

## Hungary: Selected Issues

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Price: \$18.00 a copy

**International Monetary Fund**  
**Washington, D.C.**



INTERNATIONAL MONETARY FUND

HUNGARY

**Selected Issues**

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Approved by the European Department

September 15, 2006

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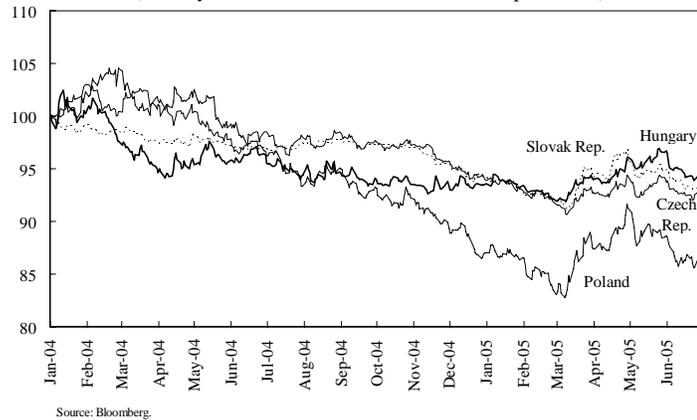
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## I. COMMON AND COUNTRY-SPECIFIC COMPONENTS IN CURRENCY MOVEMENTS: WHAT'S HOLDING THE FORINT UP?<sup>1</sup>

### A. Introduction

1. In early and mid-2005, policymakers and market participants were focused on the possible breach of the “strong” edge of Hungary’s exchange rate band with the euro. The Czech koruna, the Hungarian forint, the Polish zloty, and the Slovak koruna—the currencies of the four central European (CE-4) new members of the European Union—had appreciated markedly since January 2004 (Figure 1).<sup>2</sup> The forint was moving in the range of Ft 241-250 per euro. There was even a concern that speculators may employ strategies to gain from temporary breaches of the strong edge of the band at Ft 240.01 per euro. The Magyar Nemzeti Bank (MNB), in its

Figure 1. CE-4: Currency Appreciation vs. Euro, Jan. 2004 - June 2005  
(January 1, 2004 = 100; increase denotes depreciation)



Source: Bloomberg.

August 2005 *Quarterly Report on Inflation*, inferred that markets viewed the prospects of the new members with a high degree of optimism (p. 15):

*“Trends in the global market also affected CEE markets. On certain occasions, there was strong co-movement between the Czech, Polish, Hungarian and Slovak currencies, whilst country-specific factors were pushed into the background. Price and yield data as well as investment banks’ analyses suggest that the risk perception of the new EU Member States has been even more favourable than the general perception of emerging markets.”*

The implication was that country-specific features and fundamentals were overwhelmed by the sanguine view of the region, to the point that markets were willing to discount well-known weaknesses, such as Hungary’s large fiscal and current account deficits.

<sup>1</sup> Prepared by Abdul Abiad.

<sup>2</sup> Throughout this paper, exchange rates are quoted as local currency units per benchmark currency (either the euro or the U.S. dollar), so that an increase is a depreciation.

2. **Since September 2005, however, the forint has weakened considerably, and its volatility has increased.** Between September 2005 and June 2006, the forint weakened from Ft 244 per euro to Ft 282 per euro, a depreciation of 13½ percent (Figure 2). The forint's volatility also increased, particularly in the months of March and June 2006, when the coefficient of variation (standard deviation/mean) increased to 2 percent and 3 percent, respectively, compared with an average of 0.6 percent in the previous two years (Figure 3). The forint's weakening, especially relative to the other CE-4 currencies, has been attributed, in part, to Hungary's weak fundamentals: the country-specific factors are, apparently, no longer “in the background.” The MNB's May 2006 *Quarterly Report on Inflation* reflected this shift in sentiment (p. 10):

*“From September 2005 ... financial markets were concerned about the developments and fundamental risks and the high budget and current account deficits. Hungarian and regional trends began to diverge at that point.”*

The spikes in the forint's volatility also coincided with heightened global emerging market (EM) volatility. The benefit of EU membership proved insufficient to insulate the CE-4 currencies—and particularly the forint—from weakness.

3. **This selected issues chapter has three objectives.** First, it aims to statistically separate the common and country-specific components of CE-4 currency movements. Second, it further decomposes the CE-4's common factor into the part explained by global EM sentiment, and the part that is unique to the CE-4. Finally, it analyzes the trends in these three components, to understand past currency developments, as well as to reflect on near-term prospects.

