbers of immigrants, however, may also be a sign of rigidities in the local labour market, with demand for labour not being met from local sources.

⁶⁰ The data on international mobility are not fully comparable at the international level due to differing methods of data collection.

(1.1%), Poland (1.4%) and Slovakia (0.4%). Distinctly higher numbers of foreigners than in the Czech Republic live in Austria (9.4%) and Germany (8.8%).⁶¹

Table 32: Immigration (number of persons per 10,000 inhabitants)

	1999	2000	2001	2002	2003	2004	2005
CZ	9.6	.	.	43.8	58.8	52.3	58.9
AT	108.5	101.9	111.8	.	.	155.9	.
DE	106.5	.	106.8	.	.	94.5	.
PT	14.2	18.0	18.5	.	.	.	.
HU	18.0	19.8	.	17.3	21.1	.	.
PL	.	.	.	.	.	2.5	.
SI	24.9	31.1	39.2	45.8	46.5	50.9	.
SK	.	.	3.8	.	12.2	19.3	.

Sources: Eurostat, CZSO, CNB calculation.

At the end of April 2006, 156,700 foreign workers were registered in the Czech Republic.⁶² Most of these were Slovaks (50%), followed by Ukrainians (26%) and Poles (8%). The number of foreign workers has been increasing very rapidly since the beginning of 2005, with 43,800 newcomers recorded over the whole of 2005. The main factor of foreign employment in the Czech Republic is probably demand for labour. Accession to the EU in 2004 and the related relaxation of conditions for foreign employees had only a limited effect (Galuščík 2006).⁶³

Foreign workers are employed in the Czech Republic mainly in manufacturing, construction, real estate and renting, and wholesale and retail trade (Chart 17). These industries are reporting the highest growth in the number of foreign workers. Foreign workers find employment in jobs requiring lower qualifications (Chart 18).⁶⁴ Foreigners thus seem to fill the gaps in the rigid labour market, as the majority of the long-term unemployed in the Czech Republic are persons with lower education (see section 2.3.1).

International mobility in the Czech Republic, according to data on recorded mobility, is probably at a similar level to Slovenia and lower than in Austria and Germany. The high growth in foreign employment in the Czech Republic since 2005 is probably due to increasing demand for labour and can be viewed as evidence of an ability to adjust. However, this trend is probably linked with the other rigidities on the Czech labour market.

⁶¹ 2005 data, excluding Austria (2004) and Poland (2002).

⁶² Data from labour offices on the numbers of workers subject to the recording obligation and on the numbers of workers who require a work permit.

⁶³ Since May 2004, EU nationals have been able to work in the Czech Republic without restrictions (Slovak nationals did not require a work permit even prior to EU accession). However, the numbers of foreign workers began to increase more significantly only in 2005. The numbers of foreign workers in the Czech Republic since 1996, when data on foreign employment began to be available, correlate very closely with economic activity as measured by GDP growth. The extraordinary increase in foreign workers in 2005 is probably related primarily to the high GDP growth and a related increase in demand for labour.

⁶⁴ This is particularly apparent for Ukrainian nationals. Slovaks, in addition to these jobs, find employment in skilled jobs, presumably due to the lack of a language barrier.

Chart 17: Foreign employees in the Czech Republic by industry (thousands of persons)

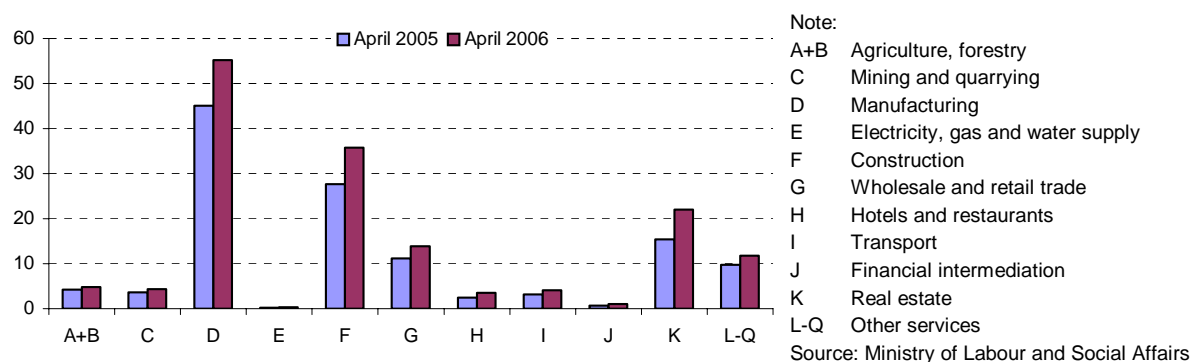
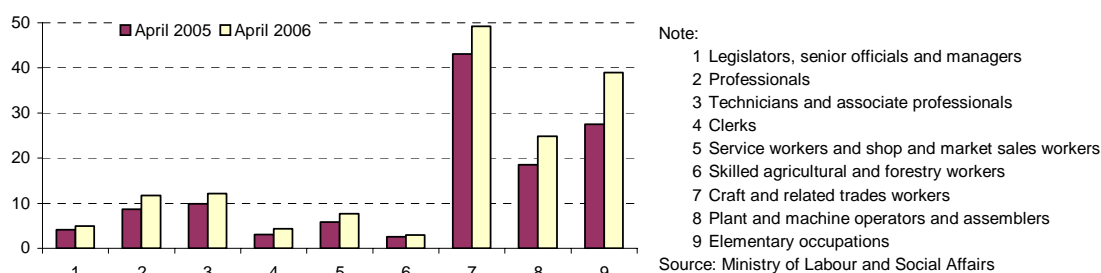


Chart 18: Foreign employees in the Czech Republic by profession (thousands of persons)



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 by the Czech Republic.⁶⁵

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).⁶⁶ Other euro area countries applied a two-year transition period to workers from the new Member States, during which a work permit was necessary to employ them. During 2006, the above transitional period was cancelled in Finland, Italy, Portugal, Greece and Spain, and the labour markets in Belgium, France and the Netherlands were partially liberalised in 2006. Specific circumstances relating to individual countries that have extended their transition periods and in the new member countries under review are provided in more detail in Table 33. 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.

⁶⁵ The position of the Czech government is included in its resolution No. 13 of 7 January 2004.

⁶⁶ However, job applicants from the new Member States are not entitled to draw any social benefits.

Table 33: Persisting administrative barriers for the new members of the European Union

Country	Current situation	Outlook
Austria	A transition period applies until 30 April 2009 to workers from the new Member States surveyed. A quota known as the “Bundeshöchstzahl” is set in Austria, stipulating that the percentage of foreigners employed may not exceed 8% of the entire Austrian labour force. The individual federal states then set quotas known as “Landeshöchstzahlen”	Further development is <i>unclear</i> .
Belgium	A transition period applies until 30 April 2009 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. As from 30 April 2006, issuance of permits was simplified for professions in demand.	Further development is <i>unclear</i> .
France	A transition period applies until 30 April 2009 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. As from 1 May 2006, issuance of permits was simplified for professions in demand.	Further development is <i>unclear</i> .
Germany	A transition period applies until 30 April 2009 to workers from the new Member States surveyed. The situation of job applicants from the Czech Republic and Slovakia is facilitated by bilateral agreements. 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.	Further development is <i>unclear</i> .
Luxembourg	A transition period applies until 30 April 2009 to workers from the new Member States surveyed. As from 1 May 2006, issuance of permits was simplified for some professions.	Revision envisaged in May 2007.
Netherlands	A transition period applies until 30 April 2009 to workers from the new Member States surveyed. As from 1 June 2006 issuance of permits was simplified for professions in demand.	Cancellation of the transition period notified as of 1 January 2007.

Czech Republic	No restrictions apply to workers from the countries surveyed or from other euro area countries.
Hungary	A transition period applies to those euro area countries which do likewise.
Poland	A transition period applies to those euro area countries which do likewise.
Slovakia	A transition period applies to those euro area countries which do likewise.
Slovenia	A transition period applies to those euro area countries which do likewise.

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).⁶⁷ If industry-level bargaining predominates, it may result in lower wage flexibility. The negative impact of industry-level 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 34). According to OECD data, collective bargaining coverage is high in Austria and Portugal, while it is lowest in the Czech Republic.⁶⁸ 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

⁶⁷ 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.

⁶⁸ Some of the more recent work investigating collective agreement coverage has generated results that differ from the information given in Table 34. Using a sample of businesses from the Average Earnings Information System (MLSA), Jurajda (2005) has estimated that the coverage of employees in the business sector by collective agreements was more than 50% in 2004. Furthermore, the coverage is over 70% when extension of the binding effect of higher-level collective agreements is taken into account. Moreover, it is likely that more than 80% of firms with more than 250 employees have a collective agreement. Comparing firms in the same industry and size categories, Jurajda finds no major differences in wage levels, except for highly skilled personnel, whose wages seem to be lower in firms with a collective agreement. This suggests that coverage by collective agreements is higher in the Czech Republic than set out in Table 34, while the impact of collective bargaining on wages may be rather 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 34 relate to 2000, when the extension of the binding effect of higher-level collective agreements was also in force.⁶⁹

Table 34: 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
DE	31	25	80+	68	3	3	4	4
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) 1997 data for Portugal, 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 (2004).

