

## **Czech Republic: Selected Issues**

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CZECH REPUBLIC

**Selected Issues**

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Approved by European Department

July 22, 2004

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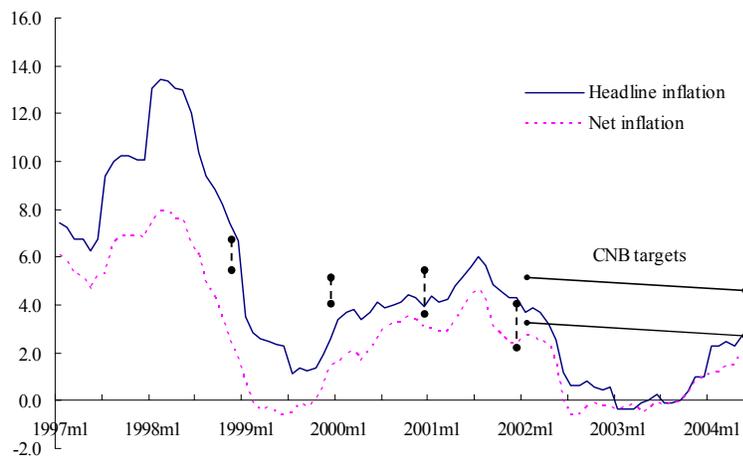
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## I. INFLATION IN THE CZECH REPUBLIC: CURRENT DEVELOPMENTS AND OUTLOOK<sup>1</sup>

### A. Motivation

1. **Inflation in the Czech Republic has fallen substantially since peaking in the double-digits in 1998.** The crisis-led depreciation of the koruna in mid-1997 pushed year-on-year inflation to over 13 percent but tight monetary policy contributed to its brisk reduction by a cumulative 12 percentage points between early 1998 and mid-1999. At the same time, the Czech National Bank (CNB) adopted an inflation targeting framework in 1998 that had a moderating effect on inflation expectations. Some of the decline in inflation can also be attributed to the growing competition on the Czech retail market—the entry of foreign retail chains put pressure on retailers to cut margins and on suppliers to increase productivity. With large increases in some regulated prices and monetary policy easing, inflation picked up during 2000–01 and was within or close to the CNB’s target range. However, the appreciating currency together with the continued strong competition on the Czech retail market exerted downward pressure on inflation during 2002–03. In this period, inflation was well below the CNB target band.

Figure 1. Headline and Net Inflation, 1997-2004  
(In percent; year-on-year)



Source: Czech National Bank.

Note: Inflation targets were specified in terms of year-end net inflation between 1998-2001, and headline inflation on a continuous basis thereafter. Net inflation excludes the contribution to inflation of changes in indirect taxes and regulated prices.

<sup>1</sup> Prepared by Martin Sommer.

2. **After a period of historically low inflation, prices started picking up in the last quarter of 2003.** The strong koruna and unused capacity in the economy kept inflation around zero since the middle of 2002. In late 2003, an unfavorable harvest and the gradual depreciation of the koruna put upward pressure on prices and inflation further accelerated as a result of indirect tax changes and adjustments to administered prices in January and May 2004. Headline inflation rose from virtually zero in September 2003 to 2.7 percent year-on-year in May 2004. Over the same period, net inflation—excluding the price impact of taxes and regulated prices—accelerated from zero to 2.0 percent.

3. **Price developments are currently influenced by numerous factors—most of them contributing to a rise in inflation.** Besides the increases in taxes and regulated prices, these factors include high oil prices and robust economic growth. The exchange rate depreciation during the second half of 2003 also contributed to a pent-up of inflationary pressures. By contrast, the koruna appreciation in the second quarter of 2004 could unwind some of these pressures if the strength of the koruna is sustained. To get a more precise view of near-term price developments, staff constructed a simple model of Czech inflation.

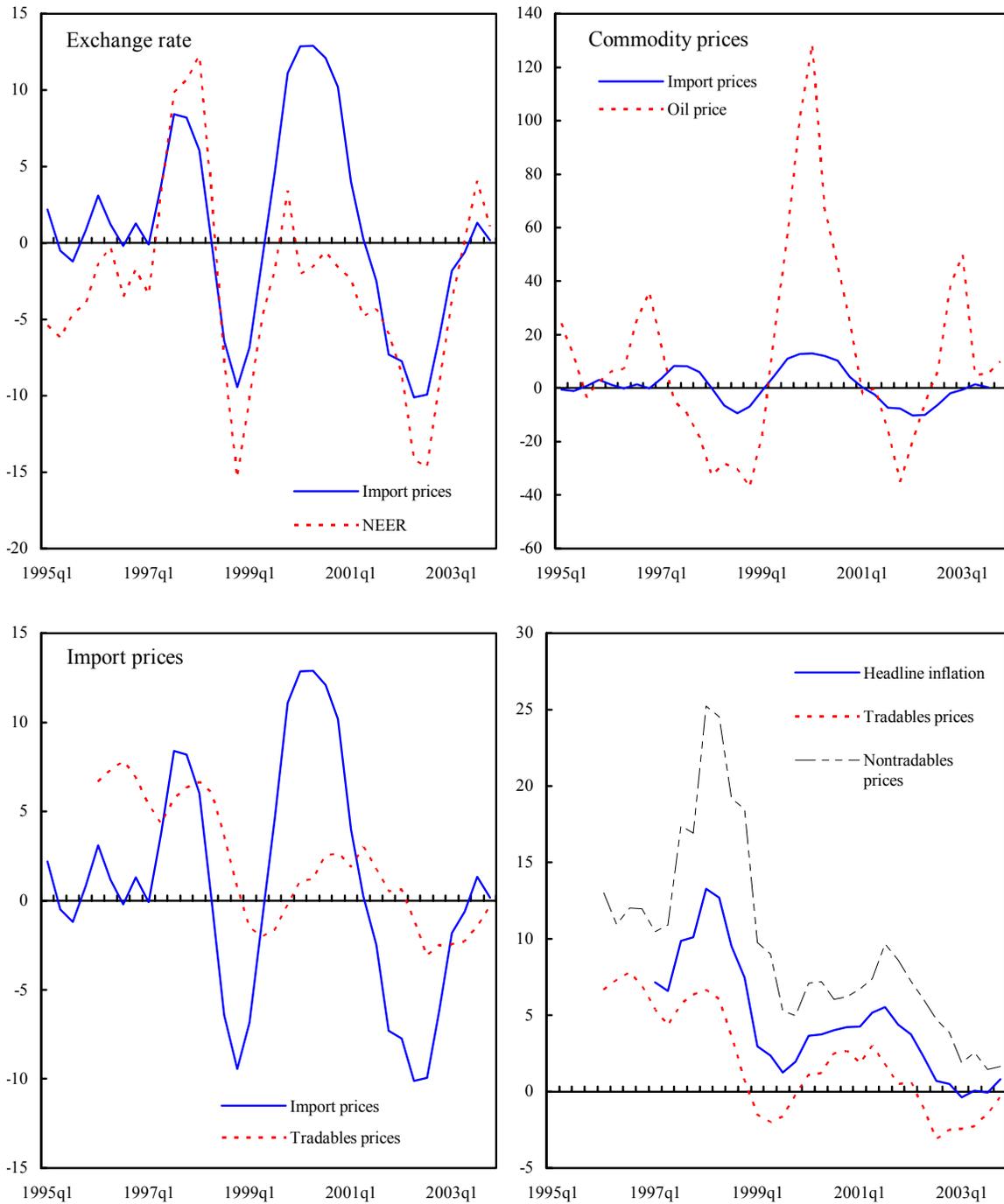
4. **The model makes a distinction between the determinants of prices in the tradable and nontradable sectors.**<sup>2</sup> The Czech Republic is a small, open economy that is still undergoing a technological catch-up with the advanced economies. Rising productivity is increasing real wages in the whole economy. However, productivity growth in the services sector (or more generally, in the nontradable sector) lags productivity growth in the manufacturing (or, in the tradable sector). Wage growth in excess of productivity causes prices in the nontradable sector to grow faster than in the tradable sector (the Balassa-Samuelson effect). This suggests the need for a separate analysis of the tradable and nontradable sectors.

