

INTERNATIONAL MONETARY FUND



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INTERNATIONAL MONETARY FUND

CZECH REPUBLIC

Selected Issues

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Approved by European Department

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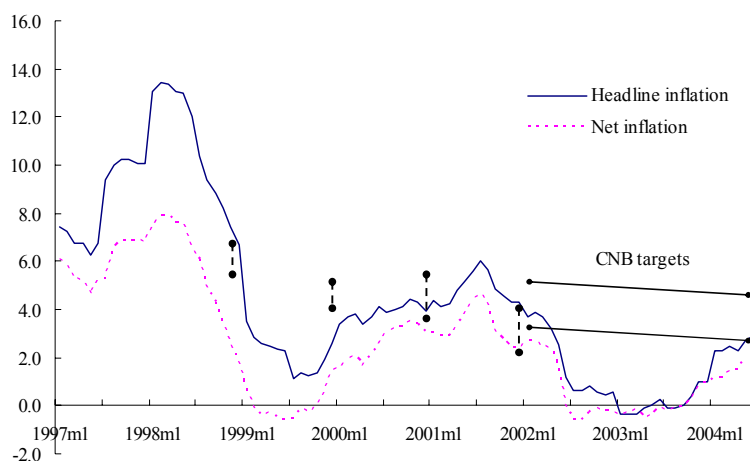
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I. INFLATION IN THE CZECH REPUBLIC: CURRENT DEVELOPMENTS AND OUTLOOK¹

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.

¹ 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.

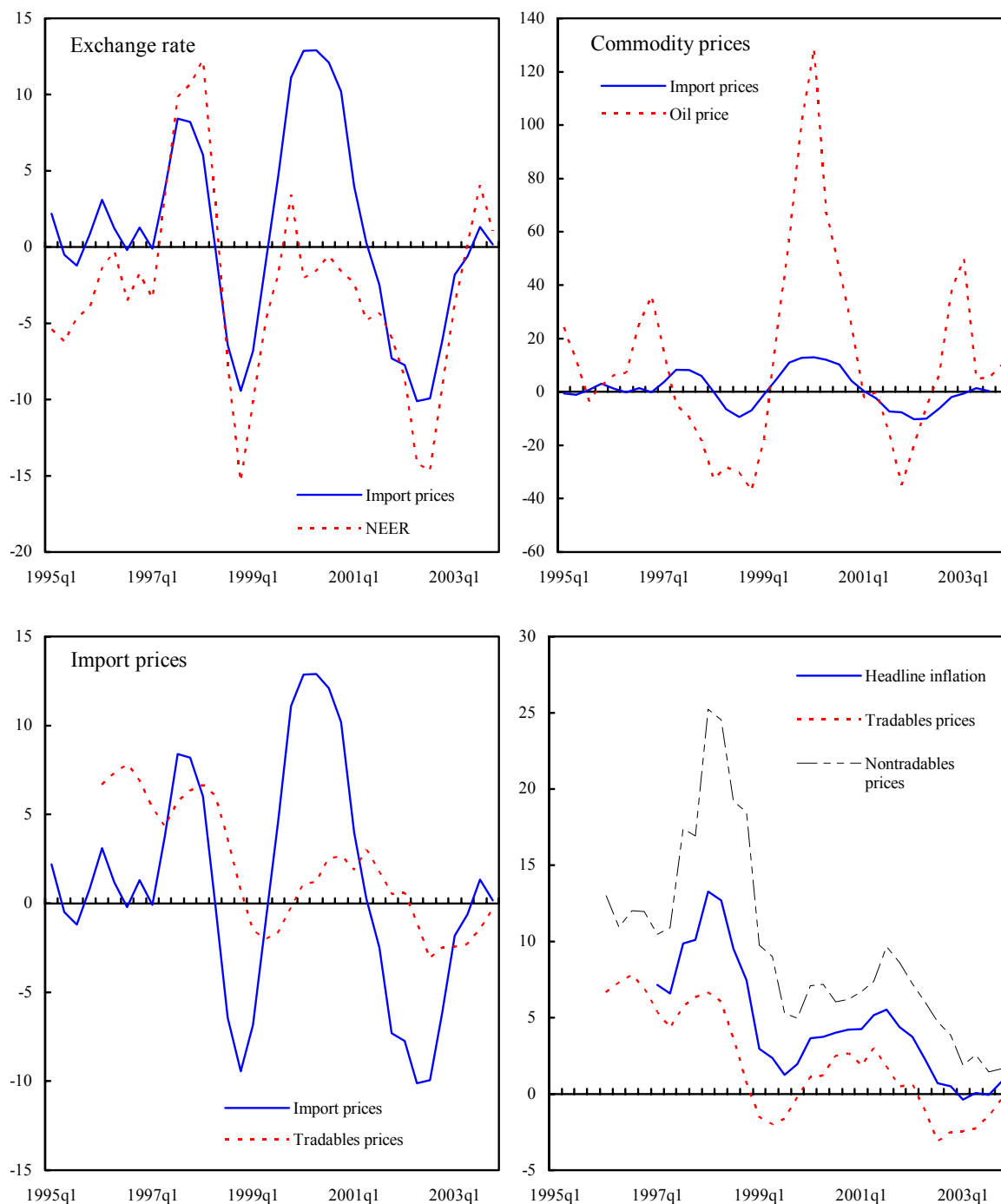
3. **Price developments are currently influenced by numerous factors—most of them contributing to a rise in inflation.** Besides the increases in taxes and regulated prices, these factors include high oil prices and robust economic growth. The exchange rate depreciation during the second half of 2003 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.**² 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.