Figure 2. CE-4: Currencies vs. Euro, Sept 2005 - June 2006  
(September 1, 2004 = 100; increase denotes depreciation)

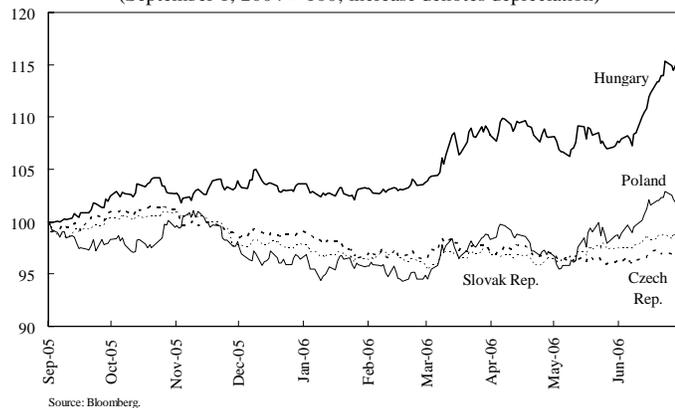
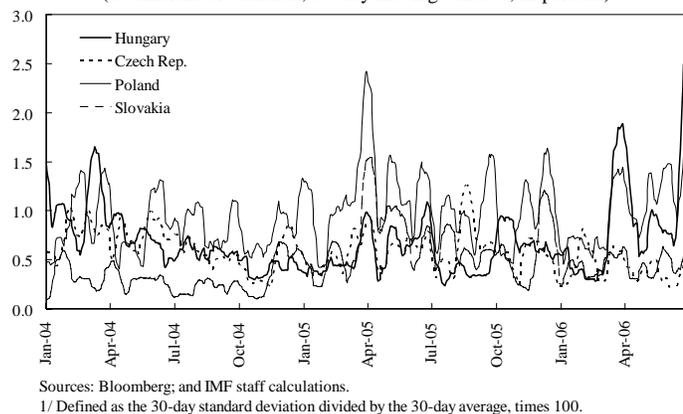


Figure 3. CE-4: Historical Currency Volatility, 2004-06 1/  
(Coefficient of variation, 30-day moving window, in percent)



4. **Currency fluctuations are decomposed using two different approaches.** The first approach, the state space model, assumes that CE-4 currency movements are formed of two unobserved components: one that is common to all four countries and another that is country specific. These unobserved components are derived using Kalman filter and maximum likelihood estimation techniques following specification of their dynamics and expressing the model in state space form. The second approach, the global factor model, takes the set of global emerging markets and assumes that currency movements are composed of three parts: one that is common to all emerging markets, one that is common to each region, and one that is country specific. The advantage this approach holds over the first model is that it can shed light on the extent to which the comovement in CE-4 currencies is due to region-specific, as opposed to global, factors.

5. **The paper reaches three conclusions.** First, the study confirms a strong comovement—specifically, a common trend toward appreciation—among the CE-4 currencies. However, the importance of this common component varies for the four countries. While it accounts for about 90 percent of the variation in the Czech and Slovak koruny and the Polish zloty, it explains less than half of the variation in the forint. Second, although country-specific movements have weakened the forint, it has benefited from being in the CE-4 region: if it had not taken part in the regional appreciation, the currency would have weakened past the central parity as early as March 2006, and would have been close to Ft 300 per euro by end-June 2006. Third, the CE-4's common appreciation over the past three years can be segmented into two subperiods. From mid-2003 to end-2004, there was a strong, region-specific appreciation, the tail end of a long and steady appreciation that began in mid-2000 and that can be dubbed an “EU accession effect.” But since 2005, this region-specific appreciation has ended, and any subsequent appreciation in CE-4 currencies has been due to the strength of emerging markets more generally vis-à-vis the euro.

6. **The rest of the chapter proceeds as follows.** Section B lays out the state space model of CE-4 currency movements, describes the data used, and analyzes the estimation results. Section C presents the global factor model EM currency movements, compares the CE-4 estimates with those obtained from the state space model, and decomposes the CE-4 common component into its regional and global parts. Section D takes a brief look at the possible factors that move the various components, and Section E concludes.