5. **Given the openness of the Czech economy, producers in the tradable sector face strong competition from abroad—the prices of tradables are therefore linked to import prices.** The top part of Figure 2 illustrates that the nominal effective exchange rate and oil prices seem to be the main determinants of import prices. The bottom of Figure 2 then shows the pass-through of the import prices into the prices of tradable goods. The pass-through appears to be delayed and incomplete, reflecting domestic distribution costs, and potentially also the willingness of distributors to absorb some of the volatility in import prices through changes in their own margins. Headline inflation remains above tradables inflation over the sample period. This reflects high wage and low productivity growth in the nontradable sector (the Balassa-Samuelson effect) and rising indirect taxes and regulated prices.

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<sup>2</sup> According to CNB estimates, tradable goods and services make up 55 percent of the Czech CPI basket, while nontradables form the remaining 45 percent.

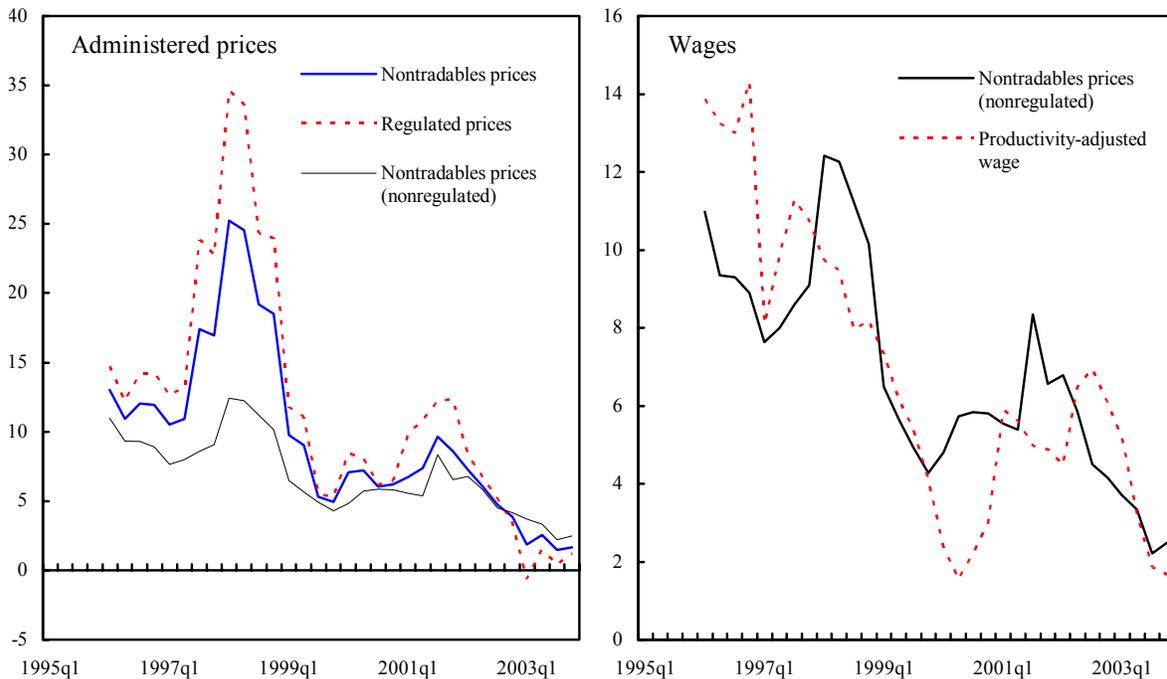
Figure 2. Determinants of Inflation: Tradable Sector, 1995-2003  
(In percent; year-on-year)



Sources: Czech Statistical Office; Czech National Bank; and IMF staff calculations.  
Note: NEER stands for the nominal effective exchange rate.

6. **Figure 3 confirms the link between the nontradable prices and productivity-adjusted wages.** This is consistent with profit maximization—nominal wage growth that is not matched by real productivity improvements should be reflected in nontradable inflation.

Figure 3. Determinants of Inflation: Nontradable Sector, 1995-2003  
(In percent; year-on-year)



Sources: Czech Statistical Office; Czech National Bank; and IMF staff calculations.

## B. Model

7. **The inflation model reflects these behavioral linkages.** The model consists of four basic equations and one accounting identity:

- In equilibrium, the domestic price level is determined by import prices  $P^{import}$  and economy-wide wage costs per worker  $W$  adjusted for productivity—see equation (1). The first term captures the foreign component of tradables prices, while the second term controls for the domestic distribution costs of tradables and the equilibrium price of nontradables. Productivity is defined as the gross value added in the economy per worker  $VA/L$ . The term  $Taxes\_cumul$  is introduced to control for changes to indirect taxes because these influence the margin between the equilibrium prices and costs.

The series was constructed as the cumulative contribution of indirect tax changes to nonregulated prices as estimated by the CNB. The term  $\varepsilon$  is a residual.<sup>3</sup>

$$\ln CPI_t - \ln Taxes\_cumul_t = c_1 + \alpha \ln P_t^{Import} + (1 - \alpha)(\ln W_t - \ln \frac{VA_t}{L_t}) + \varepsilon_t \quad (1)$$

- Consistently with the methodology of the CNB (2004), headline inflation  $\pi$  is for the purposes of the short-term analysis decomposed into three categories: growth in regulated prices, the contribution of changes in indirect taxes on nonregulated goods and services to headline inflation, and net inflation. Equation (2) is an accounting identity and the coefficient values represent the relevant CPI basket shares. The actual and projected growth rates of regulated prices and the contribution of taxes to inflation were provided by the CNB and are considered exogenous.

$$\pi_t = 0.8203 * \pi_t^{net} + 0.1797 * Regul\_Prices_t + Taxes_t \quad (2)$$

- Net inflation  $\pi^{net}$  is modeled as an autoregressive process to capture the persistence of price changes. The inflation equation (3) further contains the lagged residual  $\varepsilon$  from equation (1). The idea is to introduce an “error-correction” mechanism into the inflation dynamics: whenever the price level is higher than its equilibrium value ( $\varepsilon > 0$ ), there will be downward pressure on inflation.<sup>4</sup> Finally, the inflation equation also incorporates the exchange rate—this turned out to be the only significant variable in the equation besides the inflation lags and the error-correction term.

$$\pi_t^{net} = c_3 + \rho \varepsilon_{t-1} + \delta_1 \pi_{t-1}^{net} + \delta_2 \pi_{t-2}^{net} + \varphi \Delta \ln CZK / USD_{t-1} + \eta_t \quad (3)$$

- Import prices are expressed as a function of the nominal exchange rate and commodity prices. Since the model will be used for forecasting, the effective

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<sup>3</sup> The appropriate variables in equation (1) should be nontradable wage and productivity. However, the sector-level wage and employment data are unreliable. We use instead the economy average, which potentially underestimates nontradable—and therefore also overall—inflation. Ideally, one should also include the impact of taxes on regulated prices, and any information on margins in the regulated sectors but these data are not available.

<sup>4</sup> A similar error-correction mechanism has been used in previous inflation studies such as Fagan, Henry, and Mestre (2001), Kuijs (2002), and Sun (2004). The coefficient on the error-correction term  $\varepsilon$  is expected to be negative. An attempt was made to incorporate into the equation (3) information about the time-varying inflation target for net and headline inflation. However, the target term was insignificant—probably because in practice, inflation tended to stay far away from the target for long periods.

exchange rate is approximated in terms of the exchange rates vis-à-vis euro (CZK/EUR) and U.S. dollar (CZK/USD). The main source of commodity price shocks in the Czech Republic is crude oil whose price is also included in the equation.

$$\ln P_t^{Import} = c_4 + \beta \ln P_{t-1}^{Import} + \gamma \ln CZK / EUR_t + \delta \ln CZK / USD_t + \omega \ln Oil_t + v_t \quad (4)$$

- The productivity-adjusted nominal wages are modeled using a simple Phillips curve. Variable  $y_t$  denotes the output gap—a measure of slack in the economy.<sup>5</sup>

$$\Delta W_t - \Delta(VA/L)_t = c_5 + \mu(\Delta W_{t-1} - \Delta(VA/L)_{t-1}) + \theta y_{t-1} + v_t \quad (5)$$

### C. Estimation

8. **Every equation of the model was separately estimated with seasonally adjusted quarterly data for 1998:1-2003:4.** The sample was chosen to cover only the period of the inflation targeting regime. To avoid issues with time averaging, all growth rates are defined as quarter-on-quarter changes. The estimates of coefficients from equations (1), (3), (4), and (5) are reported below. Almost all coefficients are significant at least at the 5 percent level (denoted with a single star) and many are significant at the 1 percent level (double star).<sup>6</sup> The coefficient signs are consistent with the theory. The size of the coefficients also seem plausible. For example, the coefficient on productivity-adjusted wages in equation (1) is consistent with the large share of nontradables (and the distribution cost of the tradables) in the Czech CPI basket.<sup>7</sup>

$$\ln CPI_t - \ln Taxes\_cumul_t = -7.29^{**} + 0.31^{**} \ln P_t^{Import} + 0.69^{**} (\ln W_t - \ln \frac{VA_t}{L_t}) + \varepsilon_t \quad (1)$$

(0.02) (0.03) (0.03)

$$R_{adj}^2 = 0.92, \quad s.e. = 0.02$$

$$\pi_t = 0.8203 \pi_t^{net} + 0.1797 Regul\_Prices_t + Taxes_t \quad (2)$$

<sup>5</sup> The output gap is defined as the percentage deviation of seasonally adjusted GDP from its potential value. Potential output was estimated by the staff based on assumptions about gradually accelerating productivity growth, slow aging of the population, and a modest decline in the participation ratio.