² 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)

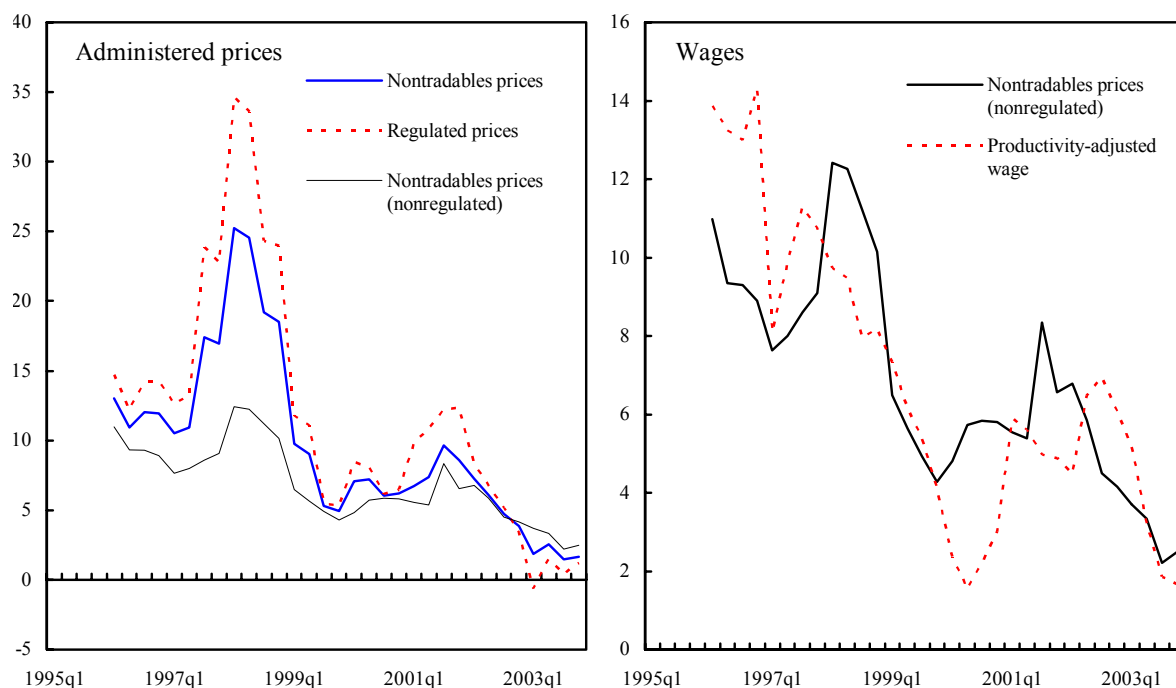


Sources: Czech Statistical Office; Czech National Bank; and IMF staff calculations.

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 ε is a residual.³

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

- Consistently with the methodology of the CNB (2004), headline inflation π 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 π^{net} is modeled as an autoregressive process to capture the persistence of price changes. The inflation equation (3) further contains the lagged residual ε 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.⁴ 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

³ 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.

⁴ 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 ε 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.⁵

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

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).⁶ 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.⁷

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

(0.02) (0.03) (0.03)

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

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