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 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 35).⁷⁰ By international comparison, the minimum wage as a proportion of the average wage in the Czech Republic is roughly the same as in Hungary and Portugal, while it is higher

⁶⁹ 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. The extension of the binding effect of higher-level agreements does not apply to businesses employing less than 20 people, businesses employing more than 50% disabled people or businesses subject to a higher-level collective agreement. An analysis of Labour Force Survey data reveals that, as of 15 August 2006, extended higher-level collective agreements for 2006 covered approximately 10% of employees. Therefore, the practice of extending higher-level collective agreements has not been applied very widely.

⁷⁰ The figure for the Czech Republic on the ratio of the minimum wage to the average wage in 2005 is not available from the Eurostat database. However, according to CNB calculations (the ratio to the average wage in all surveyed organisations), there was a further increase of 0.6 percentage point in 2005 and another 1.5 percentage point in 2006.

than in Poland and Slovakia and lower than in Slovenia.⁷¹ In Slovenia and Slovakia, the minimum wage is paid to about the same proportion of employees as in the Czech Republic (Table 36). Hungary, Portugal and Poland have a greater share of employees on the minimum wage compared to the Czech Republic. 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 the three countries above.⁷²

Table 35: Minimum wage (%)

	2002	2003	2004	2005
CZ	34.0	35.8	38.8	.
PT	43.0	40.7	40.7	.
HU	42.1	38.6	40.7	38.2
PL	33.0	33.9	35.1	.
SI	45.3	46.3	44.1	.
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 36: Share of employees earning the minimum wage (%)

	2000	2001	2002	2003	2004	2005
CZ	1.6	1.7	2.0	2.0	2.0	.
PT	6.2	4	4.0	5.7	5.5	.
HU	3.9	8.4	11.4	8.1	8.0	8.0
PL	.	2.9	4.0	.	4.5	.
SI	2.0	2.6	2.6	2.7	2.0	.
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 37). This relation 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 2005 was around 90% or more. This ratio is increasing.⁷³

⁷¹ No minimum wage has been defined at the national level in Austria and Germany.

⁷² As shown in Table 36, 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.

⁷³ Since July 2006, the minimum wage has stood at CZK 7,955. The minimum wage as a share of the average wage is thus around 2.1 percentage points higher than in 2004 (Table 3535). The assumed negative impact of the minimum wage on wage flexibility and job creation is probably increasing. While the minimum wage rose by 10.7% compared to 2005, the average wage will increase by only 6.6% in 2006, according to the CNB's forecast (July 2006).

Table 37: Minimum wage and gross monthly wage in selected professions (%)

Main employment class	Minimum wage / 1st decile		
	2003	2004	2005
Total for the Czech Republic – business sector	63.9	66.1	68.0
Services and shop workers	87.6	89.2	90.1
Skilled agricultural and fishery workers	74.4	74.3	76.3
Elementary occupations	84.3	86.3	89.1

Note: The table only lists those professions with a ratio to the median wage of over 50% in 2005.

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

Employment protection

Strict **conditions for the recruitment and dismissal of employees** reduce flows on the labour market and increase long-term unemployment (OECD, 2004).⁷⁴ 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 graduates and young people. The combination of the high costs of dismissing permanent employees and weak 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 38). In the Czech Republic, the cost of dismissing employees is relatively high, especially with regard to short-term contracts (Chart 19).⁷⁵ This institutional setup may adversely affect job creation and long-term unemployment in the Czech Republic.

Table 38: Employment protection indices (EPL)^a

	Permanent employment ^b		Temporary employment ^c		Collective dismissals ^d		Overall index ^e	
	konec 90. let	2003	konec 90. let	2003	konec 90. let	2003	konec 90. let	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
DE	2.7	2.7	2.3	1.8	3.5	3.8	2.6	2.5
PT	4.3	4.3	3.0	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

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

b) protection against individual dismissal

c) fixed-term contracts, temporary work agencies

d) relative to individual dismissals

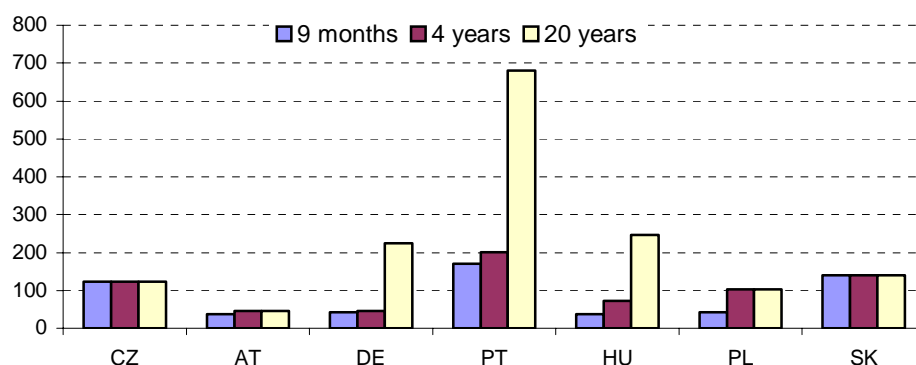
e) weighted average of indicators of permanent employment, temporary employment and collective dismissals.

Source: OECD (2004).

⁷⁴ Bassanini and Duval (2006) confirm the conclusions of other papers that employment protection, as measured by the EPL index (Table 3838), has no clear impact on the overall employment rate. Higher EPL values, however, adversely affect the entry of young people onto the labour market. A higher EPL index, according to these authors, is also associated with substitution of part-time contracts with full-time contracts for women.

⁷⁵ 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 38. A slight decline in the index is likely in Portugal after 2003 in connection with the reform of its labour law.

Chart 19: Costs of 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.

Sources: OECD, CNB calculation.

A very low index for the protection of temporary employment combined with high protection of permanent employment in the Czech Republic (Table 38) 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 1.1.⁷⁶ With respect to collective dismissals of employees (above the level of individual dismissals), the Czech Republic applies the lowest restrictions by international comparison.

In terms of the aggregate index of employment protection, which is a weighted average of the three foregoing components, the Czech Republic ranked among the countries with less regulation of the labour market in 2003, as compared to the sampled countries. However, one should take into account that there is quite a disparate intensity of protection of permanent and temporary jobs behind the average figure, which may result in the above issue of labour market duality.

Under the new Labour Code, effective from January 2007, conditions for the dismissal of employees will remain practically 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 draft new Labour Code shows that the permanent employment protection index will decline only slightly, from the current 3.3 to 3.2.⁷⁷ The temporary employment index and the index of conditions for collective dismissals will be the same as in 2004 and 2005. The adverse impact of permanent employment protection on job creation and long-term unemployment is – and will probably continue to be – higher than in the countries included in the comparison, except for Portugal.

⁷⁶ 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. On the other hand, the conditions applicable to temporary jobs have been relaxed slightly since March 2004, as fixed-term contracts may be offered to graduates.

⁷⁷ The difficulty in dismissing employees will decrease slightly as from January 2007, as employers, in the case of redundancy dismissals, will no longer be required to consider the option of transferring employees to another job or retraining them.

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). According to Bassanini and Duval (2006), regulation on the product markets increases overall unemployment.

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 39, last column). The overall index in the Czech Republic remained almost unchanged against 1998, while it fell significantly in Austria, Germany and Poland. 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.

Table 39: Indices of administrative barriers to entrepreneurship^a

	Costs related to startups ^b		Regulatory and administrative opacity ^c		Barriers to competition ^d		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	0.8	1.7	1.6
DE	2.4	1.6	2.6	2.2	0.4	0.5	2.0	1.6
PT	2.1	1.7	1.8	1.2	1.0	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: a) 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:

b) Administrative burdens for corporations, administrative burdens for sole proprietors, and sector specific administrative burdens.

c) Licences and permits system, government strategy of communication and simplification of rules and procedures.

d) Legal barriers to entry into the industry and antitrust exemptions for public enterprises.