<sup>6</sup> The OLS estimates of coefficients in equations (1) and (4) are super-consistent because both equations are estimated with non-stationary, cointegrated series. The t-statistics on the individual coefficients continue to be asymptotically normally distributed.

<sup>7</sup> The coefficient on the productivity adjusted wage term is consistent with about 40 percent distribution costs for the tradables.

$$\pi_t^{net} = 0.24 - 0.21^{**} \varepsilon_{t-1} - 0.20 \pi_{t-1}^{net} + 0.61^{**} \pi_{t-2}^{net} + 0.05^{*} \Delta \ln CZK / USD_{t-1} + \eta_t \quad (3)$$

(0.14) (0.07)      (0.13)      (0.13)      (0.02)

$$R_{adj.}^2 = 0.56, \quad s.e. = 0.49$$

$$\ln P_t^{Import} = 3.80^{**} + 0.54^{**} \ln P_{t-1}^{Import} + 0.21^{**} \ln CZK / EUR_t + 0.13^{**} \ln CZK / USD_t + 0.08^{**} \ln Oil_t + v_t \quad (4)$$

(0.47) (0.04)      (0.03)      (0.02)      (0.01)

$$R_{adj.}^2 = 0.99, \quad s.e. = 0.01$$

$$\Delta W_t - \Delta(VA/L)_t = 0.97^{**} + 0.32 (\Delta W_{t-1} - \Delta(VA/L)_{t-1}) + 0.26^{**} y_t + v_t \quad (5)$$

(0.29) (0.17)      (0.09)

$$R_{adj.}^2 = 0.52, \quad s.e. = 0.62$$

#### D. Inflation Projections

9. **Using the estimated equations, the staff prepared two alternative short-term inflation scenarios.** The two projections differ in their assumptions about the exchange rate of the koruna to the euro and economic growth. The no-policy change projection assumes that interest rates remain constant at their present level and the exchange rate at CZK/EUR 32.25—about its current four-quarter average. In the policy-reaction projection, interest rates are assumed to rise gradually to keep inflation close to the middle of the CNB target band. This would be a scenario consistent with recent comments of senior CNB officials. Based on the initial market reactions to those comments, the exchange rate is calibrated at CZK/EUR 31.50 over the forecast period. The staff projects GDP growth at 3¼ percent in 2004 and 3.4 percent in 2005 in the policy-reaction scenario. In the no-policy change scenario, growth is about ¼ percentage point higher.

10. **In both scenarios, the oil price and the cross-rate of USD/EUR are consistent with the May 2004 *World Economic Outlook* projections.** The model also incorporates CNB assumptions about the impact of the regulated price and tax changes on inflation. Given the assumptions about the exchange rates and oil prices, equation (4) provides an estimate of import prices. The staff projection of GDP growth together with assumptions about potential growth determine the future output gap.<sup>8</sup> Equation (5) then provides a short-term forecast of productivity-adjusted wage growth and level. Net inflation is calculated from equation (3). Adding the contribution of taxes and regulated prices in equation (2) leads to the forecasts of headline inflation and the overall price level. Finally, given the estimated price level, import prices, productivity adjusted wages, and exogenous taxes, one can use equation (1) to

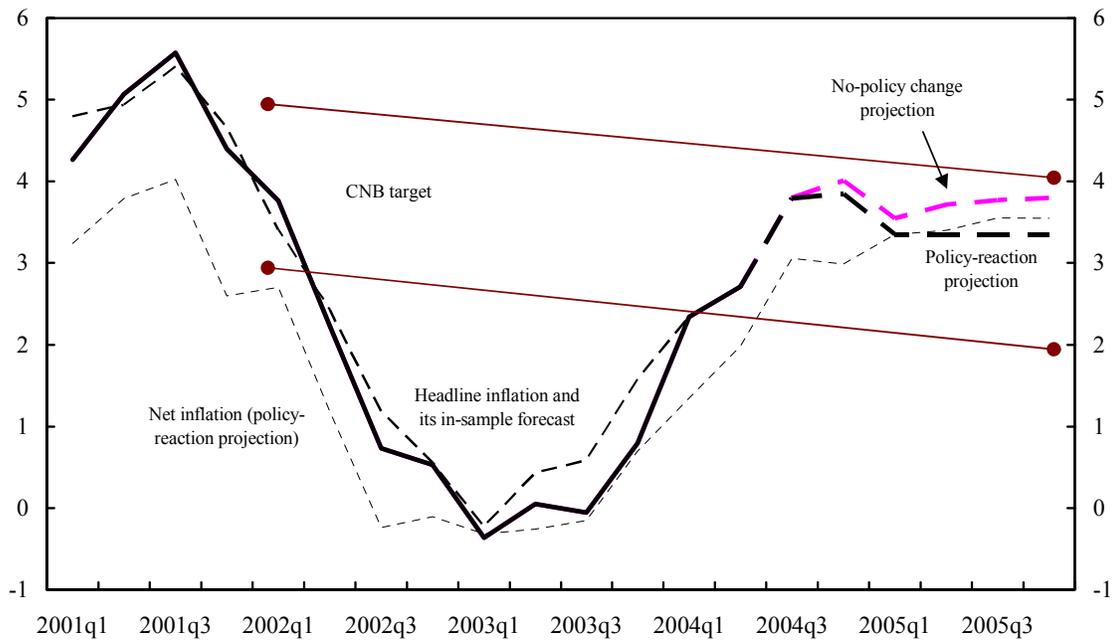
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<sup>8</sup> The average potential growth over 2000–03 is estimated at 2.5 percent. The potential output growth in 2004 and 2005 is predicted at 2.9 percent, and 3.2 percent, respectively.

compute the deviation of the price level from its equilibrium value,  $\varepsilon$ . This term then becomes an input into the next round of inflation projections.

11. **The policy-reaction scenario of the model shows year-on-year inflation peaking around 4 percent in the last quarter of 2004** owing to the inflationary impact of administrative measures and a base effect (the negative price growth from Q3/2003 drops out of the year-on-year growth rate). The inflation rate is then expected to move towards the middle of the CNB target band. While the dropping out of the effects of administered prices and taxes changes would have contributed to a fall in inflation by about 1 percentage point in early 2005, the forecasted reduction in inflation is smaller. This is because the shrinking slack in the economy together with growth of wages and commodity prices will put upward pressure on prices. In the alternative scenario with constant interest rates, these pressures would accelerate inflation beginning in mid-2005. Figure 4 plots projections of the model for both headline and net inflation. Net inflation is slightly higher than headline inflation in 2005 because regulated prices are assumed to grow slower than market prices.

Figure 4. Baseline Projection of Headline and Net Inflation, 2001-05  
(In percent; year-on-year)



Source: IMF staff calculations.

12. **The policy-reaction scenario is subject to several risks:**

- The sensitivity analysis suggests that if oil prices remain around US\$40 per barrel, both headline and net inflation at end-2005 would be higher—close to the no-policy change projection.
- There are also some downside risks to inflation but these are difficult to quantify. First, competition on the Czech retail market is intense and has limited the pass-through of recent VAT tax changes into consumer prices. Market observers consider that competition will continue to put downward pressure on retail margins which could in turn offset some of the inflation pressures. Second, the uncertainty about potential output growth is substantial. Given the previous high level of investment, including FDI, potential growth may be higher than estimated by the staff—this would imply a larger slack in the economy and weaker inflation pressures.
- The response of the labor market to this year's one-off inflation factors is also uncertain. Should workers get compensated for the tax and price hikes, there would be second-round effects on prices, which may be significant given the large weight of nontradable sector in the economy.