## **B. The State Space Model of CE-4 Currencies**

7. **The first model used in this chapter, the state space model, focuses solely on decomposing CE-4 currency movements into common and country-specific components.** The “unobserved components” dynamic factor analysis used here is based on maximum likelihood Kalman filtering (Engle and Watson 1981; Harvey 1989; and Cuthbertson, Hall, and Taylor 1992). This methodology has frequently been used to identify unobserved components, including by Stock and Watson (1991) to identify the state of the business cycle, by Fama and Gibbons (1982) to study the behavior of the ex ante real interest

rate, and by Mody and Taylor (2006) to identify East Asian “common vulnerabilities.” Let  $y_{it}$  be the exchange rate of country  $i$  at time  $t$ , expressed in local currency units per euro, where  $i = 1$  (Czech Republic), 2 (Hungary), 3 (Poland), or 4 (Slovak Republic). There is an unobserved component,  $\kappa_t$ , that is common to all CE-4 currencies, and a second component,  $\eta_{it}$ , that is idiosyncratic or country specific:

$$y_{it} = \gamma^{(i)}\kappa_t + \eta_{it} \quad i = 1,2,3,4. \quad (1)$$

where  $\gamma^{(i)}$  is the country-specific sensitivity of country  $i$  to the common component; that is, the influence of the common component may vary from country to country.

**8. Both the common and country-specific unobserved components are assumed to follow autoregressive processes.** The persistence of the country-specific factors is allowed to vary across countries:

$$\kappa_t = \phi\kappa_{t-1} + \omega_t \quad (2)$$

$$\eta_{it} = \psi^{(i)}\eta_{i,t-1} + \varepsilon_{it}, \quad i = 1,2,3,4. \quad (3)$$

The innovations  $\omega_t$  and  $\varepsilon_{it}$  are assumed to be Gaussian and orthogonal, and the variance of  $\omega_t$  is normalized to unity in order to achieve identification of the common component:

$$[\omega_t, \varepsilon_{1t}, \dots, \varepsilon_{4t}]' \sim N(0, \Sigma), \text{ where } \Sigma = \text{diag}(1, \sigma_1^2, \dots, \sigma_4^2). \quad (4)$$

The system expressed in equations (2)–(4) can be written in state space form as follows:

$$\begin{bmatrix} y_{1t} \\ y_{2t} \\ y_{3t} \\ y_{4t} \end{bmatrix} = \begin{bmatrix} \gamma^{(1)} & 1 & 0 & 0 & 0 \\ \gamma^{(2)} & 0 & 1 & 0 & 0 \\ \gamma^{(3)} & 0 & 0 & 1 & 0 \\ \gamma^{(4)} & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \kappa_t \\ \eta_{1t} \\ \eta_{2t} \\ \eta_{3t} \\ \eta_{4t} \end{bmatrix} \quad (5)$$

$$\begin{bmatrix} \kappa_t \\ \eta_{1t} \\ \eta_{2t} \\ \eta_{3t} \\ \eta_{4t} \end{bmatrix} = \begin{bmatrix} \phi & 0 & 0 & 0 & 0 \\ 0 & \psi^{(1)} & 0 & 0 & 0 \\ 0 & 0 & \psi^{(2)} & 0 & 0 \\ 0 & 0 & 0 & \psi^{(3)} & 0 \\ 0 & 0 & 0 & 0 & \psi^{(4)} \end{bmatrix} \begin{bmatrix} \kappa_{t-1} \\ \eta_{1,t-1} \\ \eta_{2,t-1} \\ \eta_{3,t-1} \\ \eta_{4,t-1} \end{bmatrix} + \begin{bmatrix} \omega_t \\ \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \end{bmatrix} \quad (6)$$

or, more compactly,

$$\mathbf{y}_t = \mathbf{H}'\boldsymbol{\xi}_t \quad (7)$$

$$\boldsymbol{\xi}_t = \Gamma\boldsymbol{\xi}_{t-1} + \mathbf{v}_t. \quad (8)$$

9. **The Kalman filter provides an algorithm for estimating the parameters.** Once a system has been expressed in state space form as in (7)–(8), the Kalman filter can be used to calculate the exact likelihood function from which the parameter estimates, as well as the unobserved components, can be derived. A full description of state space models and the Kalman filter can be found in Hamilton (1994).