Source: Conway et al. (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 the complexity of regulatory and administrative conditions, where the Czech Republic recorded the highest value of all the countries under review in 2003. A further decrease in the index for the above area will result from the amended Trade Licensing Act effective since August 2006, due to the introduction of central registration points to facilitate incorporation of businesses. The amendment also decreases business startup costs, as the number of required documents has been cut. A partial improvement in administrative requirements has occurred in the Czech Republic, with conditions that ease the potential adverse impact on the labour market flexibility in the area of 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, young people, old people). Moreover, high labour taxation increases the proportion of entrepreneurs in the labour force and the size of the grey economy (Brandt et al., 2005). Higher taxation of labour may have more pronounced effects on

unemployment in the case of a high minimum wage (Bassanini and Duval, 2006).⁷⁸ 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 Poland and lower than in Austria, Germany and Hungary. Taxation of labour at the average wage level in the Czech Republic is higher than in Portugal and Slovakia (Table 40). Taxation of low-income earners in 2005 was comparable to that in Austria, Hungary and Poland. The impact of labour taxation on job creation and long-term unemployment can therefore be expected to be broadly the same as in the above three countries, but higher than in Portugal and Slovakia.⁷⁹ Labour taxation in the Czech Republic tended to increase in 2000–2005, while declining in Germany, Portugal, Hungary and Slovakia.

Table 40: Overall labour taxation^a

	100% of average wage				67% of average wage			
	2000	2004	2005	Change ^b	2000	2004	2005	Change ^b
CZ	42.7	43.5	43.8	0.2	41.4	41.9	42.1	0.2
AT	47.3	47.5	47.4	0.1	43.2	43.4	42.5	0.0
DE	53.9	53.3	51.8	-0.3	48.6	47.9	46.7	-0.3
PT	37.3	36.8	36.2	-0.1	33.2	32.4	31.7	-0.2
HU	52.7	51.8	50.5	-0.6	48.5	44.8	42.9	-1.2
PL	43.2	43.3	43.6	0.1	42.2	42.2	42.4	0.1
SK	41.8	42.5	38.3	-0.5	40.6	39.6	35.3	-0.9

Notes: a) 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% (left part of the table) and 67% (right part of the table) of the average wage.
b) Average annual change in percentage points for 2000–2004.

Sources: OECD (2006b), CNB calculation.

Work-incentive indicators

Net replacement rates (NRRs) 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. The indicator is defined as the ratio of net household income when the person under consideration is jobless to that when the same person has a job. Table 41 compares the net replacement rates for short-term and long-term unemployment and two types of households.

⁷⁸ Higher taxation cannot be shifted onto employees in this case.

⁷⁹ The tax burden on low-income groups in the Czech Republic was eased somewhat in January 2006. This is likely to slightly decrease the tax burden values given in Table 40.

Table 41: Net replacement rates^a

	Initial stages of unemployment ^b				Long-term unemployment ^c			
	Individuals without children		Family (2 children) ^d		Individuals without children		Family (2 children) ^d	
	2003	2004	2003	2004	2003	2004	2003	2004
CZ	50	50	60	60	48	44	85	81
AT	55	55	78	76	68	66	99	96
DE	63	62	83	82	83	81	85	84
PT	85	81	96	93	35	35	86	87
HU	57	58	70	69	31	35	41	44
PL	76	75	70	70	45	44	87	95
SK	67	61	76	57	66	29	123	58

Notes: a) The ratio of the net incomes of households consisting of unemployed and employed persons (%).

Income from employment of the breadwinner at 67% of the average wage.

b) Unemployed persons entitled to unemployment benefits, excluding social assistance benefits.

c) Unemployed persons after five years.

d) The other adult is economically inactive, children of 4 and 6 years of age.

Source: OECD.

Data on short-term unemployment show that the incentive to accept employment in the Czech Republic is higher than, or similar to, the levels 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. The financial reasons for seeking a job are less strong in the Czech Republic than in Hungary and Slovakia among the long-term unemployed, especially in low-income families with children. Long-term unemployed people from families with children, however, have a greater incentive to seek work than in Austria, Portugal and Poland. The NRRs in this category declined slightly from 85% in 2003 to 81% in 2004. The tax and benefit system probably contributes to pushing these persons towards inactivity and the grey economy.

Following the adoption of a new Employment Act, the conditions for qualifying for unemployment benefit and registering with labour offices became stricter as from October 2004. The data in Table 41 are not affected by that factor, but a partial improvement may have occurred as regards the incentive to seek employment. The net replacement rates are also unlikely to have been significantly affected by a reduction of the tax burden on the low-income persons since January 2006. The above indicators are influenced primarily by insurance contributions and entitlements to social benefits (Carone and Salomäki, 2005).

The results of a micro-simulation model of taxes and benefits (Galuščák and Pavel, 2006) seem to support the above conclusions; the incentive to seek employment may be weakened in the Czech Republic mainly in the case of low-income families with children.

In the Czech Republic, the benefits for the long-term unemployed are based on the minimum subsistence level, which affects the supply of labour of people with low skills. A reform of the minimum subsistence level will be implemented as of January 2007 with the introduction of a new Minimum Subsistence Level Act and Hardship Assistance Act. Under these changes, the current concept of a two-part minimum subsistence level will be abandoned and the structure of social care benefits will also change. At the same time, there will be a reform of housing benefit, which will be newly structured in relation to the level of housing expenses. The ceilings for unemployment benefit and family allowance will increase considerably as of January 2007. Micro-simulations suggest that these changes are unlikely to foster any overall improvement in the structural problems on the labour market, and for some groups the incentive to work will decrease. The net replacement rates will become higher, especially for families with children (Galuščák and Pavel, 2006).

2.4 Flexibility and shock-absorbing capacity of the banking sector⁸⁰

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.⁸¹ 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 clean-ups of privatised banks' balance sheets and qualitative improvements in banking credit portfolios in the Czech Republic. The Czech banking sector showed **better-quality loan portfolios** than banking sectors in Poland, Slovakia and Slovenia at the end of 2005, while the proportion of non-performing loans in the total loans was lower than in Germany during the recent years (see Table 42).

Table 42: Non-performing loans/total loans in the banking sector (%)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005 ^a
CZ ^b	23.5	21.8	21.0	22.3	19.9	13.7	8.9	4.8	4.0	3.9
AT	3.19	3.19	3.18	3.01	2.92	3.1	3.9	3.7	3.3	3.1
DE	.	.	4.5	4.2	4.7	4.6	5.0	5.3	5.1	4.8
PT	.	.	.	.	2.2	2.1	2.3	2.4	2.0	1.6
HU	6.0	5.1	6.1	3.5	2.6	3.0	5.1	3.9	3.7	3.1
PL	13.4	10.7	10.9	13.2	14.9	17.8	21.1	21.2	14.9	11.0
SI	6.3	5.5	5.4	5.2	5.2	7.0	7.0	6.5	5.5	4.8
SK	29.1	30.6	35.0	29.0	21.7	22.0	11.2	9.2	7.2	5.6
EU12 ^c	.	.	.	.	3.3	4.1	3.3	3.4	3.1	.

Notes: a) Preliminary data.

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

c) Weighted average.

Sources: CNB, national central banks. Unconsolidated data.

The capital adequacy ratio of the Czech banking sector, at an average of 11.9%, moves above the set limit of 8% and is at the levels similar to the other countries under review (Table 43).⁸² The capital of banks sufficiently covers potential risks. This is supported by less risky business activities of domestic banks, including trading in treasury bills and mortgage loans to households. The ratio of non-performing loans to total household loans did not exceed 3.2%. However, the rapid growth in household loans and their worse quality in the consumer credit segment may indicate a certain risk.⁸³

⁸⁰ It is impossible to quote comparable average values for EU-12 in 2005 in this section as some of the countries have not yet transferred to reporting under the International Financial Reporting Standards.

⁸¹ An unstable sector may also be a source of asymmetric shocks.

⁸² Decreases in capital adequacy in 2004 and 2005 were mostly related to use of the retained profits for the payment of dividend and royalties, or, profit repatriations to foreign owners of the banks.

⁸³ In mid-2006, 1.7% of the housing loans and 8.2% of consumer credit were at the risk of non-performance.

Table 43: Capital adequacy of the banking sector (%)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005 ^a
CZ ^b	9.72	9.65	11.92	13.64	14.87	15.38	14.15	14.48	12.55	11.86
AT ^c	12.3	11.5	11.6	11.0	10.6	11.48	11.28	12.10	11.87	11.52
DE ^b	9.7	10.1	11.4	11.5	11.7	12.00	12.70	13.40	13.20	13.40
PT ^c	11.4	11.8	11.1	10.8	9.2	9.50	9.80	10.00	10.40	11.32
HU ^b	17.73	16.01	16.29	15.00	15.21	15.64	14.08	12.69	13.24	11.43
PL ^b	12.30	12.50	11.70	13.20	12.90	15.00	14.20	13.80	15.50	14.50
SI ^b	19.73	18.96	16.03	13.96	13.49	11.94	11.87	11.53	11.76	10.53
SK ^b	.	4.81	3.19	5.34	2.44	13.35	21.30	21.59	18.68	14.79
EU12 ^{c,d}	11.9	11.6	11.6	12.1	11.6	12.10	11.94	11.92	11.78	.