**E. Conclusion**

13. **The staff's analysis shows that without interest rate increases, inflation is likely to begin to rise above the midpoint of the CNB's target in mid-2005.** Although inflation will fall in the first half of 2005 as the impact of administrative measures dissipates, the diminishing slack in the economy signals that—considering transmission lags—monetary policy needs to enter a tightening cycle in the near future to keep medium-term inflation close to the middle of the target band. The precise timing and size of future interest rate increases should take into account the robustness of economic growth, the effects of exchange rate developments on monetary conditions, and wage developments.

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## II. THE CZECH LABOR MARKET IN A CROSS-COUNTRY PERSPECTIVE<sup>1</sup>

### A. Summary and Main Issues

1. Early on in the transition, the Czech labor market performed significantly better than other countries' in the region. Unemployment, including long-term unemployment, stayed very low and participation rates remained stable at a high level. However, labor market indicators started to worsen in the late 1990s, a trend that still continues. Although labor market participation remains one of the highest among the Organization for Economic Cooperation and Development (OECD) countries, the unemployment rate drifted up to nearly 8 percent,<sup>2</sup> the prevalence of long-term unemployment increased and regional differences in labor market conditions widened. Despite solid GDP growth over the past few years, employment continued to shrink. These developments raise some concern that the flexibility of the labor market may be eroding. At the same time, several trends are set to place higher demands on labor market flexibility. Looking ahead, continuous adaptation of skills and employment patterns even while the workforce ages will be required as the Czech Republic moves up the technology ladder. And with the medium-term policy objective of adopting the euro, efficient absorption of shocks by the labor market will help maximize the net benefits from participation in the European Economic and Monetary Union.

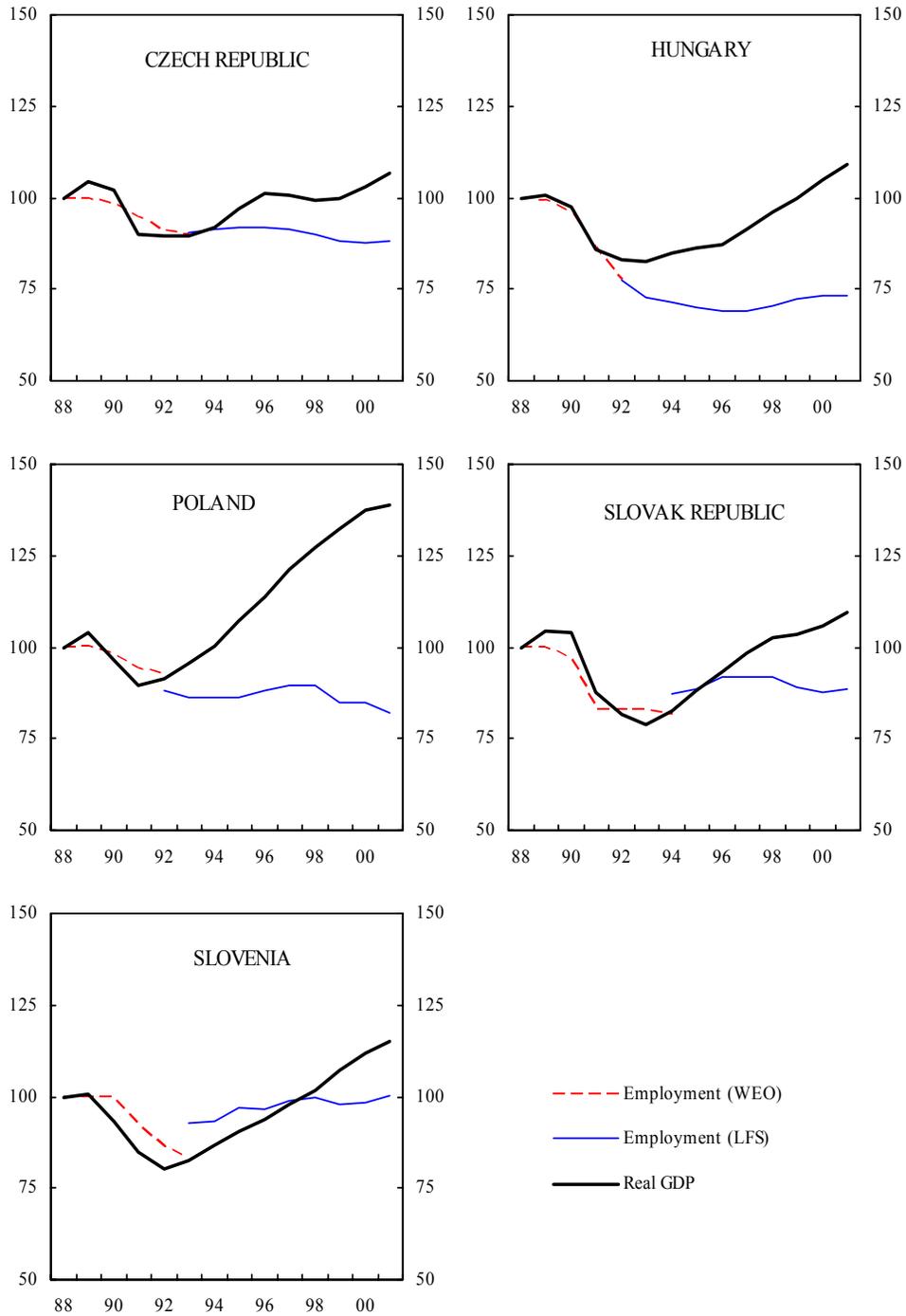
2. Given the fact that the Czech Republic underwent economic transition only during the past 10 years, labor market developments are still in flux. However, comparisons with peer countries can provide some indication of relative performance. After giving a regional overview of the main trends and stylized facts in the Central European countries' (CECs) labor markets over the past decade, the paper takes a closer look at the Czech labor market and attempts to identify the sources of emerging problems. As regards the institutional framework and the current sensitivity of wages to unemployment, the Czech Republic—like other CECs—compares favorably to Western or Southern Europe. However, high long-term unemployment, which is concentrated regionally and among the low skilled, points to persistent skill mismatch, incentive problems, and low geographical mobility of workers and jobs as possible factors behind a worsening labor market performance. Although delayed restructuring contributed to the rise in unemployment since the late 1990s, to avoid persistent high unemployment in the years to come, a comprehensive approach seems desirable. Namely, a flexible institutional setting would need to be complemented by steps to ensure that the labor force is appropriately skilled, workers and jobs can move across regions with ease, and avoidable disincentives to work are minimized.

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<sup>1</sup> Prepared by Kornélia Krajnyák.

<sup>2</sup> The paper relies on labor force survey information whenever possible. Registered unemployment is currently about 10 percent.

Figure 1. Czech Republic: Real GDP and Employment in CECs, 1988-2001  
(1988=100)



Sources: IMF, *World Economic Outlook*; and the authorities' labor force survey.

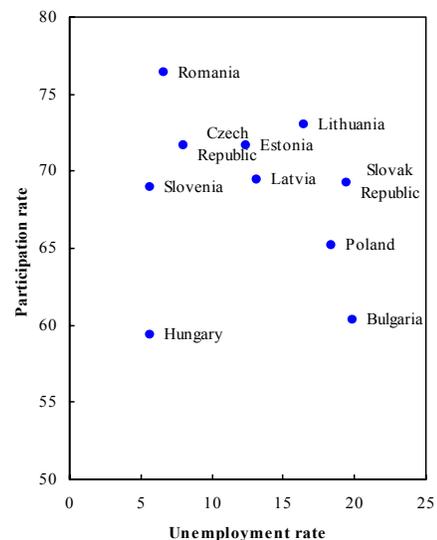
### B. Labor Markets in CECs: Some Stylized Facts<sup>3</sup>

3. Transition from a planned to a market economy reshaped the CECs' economic structures in many ways. As a result of privatization and the increased importance of nascent private firms, private sector employment gradually became dominant. Parallel to this, large employment shifts occurred across industries; the importance of the service sector increased substantially; and heavy industry and nonskilled-labor intensive light industries started to decline. The structural change was accompanied by a substantial—up to 25 percent—decline in output (the “transitional recession”). The deep recession lasted several years, and together with fundamental structural changes had profound effects on the labor market. Many pre-transition characteristics of labor markets—high participation rates, full employment, long tenures, and little wage differentiation—changed radically: over the past decade, most of these countries experienced a drop in participation, rising unemployment, greater mobility across jobs, and a substantial widening of wage differentials.