⁵ 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.

⁶ 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.

⁷ 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)

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

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

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

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

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

(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.

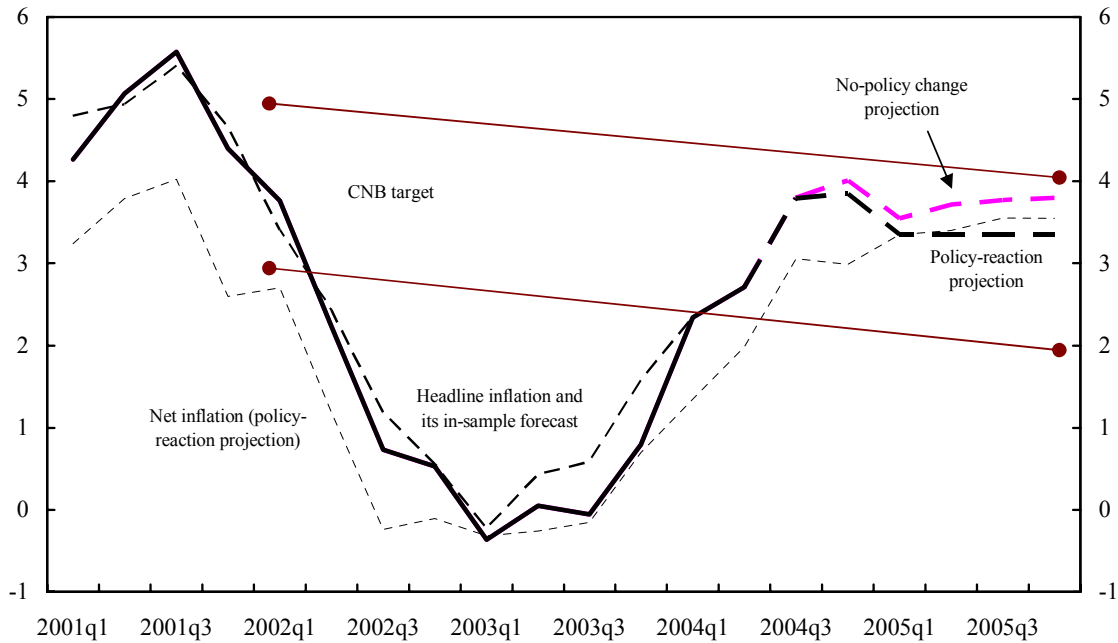
10. **In both scenarios, the oil price and the cross-rate of USD/EUR are consistent with the May 2004 World Economic Outlook projections.** The model also incorporates CNB assumptions about the impact of the regulated price and tax changes on inflation. Given the assumptions about the exchange rates 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.⁸ 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

⁸ 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, ε . 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 PERSPECTIVE¹

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,² 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.

¹ Prepared by Kornélia Krajnyák.

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