10. **The model is estimated using daily CE-4 exchange rates versus the euro, covering the period from 2003 to end-June 2006.** Daily exchange rate data were taken from Bloomberg, and days with missing data (e.g., holidays) were filled in with the previous day's value. The estimation was performed on demeaned exchange rate series, using the S-space object in EViews. To ensure that the variances are nonnegative,  $\sigma_1^2$  through  $\sigma_4^2$  were reparameterized, using  $\rho_i \equiv \ln(\sigma_i^2)$ ,  $i = 1, 2, 3, 4$ .

11. **The state space model estimates show very persistent unobserved components.** Both the common and country-specific components in the CE-4 currencies are highly persistent, with autoregressive parameters very close to one (Table 1). This result is not surprising in light of the well-known result, first documented by Meese and Rogoff (1983a and 1983b), that exchange rates are best modeled as a random walk.

Table 1. State Space Parameter Estimates

Autoregressive Parameters			Country Sensitivities			Innovation Variances			
Parameter	Estimate	Std. error	Parameter	Estimate	Std. error	Parameter	Estimate	Std. error	Implied $\sigma^2$ 1/
$\phi$	0.999	0.002	-	-	-	-	-	-	-
$\psi^{(1)}$	0.964	0.016	$\gamma^{(1)}$	0.061	0.004	$\rho_1$	-4.977	0.052	0.083
$\psi^{(2)}$	0.999	0.002	$\gamma^{(2)}$	0.644	0.042	$\rho_2$	0.122	0.042	1.063
$\psi^{(3)}$	0.985	0.006	$\gamma^{(3)}$	0.013	0.001	$\rho_3$	-7.869	0.051	0.020
$\psi^{(4)}$	0.995	0.003	$\gamma^{(4)}$	0.071	0.003	$\rho_4$	-5.141	0.065	0.076

Source: IMF staff calculations.

1/ The country-specific variance,  $\sigma_i^2$ , is computed as  $\sigma_i^2 = \exp(\rho_i)$ .

12. **The common component explains a large portion of the variation in CE-4 currencies, but its importance varies across countries, with the Hungarian forint being the outlier.** Because the common and country-specific components are not constructed to be orthogonal, they have a nonzero correlation, and a perfect variance decomposition is not possible. We measure the importance of the common component in two different ways. First, we perform the variance decomposition  $\text{var}(y_{it}) = \text{var}(\gamma^{(i)}\kappa_t) + \text{var}(\eta_{it}) + \text{cov}(\gamma^{(i)}\kappa_t, \eta_{it})$ , but we ignore the covariance term (or equivalently, reallocate it to the first two terms based on

their relative variances), so that the share of the variance explained by the common component is given by  $\text{var}(\gamma^{(i)} \kappa_t) / (\text{var}(\gamma^{(i)} \kappa_t) + \text{var}(\eta_{it}))$  (Table 2, first column). Second, we regress each CE-4 currency on the common component and a constant, and get the  $R$ -squared from the regression (Table 2, second column).<sup>3</sup> By both measures, the common component explains a very high proportion of the variation in the Czech koruna, the Polish zloty, and the Slovak koruna. But the common component accounts for a much smaller share of the variance of the Hungarian forint.

Table 2. CE-4 Currencies: Share of Variance Explained by the Common Component

	Share in Total Variance 1/	$R$ -squared of Common Component 2/
Czech koruna	0.97	0.97
Hungarian forint	0.45	0.01
Polish zloty	0.90	0.90
Slovak koruna	0.86	0.84

Source: IMF staff calculations.

1/ Defined as  $\text{var}(\gamma^{(i)} \kappa_t) / (\text{var}(\gamma^{(i)} \kappa_t) + \text{var}(\eta_{it}))$