4. In most countries, employment shrunk rapidly during the transitional recession (Figure 1). The speed of the employment decline was strongly influenced by the reform strategy: in fast-reforming countries, jobs were eliminated more rapidly in the contracting or restructuring old sectors. Early on, job creation in the new sectors remained too slow to offset the effects on employment. Even after the transitional recession was over and output growth resumed, employment declines continued as restructuring firms shed labor to increase productivity. So far, only in a few countries did employment growth finally turn positive, and employment gains remained modest. In most countries, employment is 15–25 percent below its pre-transition level.

5. As employment declined, participation rates plummeted, and unemployment shot up, in most cases to double-digit levels, with the notable exception of the Czech Republic. Countries with the largest increases in unemployment tended to experience the largest declines in participation rates, and a negative correlation remains to date (Figure 2).

Figure 2. Czech Republic: Unemployment and Participation Rates in Transition Countries 1/



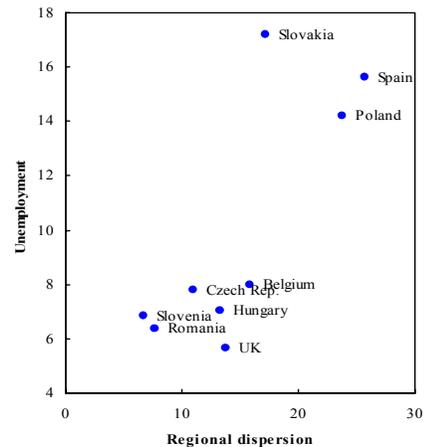
Sources: Eurostat; and IMF staff calculations.  
1/ Unemployment rates refer to 2001, participation rates to 2000. Participation rates expressed as percent of population aged 15-65.

<sup>3</sup> This section draws on ongoing cross-country work on labor markets in transition countries by the European Department.

6. Contrary to previous expectations that unemployment would serve as the most important transitory state in the reallocation of workers across sectors or jobs, the reallocation tended to happen via job-to-job moves, and the group of unemployed tended to turn into a relatively stagnant pool. These characteristics of the labor reallocation process do not seem to be out of line when compared with EU countries.<sup>1</sup> But the “stagnant pool” characterization does not necessarily hold across all CECs.<sup>2</sup>

7. Rapid and substantial structural change had its attendant effects on the labor market: employment decline and unemployment are highly concentrated in specific industries, skill categories, and geographic regions. As the industrial structure changed to bring production in line with market prices and comparative advantage, in most countries, heavy industry was the first casualty. Later, as their currencies continued to appreciate and their economies to modernize, unskilled-labor-intensive manufacturing, such as textiles or computer assembly, followed. Among the various skill categories, the low skilled were hardest hit: from the large number of low-skilled jobs lost during the transitional recession, hardly any have since been regained. Labor market conditions worsened disproportionately in “monoculture” regions specializing in outdated industries (which also tended to employ large numbers of the low skilled or workers with difficult-to-convert skills) and the structural change produced geographical pockets of extremely high, and very persistent, nonemployment.<sup>3</sup> Conversely, agglomerations with a more diversified industrial structure adapted more easily—for example, unemployment rates in the more diverse capital cities remained significantly lower than in centers of heavy industry. An additional factor in successful adjustment was distance from EU markets, with border regions having an edge in attracting FDI and new activities. As a result, labor markets in CECs are characterized by large regional differences (Figure 3).

Figure 3. Czech Republic: Unemployment Rate and its Regional Dispersion, CECs and Select EU Countries 1/



Sources: Eurostat; and IMF staff calculations.  
1/ Dispersion is the difference in the unemployment rates of the highest and lowest unemployment NUTS3 regions. Data are averages for 1998-2001.

<sup>1</sup> See Grogan (2000).

<sup>2</sup> For example, Köllő (2001) finds that far from being “more stagnant”, labor markets in depressed industrial regions in Hungary had higher-than-average turnover, including job finding rates.

<sup>3</sup> In several countries, there is also an ethnic dimension to the unemployment problem. In particular, the Roma population, which tends to be low skilled and a large share of which used to be employed in the heavy industry, have been especially hard-hit.

8. Several factors may play a role in persistent high unemployment and sluggish employment growth. First, significant skill-mismatch brought about by the rapid structural change during the past decade may have effectively reduced available labor resources. Second, wages may be sluggish to adjust to changing economic conditions, keeping unemployment high. Third, labor market and other institutions—including benefits, employment protection legislation, and taxation—may distort labor supply incentives and discourage job creation. And fourth, geographical immobility of workers and jobs may keep the labor market spatially segmented, contributing to large and persistent regional differences and higher aggregate unemployment. The rest of the section discusses these four factors.

9. **Skill mismatches.** Although the measured educational achievements of CECs are fairly high in international comparison, skill mismatches are likely to be more severe than in mature economies. Three factors can be mentioned. First, until recently, tertiary education tended to be less widespread (Table 1). With the large transition-related technological shift, demand for high skills increased at the same time when a large number of unskilled jobs were eliminated. As a result, educational premia increased, and the share of the high-skilled among the unemployed tends to be lower than in mature economies.<sup>4</sup> Second, as entire industries have been lost, the existing skill mix—especially for older workers—may not be appropriate for the new industrial structure. This is illustrated by the finding of lower educational premia for older workers (indicating skill obsolescence). And third, the education system’s performance may be patchy in preparing the young for successful labor market participation. Regarding general education, the OECD’s Programme for International Student Assessment showed considerably worse educational results for participating CECs than alternative international comparisons which concentrate more on “book learning.” Regarding secondary and vocational education, direct information is hard to come by. Nevertheless, anecdotal evidence suggests that the structure of skills taught responds with long lags to changes in demand, resulting in bottlenecks in some segments of the labor market, and possibly pushing up youth unemployment rates.

Table 1. Czech Republic: Skill Levels in Select Countries

	High skill 1/	Low skill 2/
<b>OECD high-income countries, average</b>	<b>0.156</b>	<b>0.779</b>
Austria	0.065	0.912
Germany	0.147	0.759
France	0.237	0.763
Sweden	0.125	0.716
Finland	0.124	0.784
Netherlands	0.255	0.743
UK	0.147	0.749
Italy	0.096	0.859
<b>CEC average 3/</b>	<b>0.117</b>	<b>0.835</b>
Czech Republic	0.105	0.895
Hungary	0.156	0.844
Poland	0.114	0.852
Slovak Republic	0.11	0.573
Slovenia	0.071	0.857
<b>Baltic states</b>	<b>0.195</b>	<b>0.589</b>

Sources: Marin (2004); and IMF staff calculations.

1/ Tertiary education.

2/ Up to secondary level.

3/ Weighted by 2003 population.

<sup>4</sup> For example, Eurostat data indicate that the share of managerial and professional workers among the unemployed is some 4–5 percentage points lower in the Czech Republic, Hungary and the Slovak Republic than in Belgium.

10. **Wage flexibility.** Even while unemployment increased during transition, the behavior of wages does not suggest particular rigidities in wages or wage setting.

- The transition-induced decline in output and employment was accompanied by large—up to 25 percent—real wage cuts.
- The unions' bargaining power remains limited—even if there are national or industry level wage bargaining rounds, their outcome is only indicative. In practice, wages are set at the firm level.
- The wage dispersion increased substantially across industries, regions (for example, in the Czech Republic and Hungary, average wages in the highest unemployment regions are about 30 percent lower than in the lowest unemployment regions), and skill categories.
- The elasticity of wages with respect to regional unemployment reaches mature economy levels in most countries.<sup>5</sup>
- Re-employment after a short spell of unemployment is estimated to involve taking substantial wage cuts. Reservation wages of the unemployed seem to be negatively correlated with the regional unemployment rate.

11. **Institutional framework.** In general, the flexibility of the narrowly interpreted institutional setting—unemployment benefits, minimum wages, and labor market regulations—compares favorably with the EU average, but other factors—payroll taxes and social benefits—are likely to have adverse labor market effects.

- Unemployment benefits are low, their duration short, and eligibility criteria stringent. Studies have failed to find significant negative effects on job search behavior.
- Minimum wages, at about 30–40 percent of the average wage, are relatively low in international comparison, in line with the United States and Japan, and significantly lower than in most EU countries (50–60 percent). However, empirical research indicates that there may not be much room to increase minimum wages without adverse effects on employment, particularly for the low skilled.<sup>6</sup>

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<sup>5</sup> See for example Blanchflower (2000) for comparable estimates.