Notes: a) Preliminary data.
b) Unconsolidated data, data for the Czech Republic exclude Konsolidační banka and banks under conservatorship.
c) Consolidated data.
d) Weighted average for the reporting banks in the given year.

Sources: CNB, national central banks.

The stability of the banking sector stems from the **prosperity of the banking business**. In the last two years, it was possible to attain a net interest margin of 2.37% on average in the Czech banking business (Table 44). In an environment of increasing competition and a low level of key rates, interest rates on loans and deposits somewhat 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 net interest margins (except for Slovakia) 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 45. This indicator shows values for the Czech banking sector in the last two years at higher levels than valid for the euro area countries in the comparison and, except for Slovakia, at lower levels than in the surveyed new member countries.

Table 44: Net interest margin (NIM, %)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005 ^a
CZ ^b	2.15	2.19	3.47	2.83	2.53	2.47	2.35	2.25	2.36	2.37
AT ^{b,c,d}	1.63	1.49	1.32	1.20	1.20	1.21	1.23	1.17	1.09	1.56
DE ^{b,c}	1.65	1.50	1.37	1.28	1.14	1.12	1.20	1.16	1.18	1.17
PT ^{b,c,d}	2.30	2.22	2.65	2.57	2.25	2.31	2.21	2.04	2.00	1.76
HU ^b	4.92	4.47	4.45	4.05	3.92	4.01	4.01	3.89	3.97	3.84
PL ^b	5.98	5.23	4.58	4.01	4.26	3.38	3.39	3.13	3.24	3.20
SI ^b	5.56	4.93	4.49	4.04	4.52	3.62	3.68	3.23	2.83	2.54
SK ^b	.	1.80	1.20	0.45	1.85	2.28	2.69	2.91	2.85	2.15
EU12	.	.	.	.	.	.	.	.	.	.

Notes: a) Preliminary data.
b) Unconsolidated data, data for the Czech Republic exclude Konsolidační banka and banks under conservatorship.
c) The share of net interest in average total assets, in the case of Germany since 1999.
d) 2005 data on an unconsolidated basis.

Sources: CNB, national central banks.

Table 45: Net non-interest income/average assets (%)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005 ^a
CZ ^b	2.11	2.20	1.29	1.49	1.22	1.37	1.46	1.43	1.69	1.61
AT ^c	1.59	1.65	1.68	1.62	1.59	0.89	0.75	0.83	0.84	0.94
DE ^b	0.34	0.35	0.34	0.37	0.42	0.36	0.34	0.35	0.35	0.37
PT ^c	0.77	0.78	1.19	1.04	1.07	0.88	0.88	1.02	1.06	1.39
HU ^b	0.15	0.72	-1.02	0.51	1.05	1.74	1.57	1.64	1.70	1.68
PL ^b	1.81	2.04	2.01	2.48	2.73	3.05	2.73	2.52	2.37	2.28
SI ^b	4.26	4.21	3.55	3.49	3.88	3.71	4.01	3.20	3.00	3.34
SK ^b	2.26	1.33	1.70	1.75	1.14	1.09	1.25	0.95	1.44	1.48
EU12 ^{c,d}	.	0.93	1.09	1.00	1.07	0.84	0.90	1.11	0.82	.

Notes: a) Preliminary data.
b) Unconsolidated data, data for the Czech Republic exclude Konsolidační banka and banks under conservatorship.
c) Unconsolidated data. Net non-interest income/assets as at year-end.
d) Weighted average.

Sources: CNB, national central banks.

Over the last two years, 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. Except for Hungary and Poland, which posted higher pre-tax and after-tax returns on assets, the Czech banks in total showed greater returns than those in other monitored countries in 2005, and, compared to the euro area countries, posted multiples of return on assets and return on equity (see Table 46 and Chart 20).

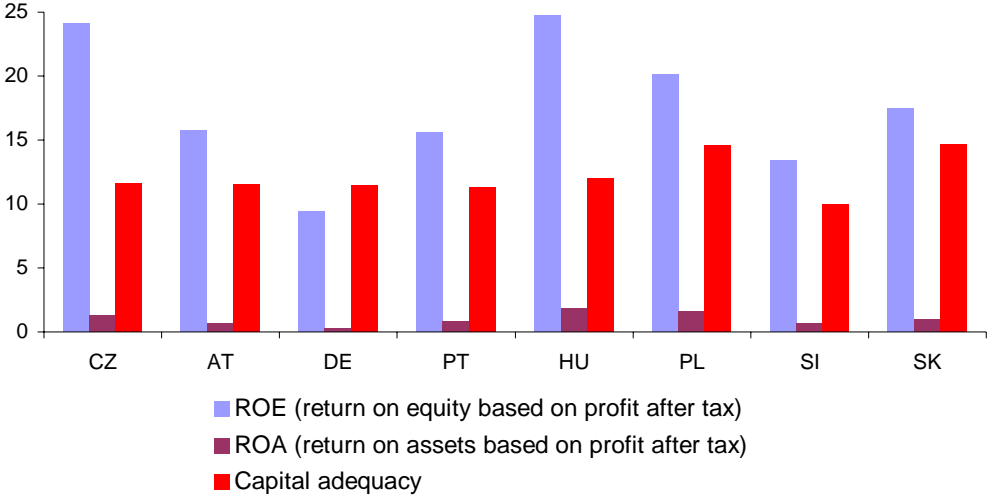
Table 46: Pre-tax profit/average assets (%)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005 ^a
CZ ^b	0.37	-0.17	-0.34	-0.21	0.56	0.93	1.59	1.64	1.76	1.76
AT ^c	1.45	1.26	1.25	1.21	1.39	1.25	0.53	0.60	0.96	0.65
DE ^b	0.46	0.42	0.61	0.35	0.29	0.2	0.15	0.03	0.15	0.44
PT ^c	0.77	0.88	1.09	1.05	1.05	0.96	0.78	0.89	0.84	0.98
HU ^b	1.95	0.96	-2.19	0.54	1.23	1.48	0.18	1.82	2.34	2.44
PL ^b	3.77	3.00	1.75	1.60	1.51	1.36	0.82	0.95	1.57	1.98
SI ^b	1.12	1.12	1.19	0.79	1.10	0.45	1.11	1.00	1.05	1.00
SK ^b	-0.34	0.01	-0.23	-3.88	0.63	1.05	1.20	1.17	1.32	1.23
EU12 ^{c,d}	.	0.49	0.69	0.73	0.83	0.47	0.40	0.47	0.58	.

Notes: a) Preliminary data.
b) Unconsolidated data, data for the Czech Republic exclude Konsolidační banka and banks under conservatorship.
c) Unconsolidated data. Pre-tax profit/assets as at year-end.
d) Weighted average.

Sources: CNB, national central banks.

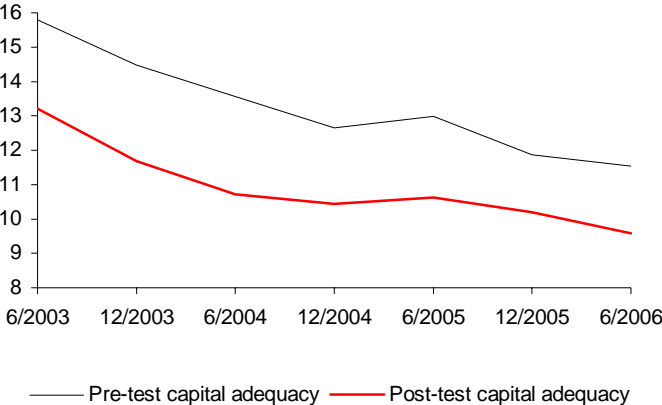
Chart 20: Profitability and capital adequacy of banks in 2005 (%)



Note: Unconsolidated data. Return on equity is based on Tier 1 capital.
 Sources: CNB, national central banks, ECB.

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 10.2% after significant adverse shocks with the data as of the end of 2005, or, 9.6% in respect of the data for 2006 H1 (see Chart 21). The scenario, including an in-built outlook for macroeconomic variables from the CNB forecast and the credit model of the credit risk development, has indicated only mild impact on the banks’ solvency within the next year. Under the worst considered macroeconomic scenario, capital adequacy of the banking sector could drop below 10%, however the probability of such development is quite low.

**Chart 21: Stress test results for the Czech banking sector
(capital adequacy, in %)**



Source: CNB.

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 33% year-on-year.

In the context of completed structural changes, the Czech banking sector has created suitable conditions for coping with potential economic shocks. The favourable potential of the changes is however partly spent due to declining solvency and capital adequacy of banks following an outflow of profits, or, dividends abroad. Transition of the banking system to the Basel II requirements in 2007 may cause increased capital requirements, internally connected with increased coverage of operating risk of the banks, and externally with coverage of credit risk vis-à-vis the corporate sector. A further rise in household indebtedness could necessitate higher additions to provisions within the banking sector, in case banks underestimate the inability to repay debts. The situation of 2006 is still acceptable in this respect, however future developments of banking deals may require capital reinforcement of the banks.