<sup>6</sup> Kertesi and Köllő (2003) examine the employment effects of nearly doubling the minimum wage in Hungary in 2000–02. Although even after the increases, the minimum wage remained well below 50 percent of the average wage, the share of minimum-wage workers jumped from 5 to 17 percent. The minimum wage increase is found to have significantly reduced employment in the small firm sector and worsened the job-finding probability of low-wage workers.

- Labor market regulations.
    - Employment protection legislation is generally less stringent than elsewhere in the EU, and anecdotal evidence suggests that the legislation may not be strictly enforced.
    - Working hours are generally flexible.
  - Payroll taxes are high, reflecting the costs of the “premature welfare state”. Employment declines over the past decade led to a shrinking labor tax base, exerting upward pressures on social security contribution rates. Impending population aging — a problem in all CECs — is likely to put further pressure on taxes on labor through likely higher financing needs of the health care and in some countries, the pension system.
  - Social benefits targeted to provide a minimum living standard (MLS) to the low-income segment of the populace may distort labor supply incentives for a subset of workers. Benefit income for low-wage families may well exceed their opportunity income in employment. In addition, the tax and benefit systems interact to generate extremely high effective marginal tax/ benefit withdrawal rates for these workers. Most of these benefits have nonlabor-market objectives—for example, ensuring a minimum living standard for families with children—and some conflict of equity and efficiency objectives may be inevitable, especially as average wages are very close to the MLS.
12. **Geographical immobility of persons and jobs** may play a role keeping the labor market spatially segmented, leading to pockets of high unemployment and pushing up aggregate unemployment.
- While net migration flows tend to point in the right direction (with the notable exception of the suburbanization of the central agglomeration), with people moving from high-unemployment to low-unemployment regions, the flows are small even in a European context—estimated to be on par with Italy or Portugal.<sup>7</sup>
  - The main source of spatial mobility is commuting rather than a change of residence. However, the relatively high costs of commuting may be prohibitive, especially for low-wage workers (Table 2). With the exception of Slovenia, a minimum wage

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<sup>7</sup> See Fidrmuc (2002).

worker needs to pay almost ½ percent of his monthly wages for one liter of gasoline,<sup>8</sup> and 15 to 20 percent of his monthly wages for a monthly rail ticket. In addition, the bad state of transport infrastructure in some regions lengthens travel times and reduces the feasible commuting distance.

Table 2. Czech Republic: Indicators of Commuting Costs in CECs 1/

	Czech R.	Hungary	Poland	Slovak R.	Slovenia
Cost of gasoline per liter, US\$	0.81	0.94	0.83	0.74	0.80
In percent of monthly average wage	0.15	0.17	0.14	0.17	0.07
In percent of monthly minimum wage	0.40	0.42	0.42	0.43	0.17
Cost of rail ticket, 30km return, US\$	1.77	2.12	...	2.03	...
In percent of monthly average wage	0.32	0.39	...	0.45	...
In percent of monthly minimum wage	0.88	0.95	...	1.17	...
Cost of monthly rail ticket, US\$ 2/ 3/	26.8	46.8	29.3	...	...
In percent of monthly average wage	4.8	8.6	5.0	...	...
In percent of monthly minimum wage	13.3	21.0	15.0	...	...

Source: IMF staff calculations.

1/ Data for 2003 (rail prices) and 2002 (gasoline prices, minimum and average wage).

2/ For distance of about 30 km.

3/ For Hungary, includes employee and employer share.

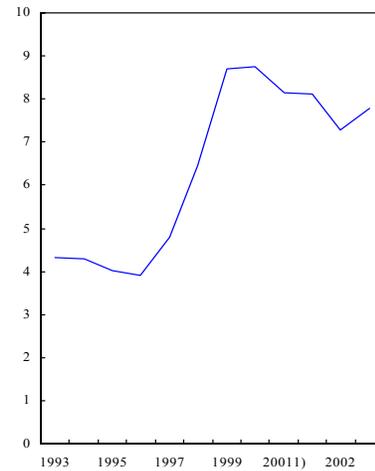
- Low-unemployment regions appear to have an edge in attracting jobs and capital despite higher wages. Patterns of regional investment and firm creation rates, as well as the distribution of FDI flows indicate that investors favor the capital cities and regions close to the EU borders. In addition to market size and/or market access and better business infrastructure, agglomeration effects may also be at work. The existence of agglomeration effects is supported by the finding that productivity increases in advantaged regions tended to outpace those in disadvantaged regions.

<sup>8</sup> In relative terms, this is about 10 times more expensive than in the US.

### C. The End of the “Czech Miracle”?

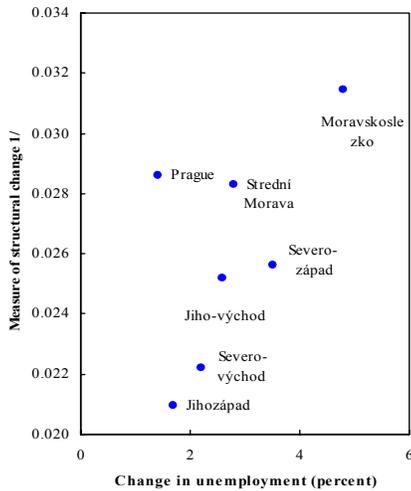
13. The path of unemployment in the Czech Republic shows a markedly different pattern than in other CECs. The “Czech miracle”<sup>9</sup> of the first half of the 1990s was characterized by very low unemployment rates and sustained high labor force participation, at the same time when unemployment was increasing rapidly and participation was falling in other countries. Behind the Czech developments were several factors: (i) delayed restructuring, with a relatively small output drop and job destruction; (ii) early retirement schemes to shrink the labor force; and (iii) low unemployment benefits and strict application of eligibility criteria. Empirical research found that active labor market policies (ALMPs) were effective in ensuring high exit-to-job rates among the unemployed and making the job-worker matching process more efficient.<sup>10</sup>

Figure 4. Czech Republic: Unemployment Rate, 1993-2003 1/



Source: Czech Statistical Office.  
1/ In percent of the labor force. Based on the labor force survey.

Figure 5. Czech Republic: Change in Unemployment and Structural Change in Czech Regions, 1998-99



Sources: Eurostat; and IMF staff calculations.  
1/ Staff calculations based on value added by industry in NUTS2 regions. See text for definition.

14. Since the mid-1990s, the picture has become less rosy: while participation rates remain among the highest in Europe, unemployment has grown to levels more “usual” for a CEC (Figure 4). Why did the miracle end? Part of the explanation is that there was no miracle—the Czech Republic merely delayed enterprise restructuring until the second half of the 1990s, especially in the previously rather important heavy industry and mining sectors. After restructuring started, unemployment shot up and regional differentials widened. Figure 5 plots a measure of change in regional industrial structure in 1998–99 against the change in unemployment

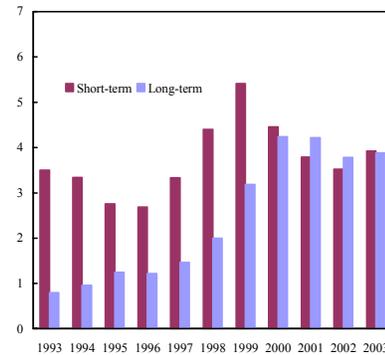
<sup>9</sup> See Boeri and Burda (1996).

<sup>10</sup> See for example Boeri and Burda (1996), Terrell and Sorm (1998) and Münich, Svejnar and Terrell (1998).

over the same period.<sup>11</sup> The positive correlation indicates that more structural change—or more restructuring—tended to coincide with larger increases in unemployment. Cumulative worker displacement related to this process is expected to peak in the next years as the restructuring of the steel and the mining sectors draws to a close. In the meantime, traditional industries intensive in low-skilled labor (textiles and leather) have also been shrinking, indicating further changes in the economy’s industrial structure.

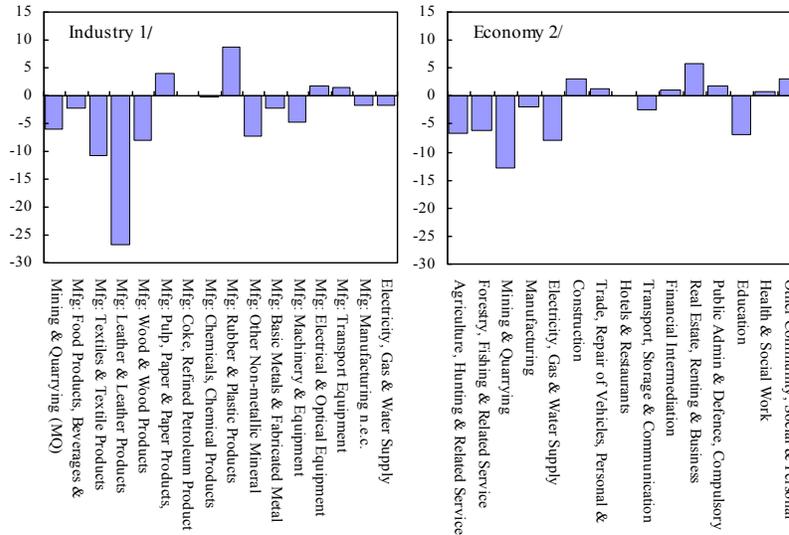
15. While high and rising Czech unemployment is related to delayed but inevitable economic restructuring, more recently there are signs of emerging structural problems. The incidence of long-term unemployment increased (Figure 6) and employment growth failed to pick up despite healthy GDP growth—job creation in services remained too weak to offset shrinking employment in most manufacturing industries (Figure 7). Recent research gives other indications

Figure 6. Czech Republic: Unemployment by Duration (percent)



Source: Czech Statistical Office, Eurostat, and IMF staff calculations.

Figure 7. Czech Republic: Employment Growth by Branch, 2003 (In percent)



Source: Czech Statistical Office.  
 1/ Based on registered employment.  
 2. Based on the labor force survey.

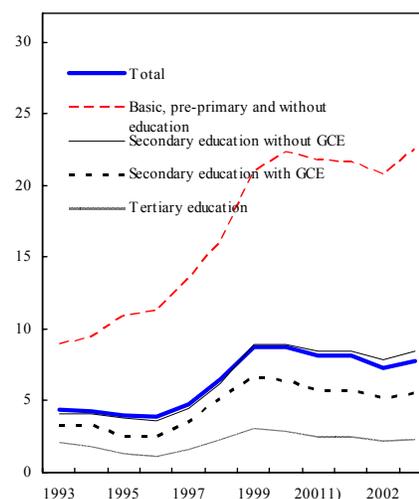
<sup>11</sup> Following Newell and Pastore (2000), the measure of structural change is based on changes in industry shares in regional output. The index is defined as  $S = 0.5 \sum_i (|s(i,t) - s(i,0)|)$ , where  $s(i,t)$  is the share of industry  $i$  in total output at time  $t$ . The time period considered is determined by data availability.

of eroding labor market flexibility, such as a rising NAIRU, possibly declining responsiveness of wages to regional labor market conditions, and weakening labor market flows.<sup>12</sup>

16. In what follows, this paper examines more closely four factors—skill mismatches, wage flexibility, the institutional framework, and geographical mismatches of jobs and workers—that are likely to influence the Czech labor market’s performance.

17. There are indications that **skill mismatch** is likely to play a significant role in the upward drift of Czech unemployment. On the general level, the importance of high-skilled workers in the labor force is smaller in the Czech Republic than in most Western European countries (cf. Table 1). With a technological shift towards more skill-intensive activities, demand for high-skilled workers increased and their unemployment rates remained low (Figure 8). Even though tertiary enrollment expanded considerably—the share of those with tertiary education in the population older than 15 years increased from 6.3 to 8.1 percent in 10 years—relative returns to education increased, by some estimates to higher levels than seen in Western Europe.<sup>13</sup> At the same time, demand for unskilled labor shrunk, particularly after restructuring accelerated in the late 1990s, and unemployment rates for the unskilled shot up to above 20 percent, despite the fact that the share of the unskilled in the 15+ population dropped by 2 percentage points.

Figure 8. Czech Republic: Unemployment Rate by Educational Achievement, 1993-2003



Source: Czech Statistical Office.

18. Independent of educational attainment, structural changes are likely to have led to skill obsolescence in specific industries, contributing to higher unemployment of skilled workers. Indeed, based on Eurostat data, the skill categories “craft and related trades workers” and “plant and machine operators and assemblers” tend to contribute more to total unemployment in the Czech Republic than in Western European countries. In addition, the

<sup>12</sup> A series of papers in Flek (forthcoming) examines various aspects of the Czech labor market.

<sup>13</sup> Jurajda (2004) finds that the college/high school wage gap in the Czech Republic is about 50 percent higher than in Austria or Germany.

incidence of long-term unemployment is substantially higher among workers who previously worked in the mining sector than among workers from other industries.<sup>14</sup>

19. **Wages** are estimated to be as sensitive to local labor market conditions as in mature economies. Estimates of a summary indicator—the elasticity of wages with respect to the regional unemployment rate, or the slope of the wage curve—show that wage flexibility in the Czech Republic is on par with mature economies in and outside Europe. However, Galuščák and Münich (2004) provide some evidence that the sharp rise of long-term unemployment since the late 1990s might have coincided with a weakening of this flexibility—perhaps because the long-term unemployed are not part of the effective labor pool and contribute little to downward pressures on wages.

20. The Czech Republic is broadly comparable to other CECs as regards **labor market institutions**. Like in other CECs, unemployment benefits, minimum wages, and employment protection legislation compare well with the EU. In the area of payroll taxes, and more generally taxes on labor, however, this position is less comfortable. In addition, social benefits provided with nonlabor-market objectives may generate incentive problems for some groups of workers.

- Unemployment benefits and minimum wages are on the modest side in international comparison (Table 3). At six months, duration of unemployment benefits is also low.

Table 3. Czech Republic: Unemployment Benefits and Minimum Wages in the CECs and Baltics 1/

	Czech R.	Hungary	Poland	Slovak R.	Slovenia	Estonia	Latvia	Lithuania
Minimum wage 2/	36	41	33	39	41	30	35	38
Unemployment benefit 2/	20	25	20	35	39	6	25	9

Sources: Vienna Institute for International Economic Studies; International Labor Organization; and country authorities.

1/ Data relate to 2002.

2/ In percent of the average gross wage.

- The strictness of employment protection legislation in the Czech Republic is comparable to that in other CECs (Table 4). Employment protection is considerably less stringent than in Southern Europe or in most countries of Western Europe. However, as countries in Western and Southern Europe tended to ease their employment protection legislation in the last few years and Czech regulations did not change, the Czech Republic's relative position worsened. Scope for improvement

<sup>14</sup> Jurajda and Münich (2002) report that in 2000, when restructuring of the heavy industry was still in its infancy, the long-term unemployment rate for ex-miners was 9 percent, while in other industries it was about 3–4 percent.

could be identified by looking at the various areas of employment protection legislation. Based on data from the OECD (2004), legal regulations for firing from regular employment—for example, notification requirements—appear to be an area where the Czech Republic's scores are not favorable in international comparison.

Table 4. Czech Republic: Overall Strictness of Employment Protection Legislation in CECs and Select EU Countries 1/

	Index 2/	
	late 1990s	2003
CECs		
Czech Republic	1.9	1.9
Hungary	1.3	1.5
Poland	1.5	1.7
Slovak Republic	2.4	1.9
Slovenia 3/	3.2	...
Western Europe		
Austria	2.2	1.9
Belgium	2.2	2.2
France	3.0	3.0
Germany	2.5	2.2
Ireland	0.9	1.1
Netherlands	2.1	2.1
Southern Europe		
Greece	3.5	2.8
Italy	2.7	1.9
Portugal	3.7	3.5
Spain	2.9	3.1

Source: *OECD Employment Outlook, 2004*.

1/ Covering regular and temporary contracts, OECD "version 1" indicator.

2/ Indicators range from 0 to 6, with a higher value indicating stricter employment protection.

3/ Calculated by the Slovenian authorities.

- At 35 percent of the gross wage, employer payroll taxes are one of the highest among the CECs, higher than in many EU countries (Table 5). While reducing such nonwage costs could help job creation, it runs into fiscal constraints, which will become even more tight as the population ages and the Czech Republic aims to meet the Maastricht criterion on the general government deficit.

Table 5. Czech Republic: Social Security Contributions, CECs and Select EU Countries<sup>1/</sup>

	Czech R.	Hungary	Poland	Slovak R.	Belgium	Germany
Employer contribution	35.0	29.0	20.4	37.8	35.6	20.7
Employee contribution <sup>2/</sup>	12.5	12.5	25.0	12.8	14.0	20.7

Source: OECD (2002).

<sup>1/</sup> In percent of gross wages, 2002.