3. SUMMARY RESULTS OF ANALYSES – COMPARISON WITH 2005 DOCUMENT

Analysis	Method / Category	Section	2005 value ^a	2006 value ^b	Commentary	
CYCLICAL AND STRUCTURAL ALIGNMENT						
Direct alignment indicators						
Real economic convergence	GDP per capita, PPP, EU-12=100	1.1.1	65.6 ^c	68.5	The Czech Republic continues to converge. The indicator above the levels of PT, HU, SK and PL.	
	The price level of GDP, EU-12=100	1.1.1	52.4 ^c	55.0	Convergence was achieved in 2005, still greatly lagging behind AT, DE, PT and SI.	
	Real exchange rate against the euro, 1998=100	1.1.1	115	123	Real appreciation is present (higher on average since 1998 than all countries compared, except SK and HU).	
	3M real interest rates	1.1.1	-	0.4	Slightly above AT, DE, PT and SK in 2005. Although lower interest rates are beneficial for adoption of the euro, further real appreciation may lead to negative short-term money market rates in real terms.	
Correlation coefficients of real economic activity (CZ and EU-12). 2005 value: 2000:Q1-2004:Q4 2006 value: 2001:Q1-2006:Q1	GDP (Method 1)	1.1.2	0.44	0.29	The correlation is not statistically significant. Unlike in 2005 analyses, no increases in the value have been observed compared to the previous period.	
	GDP (Method 2)	1.1.2	0.27	0.26		
	GDP (Method 1, dynamic correlation, average for considered lengths of the cycle)	1.1.2	-	0.33		
	Method 1: year-on-year difference Method 2: quarter-on-quarter (or, month-on-month) difference	IPI (Method 1)	1.1.2	-	0.77	The correlation is statistically significant, the value is higher than in most countries compared. The indicator describes only part of the economy.
		IPI (Method 2)	1.1.2	-	0.41	
		Total exports (Method 1)	1.1.2	-	0.64	The methods provide different results, no statistically significant relationship is observed. Method 1 shows a statistically significant correlation.
Total exports (Method 2)		1.1.2	-	0		
Czech exports to EU-12 vs. GDP EU-12 (Method 1)	1.1.2	-	0.42			
Czech exports to EU-12 vs. GDP EU-12 (Method 2)	1.1.2	-	0.24			

Analysis	Method / Category	Section	2005 value ^a	2006 value ^b	Commentary
Synchronisation of demand shocks	Structural vector autoregression, correlation	1.1.3	convergence	asymmetry	A shift in the period under review and a statistical revision of the data since last year. Zero correlation of shocks, unchanged between the period under review. The value of correlation of shocks is similar to that in AT, PT and SK.
Synchronisation of supply shocks	Structural vector autoregression, correlation	1.1.3	divergence	asymmetry	Since 2000, the correlation has moved from negative values closer to zero.
Impact of an asymmetric shock brought about by an inflow of EU funds	The calculation using the fiscal impulse method, CNB's quarterly prediction model	1.1.4	manageable impact ^c	insignificant impact	A slight adjustment to the calculation method since last year. A smoother commencement of EU fund drawdown, including a lower net position, is expected, hence a lower demand impulse. No significant pressure will be created on monetary policy and the exchange rate.
Structural similarity of the Czech economy and the EU-12 economy	Landesmann index	1.1.5	0,17 ^c	0.15	The Czech Republic has the highest structural discrepancy among the countries compared.
Convergence of the interest rate differential	Difference in one-year and five-year interest rates	1.1.6	convergence	convergence	The Czech Republic has a zero to slightly negative interest rate differential.
Convergence of exchange rates to the euro	Bivariate GARCH	1.1.7	high correlation	high correlation	The high correlation remained broadly unchanged on a year earlier.
Exchange rate volatility (exchange rate to euro, annualised, in %)	historical (daily returns for a period of six months, 2006)	1.1.8	-	<5	Decreasing volatility over time. CZK has recently had the second lowest volatility after SIT.
	implied (options, 2006)	1.1.8	-	<5,5	A slightly downward tendency over time, together with SK lower than HU and PL.
	historical (quarterly returns, 1999-2005)	1.1.8	-	3.8	The variability is almost identical to that in HU and SK, lower than that in PL, higher than that in SI.
	fundamental (OCA criteria)	1.1.8	-	6.0	The expected variability is almost identical to that in new member states included in the comparison.
The effect of international economic relations					
Share of foreign trade with the euro area in total foreign trade	Exports,%	1.2.1	58,3 ^c	59.3	The high level of trade links remains broadly unchanged, being rather high mainly on the export side.
	Imports, %	1.2.1	60,3 ^c	52.9	
Ratio of direct investment to/from the euro area to GDP	Inflow of direct investment, % (stock)	1.2.1	79 ^{c,d} (2003)	38 (2004)	A high level of ownership links, particularly on FDI inflow side.
	Outflow of direct investment, % (stock)	1.2.1	25 ^{c,d} (2003)	1 (2004)	
Share of intra-industry trade	Grubel-Lloyd index	1.2.2	0,8 (2003)	0,8 (2004)	The high share of the intra-industry trade (a higher share is recorded only by AT) remains broadly unchanged.

Analysis	Method / Category	Section	2005 value ^a	2006 value ^b	Commentary
Financial market					
Financial sector	Financial system assets % of GDP	1.3.1	129,3 ^c	134.8	The ratio of financial system assets to GDP and the ratio of loans to GDP have risen slightly since 2004, being still substantially lower than those in AT, DE and PT, slightly lower than those in SI and higher than those in SK and PL. The ratio of loans to households is rising dynamically.
	Bank loans to non-bank clients, % of GDP	1.3.1	40,0 ^c	40.5	
	Banking sector assets /financial system assets, %	1.3.1	74,1 ^c	73.6	
	Bank loans to households, % of total loans	1.3.1	29.6	34.7	
Stock market integration	Speed of convergence of yields with yields in the euro area (beta-convergence coefficient, 2001-2006)	1.3.2	-	-0.9	High speed of convergence, comparable to that in AT. Stronger integration than in 1995-2000.

	Method / Category	Section	Value 2005 ^a	Value 2006 ^b	Commentary
ADJUSTMENT MECHANISMS					
Fiscal policy					
Government deficit (estimate for the current year)	CNB estimate % of GDP, ESA 95	2.1.2	-3,6 ^c	-3.5	Non-compliance with the Maastricht criterion in 2005 and 2006, risk of further deterioration in 2007.
Public debt (estimate for the current year)	CNB estimate % of GDP, ESA 95	2.1.2	35,8 ^c	30.6	A decline in 2005 due to revision. Outlook virtually for percentage stagnation (given by GDP growth).
Wage and price flexibility					
Real wage flexibility 2000-2004 or 2001-2006q1	Phillips curve	2.2.1	-0.008	-0.008	Wage elasticity unchanged from the previous analysis, there seems to be a decline in elasticity to statistically insignificant values since the 1990s.
Price flexibility 1998-2005	Inflation persistence	2.2.2	0.95	0.93	The inflation persistence indicator is still relatively high compared to other countries. Only a minimal decrease compared to a year earlier.
Labour market flexibility					
Long-term unemployment	Long-term unemployment rate, %	2.3.1	4.2	4.2	Stagnation in long-term unemployment, higher values than in AT, PT, HU and SI.
	Long-term unemployment as a share of total unemployment,%	2.3.1	51	53	
Regional differences in unemployment	Coefficient of variation in the unemployment rate	2.3.1	45 (2003)	44 (2004)	Together with AT and DE the highest values among the countries included in the comparison (AT has lower total unemployment, in DE there is chiefly a difference between Eastern and Western lands), a slight decline since 2002.
Population mobility	Internal migration - per 1,000 population	2.3.1	21.2	20.9	Internal migration probably lower than in AT and DE and higher than in SK and PL. No significant changes after EU entry.
International migration	Immigrants - per 1,000 population	2.3.2	52	59	Similar intensity as in SI, less than in AT and DE and more than in HU, PL, SK.

Analysis	Method / Category	Section	Value 2005 ^a	Value 2006 ^b	Commentary
Institutional environment	Trade unions and collective bargaining	2.3.3			According to OECD a relatively low effect of collective bargaining on wage creation in int. comparison (2000 data). New studies indicate potential higher coverage by collective agreements in the Czech Republic, even though the effect of collective bargaining is rather limited.
	Minimum wage as % of the average wage in industry and services	2.3.3	38.8	-	New Eurostat data not yet available. According to CNB estimate the percentage grew by 0.6 p.b. in 2005 and by another 1.5 p.b. in 2006.
	Employment protection legislation index – permanent employment	2.3.3	3,3 (2003)	3,3 (2003)	Except PT and SK higher than in the countries included in the comparison (OECD data for 2003). Estimates suggest an index decrease in SK and PT after 2003, and just an insignificant index decrease in connection with the change in labour law in the Czech Republic in 2007.
	Employment protection legislation index – temporary employment	2.3.3	0,5 (2003)	0,5 (2003)	The lowest level among the countries included in the comparison. The 2004 legislative changes led to an increase in protection of this type of employment in the Czech Republic.
	Index of administrative barriers to entrepreneurship	2.3.3	1,9 (2003)	1,9 (2003)	The highest after PL. There was probably a partial improvement in 2005 and 2006 (amendments to the Commercial Code and the Trades Licencing Act), with a possible positive impact on job creation.
	Overall labour taxation (persons at the average wage level, %)	2.3.3	43,6 ^c	43.8	Lower than in AT, DE and HU, higher than in the other countries included in the comparison.
	Overall labour taxation (persons at the level of two-thirds of the average wage level, %)	2.3.3	41.9	42.1	Taxation of persons with low incomes is lower than in DE and similar to that in AT, HU and PL.
	The share of net income of households without and with employment, % ^e	2.3.3	-	81	Motivation to seek job by long-term unemployed (families with children) is rather low - comparable with DE and PT, slightly higher than in AT and PL and much lower than in SK and HU. For short-term unemployed the motivation is comparable to, or higher than in the countries included in the comparison.

Analysis	Method / Category	Section	Value 2005 ^a	Value 2006 ^b	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	3.9	Percentage virtually unchanged from the previous year. Slightly higher than in PT, AT and HU, lower than in PL, SI, SK and DE.
Net interest margin	%	2.4	2.4	2.4	Interest margin broadly stable, lower than in HU, PL, SI. Higher than in the euro area countries included in the comparison and SK.
Net non-interest income	Percentage of average assets	2.4	1.7	1.6	Comparable with HU and SK, lower than in PL, SI, higher than in the euro area countries included in the comparison.
Pre-tax profit/average assets	%	2.4	1.8	1.8	After HU and PL the highest among the countries included in the comparison.
Capital adequacy in banks	%	2.4	12.6	11.9	A modest decline, remains at acceptable level similar to that in the other countries included in the comparison.
Capital adequacy in banks after stress tests	%	2.4	10.4	10.2	Sufficient level.

Note: a/ "Value 2005" is the most recent value of the indicator compared in the 2005 document. Unless stated otherwise, the data is for 2004.

b/ "Value 2006" is the most recent value of the indicator compared in the 2006 document. Unless stated otherwise, the data is for 2005

c/ Value 2005 is not fully comparable with value 2006. The reasons include in particular a revision of the data on the variable observed, a change in calculation, or a different implementation (in case of fiscal policy).

d/ The share of direct investment from/to the euro area in total direct investment to/from the Czech Republic.

e/ The unemployed after five years, potential income from employment at 67% of the average wage. The second person is economically inactive, children 4 and 6 years old.

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 (for the period 1993-1995). 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 international comparative price levels regression for the final consumption of households in individual countries to GDP at purchasing power parity per capita (accordingly, see Čihák, Holub, 2003 and 2005). Based on the data for 31 European countries, the following relationship has been estimated for 2005:

$$P_C = 19.693 + 0.83 \text{ GDP}_{PPP},$$

where P_C is the price level of final consumption of households and GDP_{PPP} is gross domestic product at purchasing power parity per capita (in both cases EU12=100). The simulations of the rate of equilibrium appreciation assume beta-convergence of GDP towards the level of the EU-12 at a rate of 3% a year.⁸⁴ 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% or 10% per year is also considered. These three alternative assumptions result in the range of estimates presented.

Real interest rates are derived from three-month money market interest rates. Their average annual level is deflated by average annual inflation rate for the respective country, using the Harmonised Index of Consumer Prices (HICP). An estimate of real rates for future is based on assumption of approx. 1% equilibrium three-month real rate in the euro area. From this figure, the estimated equilibrium real appreciation for each of the countries (see above) is subtracted, corresponding to the future expected inflation differential vis-à-vis the euro area average.

1.1.2 Correlation of economic activity

The alignment of economic activity in the selected countries with the euro area is analysed using the correlation analysis. Mutual relationships between individual countries and the euro area are assessed using the pairwise correlation coefficients applied to real GDP time series and newly also to the industrial production indices (IPIs) and export indices.

The simple (Pearson) correlation coefficient is used to assess the strength of a linear relationship:

⁸⁴ As compared with the 2005 analyses, the parameter was increased by one percentage point to make the calculation suit better the observed unexpectedly high growth rates of the Czech economy, reflected also in increased estimates of potential growth in the CNB forecast.

$$r_{xy} = \frac{s_{xy}}{\sqrt{\sigma_x^2 \sigma_y^2}},$$

where s_{xy} is covariance and σ_x and σ_y are standard deviations of time series x and y , respectively. When examining alignment of the cyclical behaviour between selected economies, it is suitable to monitor the correlation only within a certain band, which is considered between one and half and eight years in accordance with the standard length of the business cycle. Dynamic correlation has been therefore used as a complementary indicator,⁸⁵ able to resolve the requirement. Dynamic correlation is based on spectral analysis of time series, takes values in the interval $[-1,1]$ and, in analogy to the static correlation coefficient, is defined by the relationship:

$$\rho_{xy}(\lambda) = \frac{C_{xy}(\lambda)}{\sqrt{S_x(\lambda)S_y(\lambda)}},$$

where $S_x(\lambda)$ and $S_y(\lambda)$ are spectral density functions, $C_{xy}(\lambda)$ is cospectrum, while λ takes values in the interval $[-\pi,\pi]$. A simple static correlation is then a function (approximately an average) of dynamic correlations across the entire observed spectrum.

The analysis uses quarterly real GDP time series at 2000 constant prices (expressed in national currencies), monthly time series of the Industrial Production Index adjusted for working days, and monthly, or, quarterly time series of the total exports and exports to the euro area expressed in the national currency. The source of GDP and IPI data is Eurostat, export data are obtained from the IMF database. As in the previous year, results for Portugal are not included in the analysis of real GDP correlation since no comparable data are available for the country. The IPI time series for the Czech Republic is provisional according to Eurostat. Export data are available only in USD from the IMF database, so they had to be translated into national currencies. Average monthly, or, quarterly exchange rates according to IMF were used at the translation.

Time series are expressed in logs, seasonally adjusted and detrended. As the literature⁸⁶ does not offer a consensus on the optimal detrending method, the analysis applies two different detrending methods – namely year-on-year differences between the original time series and quarter-on-quarter (month-on-month) differences between the seasonally adjusted time series:

Method 1

Year-on-year differences of seasonally unadjusted (logarithmed) time series:

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

where y denotes the variable under investigation, t is the time period and s is seasonality ($s = 4$ for quarterly data, $s = 12$ for monthly data).

Method 2

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

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

where y_{sa} is seasonally adjusted using the TRAMO/SEATS method.

⁸⁵ Croux, Forni and Reichlin (2001).

⁸⁶ For example, Frankel and Rose (1997). Features of separate methods are described in Canova (1998).

Given the requirement of assessing development in alignment of business cycles of individual countries vis-à-vis the euro area, correlation coefficients (both static and dynamic), with respect to quarterly real GDP time series, are calculated separately for two time periods 1997:Q1 – 2000:Q4 (method 1), or, 1996:Q2 – 2000:Q4 (method 2) and 2001:Q1 – 2006:Q1. As time series of the Industrial Production Index have been available for certain countries (including also the Czech Republic) only since 1998, correlation coefficients for this indicator are calculated only for the second observed period. As regards the export data, comparatively long time series are available, which enabled calculation of all correlation coefficients for two time periods as in the case of GDP; this time, however, 1996:Q1 – 2000:Q4 and 2001:Q1 – 2005:Q4 for quarterly data and 1996:M1 – 2000:M12 and 2001:M1 – 2006:M2 for monthly data.

In contrast with the previous year, the method of removal of the trend from the seasonally adjusted time series using the Hodrick–Prescott filter was dropped. The filter is prone to overestimate cyclical behaviour of time series under review, which may get reflected in the values of correlations. However, results obtained under the method were close to those obtained under method 1.

Comparability of the results with the results from the same analysis of 2005 is reduced due to performed revisions to the real GDP time series, as well as due to migration to the 2000 constant prices. As opposed to the last year, the 1995 data were omitted from the analysis as they were not officially published by the Czech Statistical Office upon the revision, and the data available from the Eurostat database for that year are disputable. The exclusion of 1995 from the analysis means shortening of the first observed period by four and by one observation (for method 1 and method 2 respectively).