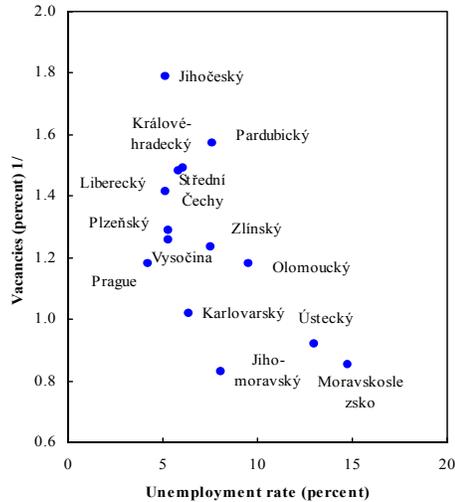
<sup>2/</sup> For Belgium and Germany, for a married couple with two children, earning 100+67 percent of the average wage.

- Social benefits have been identified as providing labor supply disincentives for one particular—and small—segment of the population: low-income families with several children.<sup>15</sup> In fact, Eurostat data indicate that in the EU-15, there is no significant difference between the incidence of unemployment in families with no children and those with three or more children. But in the Czech Republic, unemployment rates for families with three or more children are about 5 percentage points higher. However, this does not necessarily reflect overgenerous Czech social benefits, as large families in the Czech Republic and abroad may differ on a range of characteristics, including composition and educational attainment.

21. **Regional differences** in unemployment rates tended to widen as the aggregate unemployment rate increased. Differentials in labor market conditions—not only regarding unemployment, but also vacancies—are large and appear to be worsening (Figures 9 and 10). In high unemployment regions, vacancy rates are lower, and vacancies have become more scarce relative to the number of job applicants over the past few years. The decline in vacancies hints at weaker labor demand in these regions.

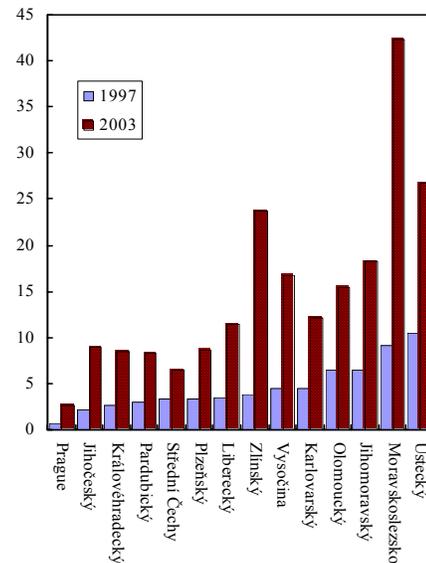
<sup>15</sup> Jurajda and München (2002) estimate that for the average family, the level of welfare benefits has only a small effect on the probability of long-term unemployment. But for low-income families with four or more children, higher benefits significantly increase the probability of long-term unemployment. Erbenova, Sorm, and Terrell (1998) reach similar conclusions. However, it should be pointed out that these large families comprise only 0.6 percent of all households.

Figure 9. Czech Republic: Vacancy Rate and Unemployment Rate by Region, 2003



Sources: Czech Statistical Office; and IMF staff calculations.  
1/ In percent of the labor force.

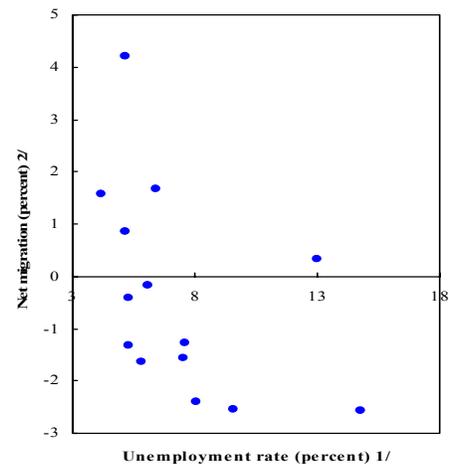
Figure 10. Czech Republic: Job Applicant to Vacancy Ratio by Region



Sources: Czech Statistical Office; and IMF staff calculations.

22. Workers appear to respond to regional labor market conditions: people tend to move from high to low unemployment regions (Figure 11). However, similarly to other CECs, mobility is too low to make an efficient channel of labor market adjustment. The skill mix is less favorable in high-unemployment regions and appears to have been changing for the worse compared with other regions (Figure 12). This can partly be due to migration,<sup>16</sup> and is consistent with a weaker attractiveness of these regions for capital despite lower wages.

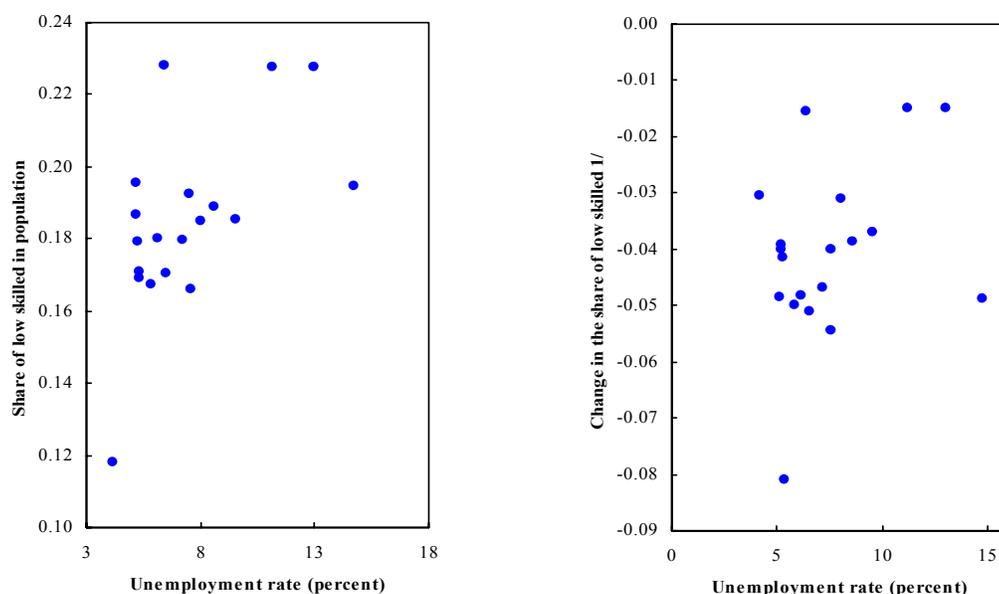
Figure 11. Czech Republic: Unemployment Rate and Net Migration by Region



Source: Czech Statistical Office.  
1/ Data for 2003.  
2/ In percent of inhabitants, 2002.

<sup>16</sup> Younger and better educated workers tend to be more mobile.

Figure 12. Czech Republic: Unemployment Rate and Skill Composition by Region, 2003



Sources: Czech Statistical Office; and IMF staff calculations.  
1/ Change during 1993-2003.

#### D. Tentative Lessons

23. Unemployment in the CECs is a multifaceted and stubborn problem. Deep and fast structural change over the last decade resulted in dramatic shifts in employment patterns and relatively flexible labor market institutions. As a result, skill and geographical mismatches probably play a larger part and institutional factors a smaller part in the problem today than in mature economies of Europe.

24. Continuing restructuring in the Czech Republic is likely to put further upward pressure on structural unemployment and downward pressure on labor market participation in the near term. While the experience of other countries indicates that this is to a large extent unavoidable, the key task is to ensure that policies in the labor market and other areas—such as the education system, housing markets, public infrastructure and the business environment—comprise an environment that helps mitigate or offset these pressures. Given the complexity of the problem, only a comprehensive approach is likely to prove effective.

25. Tackling mismatches in many instances requires going beyond narrowly defined labor market policies. An adaptable education system and adequate possibilities for re-training and life-long learning are foremost for matching the skill composition of the labor force to the changing demands of technology. To help reduce the geographical mismatch of jobs and workers, easing constraints on labor mobility—for example, by providing better information on job opportunities nationwide and by addressing rental market distortions—should be complemented by steps to attract jobs to high-unemployment regions. Provision of basic transport and business infrastructure could be particularly important.

26. Keeping and enhancing the flexibility of the of labor market institutions should also remain a priority. The experience of OECD countries suggests that rigid labor market regulations, wage rigidities across regions, high nonwage labor costs and the emergence of welfare traps may contribute to entrenched high unemployment. Indeed, recent labor market reforms in EU countries aim at improvements in these areas. While the Czech Republic's relative position is in most respects comfortable, pushing ahead with changes that improve flexibility would both keep up with the times and help avoid longer-term labor market problems.

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