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, Quah, 1989; Bayoumi, Eichengreen, 1993; and Babetskii, 2004 and 2005). Quarterly seasonally adjusted GDP series at constant prices and the GDP deflator in selected new EU countries (Czech Republic, Hungary, Poland, Slovak Republic and Slovenia) and current euro area members (Germany, Portugal and Austria) are the inputs for the SVAR model. The source of the data is Eurostat and the data cover the period 1996 – 2006:Q1. 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 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 1996 – 2000 and 2001 – to date.

1.1.4 Macroeconomic effects of financial flows from the EU funds

Preliminary estimates of financial flows adopted from the Ministry of Finance serve as the input data for the analysis of macroeconomic impacts of the inflow of EU funds in 2005 – 2013. The MF sets out these estimates primarily in euro and respects the relevant methodology of financial flow implementation with the EU in them, while taking account of the development to date. The forecasted CZK/EUR rate according to the current (i.e. July) CNB macroeconomic forecast is used to translate the input data into CZK.

The initial data stated in CZK are used to derive the economic impulse arising from the increase in the inflow of EU funds, which includes additional receipts obtained by the private

sector from the EU above the line of the means considered in the public sector expenditure (“additional receipts from the EU”). The additional receipts include the pre-accession instruments Sapard and Phare, funds for support of agriculture, approximately 65 – 70% of the funds for projects from the structural funds and resources for internal policies. Hence, unlike the same analysis presented in the last year’s document, the impulse calculation does not include receipts from the cohesion funds (CFs) that are aimed at large infrastructural projects and environmental protection projects, while such projects are practically exclusively commissioned by the government (i.e. these funds should be recognised as part of capital expenditure of the public sector). For the same reason, the pre-accession instrument Ispa has been excluded, as a pre-runner of the financial assistance from the CFs. Finally, compensations that represent direct revenue of the state budget, thereby creating already additional demand of the public sector (e.g. in the form of capital expenditure, government consumption etc.), i.e. that are contained in the fiscal impulse, are not considered in the calculation either.

For the purposes of the additional economic impulse calculation, the volumes of funds for projects from the structural funds include newly only realised expenditure⁸⁷, i.e. advanced payments as yet unspent to reimburse for implemented projects are excluded. The amounts of realised expenditure 2004 – 2005 and the first half of 2006 are adopted from the document “The Course of Drawdown of Structural Funds” compiled by the Ministry for Regional Development⁸⁸. The forecast of actual expenditure in 2006 – 2013 is a CNB’s expert estimate. The calculations also consider potential non-existence of an excessive lag between the project accomplishment and a subsequent submission of the payment request by the final beneficiaries.

Derivation of the economic impulse based on the above additional receipts from the EU closely follows the procedure applied within the CNB’s forecasting system to calculate the fiscal impulse. That involves the year-on-year change in the additional receipts from the EU stated as a percentage of GDP, multiplied using an estimated multiplier. The outlook for the Czech GDP development is taken from the CNB’s July forecast (we assume at the same time that the GDP deflator index will be broadly consistent with the inflation target).

The simulation of the macroeconomic effects of the inflow of funds from the EU budget is performed on the basis of the CNB’s quarterly prediction model. Newly identified impulses arising from the inflow of EU funds are inputted into the quarterly 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.⁸⁹ The macroeconomic effects are expressed in the sense of deviations of monitored indicators from the CNB’s macroeconomic forecast of July 2006.

Comparability of the results with the results from the same analysis included in the 2005 document is reduced due to the new method of calculation of the economic impulse arising from the inflow of EU funds. While only selected additional receipts from the EU, obtained by the private sector, are currently considered at its derivation, the last year’s document estimated the impulse based on the net position, i.e. the balance of total receipts of the Czech Republic from the EU and contributions by the Czech Republic to the EU.

⁸⁷ The realised expenditure includes funds applied for in the payment requests submitted by final beneficiaries to the intermediate entity.

⁸⁸ www.strukturalni-fondy.cz

⁸⁹ For further details on the CNB’s quarterly prediction model, see Beneš et al. (2003).

1.1.5 Assessment of the structural similarity between economies

The structural similarity of the economies 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, Czech Republic, Germany, Austria, Portugal, Hungary, Poland, Slovenia and Slovakia) vis-à-vis country B (i.e. 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 (1995) and also Flek et al. (2001).

For the purposes of the analysis the coefficient was modified to $SL/100$.⁹⁰ 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.

1.1.6 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, as well as breaks in the time series, must be taken into account when analysing the convergence of interest rates in the Czech Republic, Hungary, Poland, Slovenia 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 three-month and five-year rates in the euro area and the Czech Republic, Hungary, Poland, Slovenia and Slovakia. Instruments with a maturity of three months are compared using the Euro Area Interbank Offered Rate (EURIBOR), Prague Interbank Offered Rate (PRIBOR), Budapest Interbank Offered Rates (BUBOR), Warsaw Interbank Offer/Bid Rate (WIBO), Slovenia Interbank Rate (SITI) and Bratislava Interbank Offered Rate (BRIBOR).⁹¹ The interest rate on five-year government bonds is used to compare longer-term interest rates.⁹²

The time series of three-month interest rates starts in January 1998 for all of the countries monitored, excluding Slovenia whose time series starts as from May 1998. The time series of 5-year interest rates starts in January 1998 for the euro area, Czech Republic and Hungary,

$$^{90} SL = \sum_{i=1}^n \sqrt{(I_{sh_A^i} \cdot 100 - I_{sh_B^i} \cdot 100)^2} \cdot \left(\frac{I_{sh_A^i} \cdot 100}{100} \right) = 100 \sum_{i=1}^n \sqrt{(I_{sh_A^i} - I_{sh_B^i})^2} \cdot I_{sh_A^i} = 100 \cdot I_{SL}$$

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

⁹¹ Missing data were adopted from the New Cronos database. They include three-month interest rates of the euro area until December 1998 and three-month interest rates of Slovenia from May 1998 to December 2001.

⁹² The codes in the Bloomberg system are as follows: EUR003M Index, PRIB03M Index, BUBOR03M Index, WIBO3M Index, SITI3M Index, BBOR3M Index, and GECU5YR Index, CZGB5YR Index, GHGB5YR Index, POGB5YR Index, and CTSKK5YR Corp.

March 1999 for Poland and February 2002 for Slovakia; no data are available for Slovenia. All the time series terminate in September 2006.

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.

1.1.7 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.⁹³ 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, Slovenia 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 28 August 2006 and uses daily Bloomberg data. The Slovenian tolar rate until 1998 was obtained from the website of the Bank of Slovenia.

1.1.8 Analysis of exchange rate volatility

The historical exchange rate volatility is calculated as a standard deviation of logarithmic daily returns for a period of six months:

$$\sigma = \sqrt{\frac{1}{T-1} \sum_{t=1}^T (r_t - \bar{r})^2},$$

⁹³ Identical method has been used by Castrén and Mazzotta (2005).

where σ is the standard deviation, r_t is the daily return and T is the number of working days in the period of six months (126 for a year with 252 working days). We use the following relationship to translate the standard deviation of logarithmic daily returns to an annual form:

$$\sigma_{ann} = \sigma\sqrt{N}, \text{ where } N=252 \text{ represents an approximate number of business days in the year.}$$

The historical volatility of exchange rates of the countries included in the comparison against the euro is calculated using the CNB's rate fixing data; data from exchange rates of currencies vis-à-vis the Deutsche Mark translated vis-à-vis the euro using the conversion rate were used for the data before 1999.

The implied volatility is derived from market prices of options using the given valuation model. This volatility is directly quoted in the trading system. The source of the data is Bloomberg, the codes of indices are EURCZKV6M, EURSKKV6M, EURPLNV6M, and EURHUF6VM.

The fundamental-based exchange rate volatility ($FVOL_{ij}$) is calculated as a weighted average of the selected economic values describing alignment between the analysed countries and the euro area:

$$FVOL_{ij} = \alpha + \beta OPENNESS_{ij} + \chi FIN_{ij} + \mu DISSIM_{ij} + \rho TRADE_{ij}, \quad \text{where } OPENNESS_{ij}$$

describes openness of economies, FIN_{ij} financial development, $DISSIM_{ij}$ dissimilar commodity structure of exports and $TRADE_{ij}$ integration of international trade. Respective weights ($\alpha, \beta, \chi, \mu, \rho$) are assumed based on estimates in Horváth (2005), as well as the methodology of calculation of the above economic variables. The justification of selection of the respective economic variables can be found in Bayoumi and Eichengreen (1997), and Horváth (2005).

As the calculation of the fundamental volatility is based on quarterly economic data, the historical exchange rate volatility used for comparison with the fundamental volatility is calculated using quarterly data in 1999-2005 as follows: $VOL_{ij} = SD[\Delta(\log e_{ij})]$, where SD is the standard deviation of a quarter-on-quarter change (Δ) in the logarithm of the nominal rate (e_{ij}) between countries i and j . The fundamental and historical volatilities are then translated to their annualised value in accordance with the above formula.

1.2 The effect of international economic relations

1.2.1 The link of the economy with the euro area

The data for the calculation of the shares of exports to the euro area 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).

The source of data for the analysis of the regional structure of direct investment is the Eurostat database. Data on the inflow of foreign direct investment (FDI) from euro area countries and the outflow of direct investment (DI) to euro area countries were used.

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 intra-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). The source of data is the OECD OLISnext database.

1.3 Financial market

1.3.1 Financial sector

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 emerging market economies (unless one takes into account the formation of bank financial groups).

Loans to households in the Czech Republic mostly include debit balances at current accounts and balances at credit accounts of natural persons, i.e. **loans to individuals** (residents) and loans to small businesses (residents).

1.3.2 Stock market integration

For quantification of beta-convergence, it is useful to apply common regression analysis or the panel estimate method, in the form of the equation:

$$\Delta R_{i,t} = \alpha_i + \beta R_{i,t-1} + \sum_{l=1}^L \gamma_l \Delta R_{i,t-l} + \varepsilon_{i,t},$$

where $R_{i,t}$ is the difference of the asset yields (national stock index) of the country i and selected reference territory (a benchmark, European stock index) over time t , Δ is the difference operator, α_i is a dummy variable for the respective country and L is the lag operator. The size of coefficient β may be interpreted as a direct measurement of the convergence speed. A negative beta coefficient indicates occurrence of convergence, and the absolute value of the beta coefficient indicates the convergence speed. The higher the absolute value of the β coefficient, the higher the speed of convergence, and if $\beta=0$, no convergence is observed.

For quantification of sigma-convergence, a calculation is used of the (cross-section) standard deviation (σ), according to the formula:

$$\sigma_t = \sqrt{\left(\frac{1}{N-1}\right) \sum_{i=1}^N [\log(y_{it}) - \mu_t]^2},$$

where symbol y is the yield on asset, μ is the mean value of the data-set over time t and i stands for separate countries ($i = 1, 2, \dots, N$). For the purposes of this analysis, we introduce $N=2$, i.e. we examine development of the sigma-convergence over time between the euro area and one of the countries under review.⁹⁴ σ takes only positive value in theory. The lower σ is, the higher level of convergence has been reached. In theory, full integration is reached, where the standard deviation is zero, while high (several digit) values of σ reflect a very low degree of integration. For the chart type expression, the results were filtered using the Hodrick-Prescott filter with the recommended weekly time series coefficient $\lambda=270400$.

The calculations were carried out on the weekly data (daily data averages) drawn from DataStream and including the period from January 1995 to July 2006. The following were used as national stock indices: PX (Czech Republic), BUX (Hungary), WIG (Poland), SAX12 (Slovakia), SVSM (Slovenia), ATX (Austria), DAX (Germany) and PSI20 (Portugal). SX5P was used as the European stock index, comprising the following weights of the national stock indices of the selected euro area countries (34.9% France, 23.3% Germany, 13.5% Spain, 12% the Netherlands, 11.8% Italy, 3.5% Finland and 0.9% Ireland).

⁹⁴ For pairs of countries, the calculated values in each period are essentially equal to a half of the yield differential square.

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 method⁹⁵ 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, except for the part of the table covering the development of mandatory expenditures in the Czech Republic that includes also the figures from the state budget, which is monitored on the cash (non-accrual) basis.

The description of mandatory expenditures is based on the definition used by the Ministry of Finance. These include mandatory expenditures arising from statutory requirements and other mandatory expenditures (namely expenditure arising under international treaties or due to judicial and extra-judicial decisions on disputes that are binding upon the Czech Republic). Included shall be in particular pension insurance benefits, government payments for health insurance, government social assistance, sickness insurance benefits, debt service expenditure, state contribution related to the support of building savings schemes and private pension schemes, allocations to state funds, expenditure for contributions to political parties, payments to the EU budget, unsuccessful arbitrations etc.

In addition to the aforementioned mandatory expenditures, there are also so-called *quasi-mandatory expenditures* that include e.g. wages to the public sector employees, defence expenditures or international humanitarian assistance, investment incentives or active employment policy. Such quasi-mandatory expenditures are not considered here as it is within the government's powers to adjust them quite significantly through its own action.

Macroeconomic interpretation of the mandatory (and quasi-mandatory) expenditure amounts is however not entirely trivial. In the short run, these expenditures limit the government's reaction ability to execute an active discretionary policy (in cases of unforeseen economic

⁹⁵ See Bouthevillain et al. (2001).

shocks). On the other hand, thanks to their inertia, they stabilise to a certain extent the course of the business cycle. The key problem related to an increase in mandatory expenditures is that their expected growth is not compensated by any corresponding reductions in other expenditures and/or by increased taxation, which results in an increased fiscal imbalance.

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).

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, or Babetskii, 2006).

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

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 (1996:Q1–2006:Q1), and for two subperiods, i.e. 1996 – 2000 a 2001 – 2006.

2.2.2 Price flexibility – inflation persistence

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 1997:1 to 2006:7 are used for the calculation. As the HP filter gives a biased trend estimate at the beginning and the end of the sample, the data for the period 1998:1–2005:12 will be 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). 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.

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** (moving between municipalities). Data on internal migration in other countries are published in statistical yearbooks.⁹⁶ 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, 2005b, national statistics institutes). The data on attitudes to international mobility from the 2002 Eurobarometer survey are taken from Krieger (2004). The data on numbers of immigrants according to Eurostat, data on registered foreign employment in the Czech Republic are obtained from MLSA.

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 net replacement 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, 2004 and

⁹⁶ Migration between municipalities does not necessarily always take place due to the labour market positioning. Certain studies therefore define migration between regions (for example, World Bank 2006). In this case, however, migration at shorter distances is underestimated. In the Czech context in addition, Prague itself is an independent statutory region. An analysis of mobility between regions for the Czech Republic would then contain an important proportion of moving beyond the limits of the capital city, without any change of the labour market position.

2005a, and Brandt, Burniaux and Duval, 2005) is based on international evidence on the impact of institutional factors on macroeconomic variables.⁹⁷

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

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 legislation (EPL) index** is taken from OECD (2004). It relates to the late 1990s and to 2003 and consists of 18 items assessed according to the Labour Code in force. 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.

Costs of individual termination of an open-ended contract, in number of days for which wage has been paid since the notice was given by the employer. This includes the number of the notice period days, severance pay and the lag period until the start of the notice period. In the Czech Republic and Slovakia, these costs differ according to the notice reasons, and the number of wage-paying days will be higher in case of redundancy dismissals. The indicator is therefore an average of the costs incurred upon the notice for redundancy and for other reasons. In Austria, due to similar reasons, this indicator is an average for higher and lower skilled persons.

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 Government 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).

Later periods 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, 2006b).

Work-incentive indicators. The data on the net replacement rates (NRR) are taken from OECD tax benefit models for individual types of households, persons in the initial phase of unemployment who are entitled to unemployment benefits⁹⁸ and persons not entitled to unemployment benefits (inactive or long-term unemployed). More detailed data and distribution of NRRs for the Czech Republic are calculated using a micro-simulation tax and

⁹⁷ Freeman (2005) casts doubt on the robustness of these conclusions and calls for evidence based on microanalysis of firms and individuals and experimental methods.

⁹⁸ In this case OECD assumes that unemployed persons claiming unemployment benefits do not usually receive regular social assistance benefits, which top up households' income to the minimum subsistence amount.

benefit model developed in cooperation by the CNB and Ministry of Finance (Galuščák, Pavel 2006).

Net replacement rates 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. A NRR is defined as the fraction of net income of a household if the person under consideration has no employment and if such person works. Gross incomes of the other members of the household are supposed to be identical in both cases.

NRRs identify only financial entitlements to social benefits. Providing there is sufficient monitoring of the activity the unemployed develop in seeking a job, even high values of NRR may attach sufficient job seeking incentive.

2.4 Flexibility and shock-absorbing capacity of the banking 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”, i.e. “at-risk loans” 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.

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 responsible 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.

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 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.

The baseline historical scenarios were further developed and complemented with a macroeconomic stress test that uses consistent model scenarios derived from the CNB's prediction model. A credit model was used to estimate development of the non-performing loans in the bank portfolios, taking into account expected evolution of macroeconomic variables (growth of GDP, inflation, interest rates, exchange rate). This resulted in a quality shift in the stress tests that work with future shock scenarios of different probability degrees.⁹⁹

⁹⁹ Summaries of stress test results are included in the Financial Stability Reports published by the Czech National Bank.

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