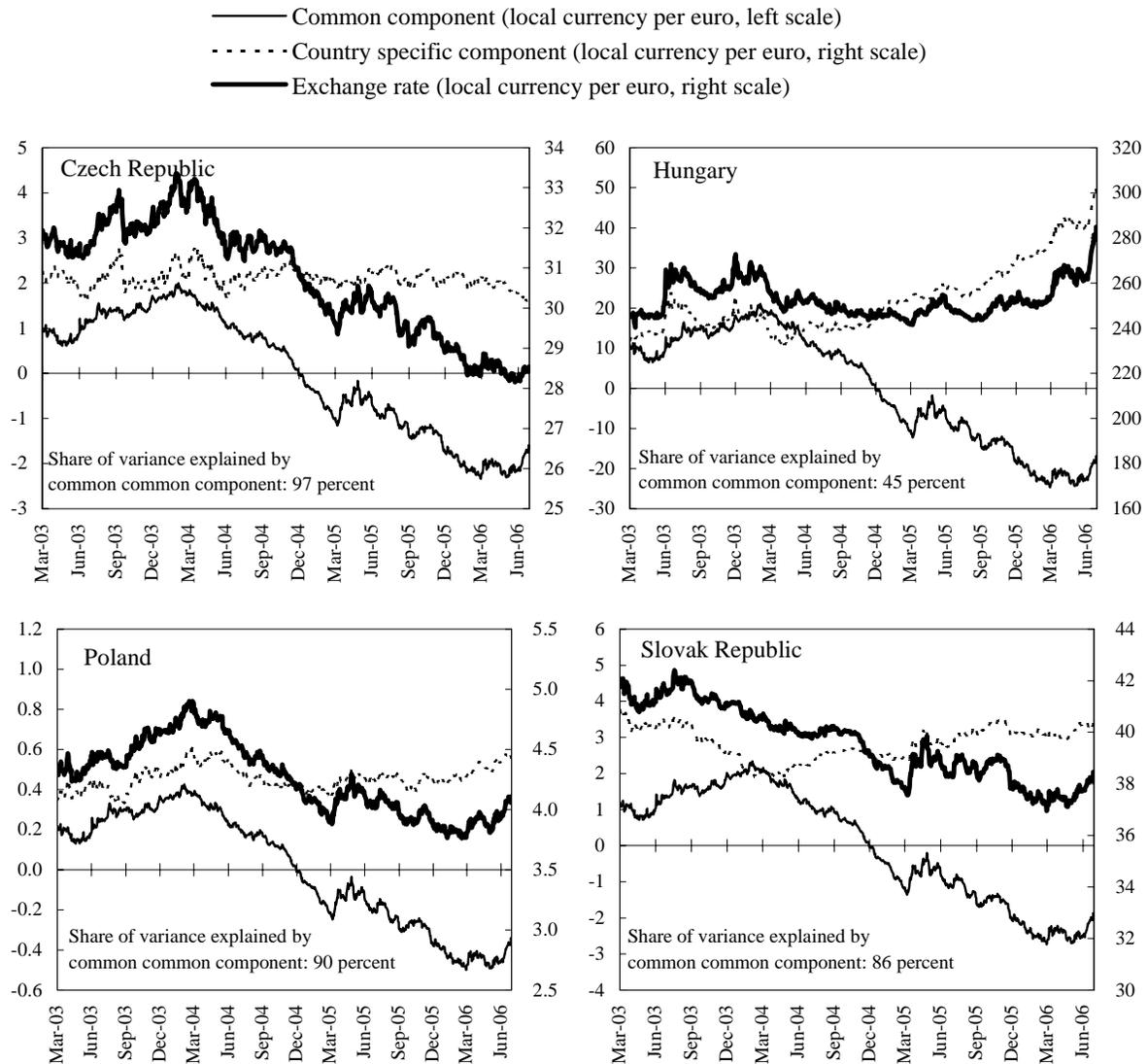
2/ Defined as the  $R$ -squared in a regression of a country's exchange rate on the extracted common component.

**13. The common component contains a trend appreciation that has supported the CE-4 currencies during 2004–06.** After weakening somewhat in 2003, the common component appreciated steadily from February 2004 until March 2006 (Figure 4, bottom line in each panel).<sup>4</sup> This regional appreciation strengthened the Czech koruna by 13 percent, the forint by 11 percent, the zloty by 18 percent, and the Slovak koruna by 8 percent during this period.

<sup>3</sup> The first measure has the advantage that the shares of variance explained by the common and country-specific components sum to one. With the second measure, the  $R$ -squared of the common component regression and the  $R$ -squared of the country-specific component regression will sum to greater than one.

<sup>4</sup> The steady appreciation was interrupted briefly by a depreciation in March–April 2005 that was due to several factors, including: concerns about faster tightening in the U.S. in response to potential stagflation; surveys indicating that France would vote “No” on the EU constitution referendum in May, potentially delaying euro adoption for the new member states; domestic politics (a euro-skeptic party gaining ground in Poland, and the Finance Minister’s sacking in Hungary); and substantial rate cuts throughout the region, making the carry trade less attractive.

Figure 4. CE-4: Decomposition of Currency Movements into Common and Country-Specific Components versus the Euro, 2003-06

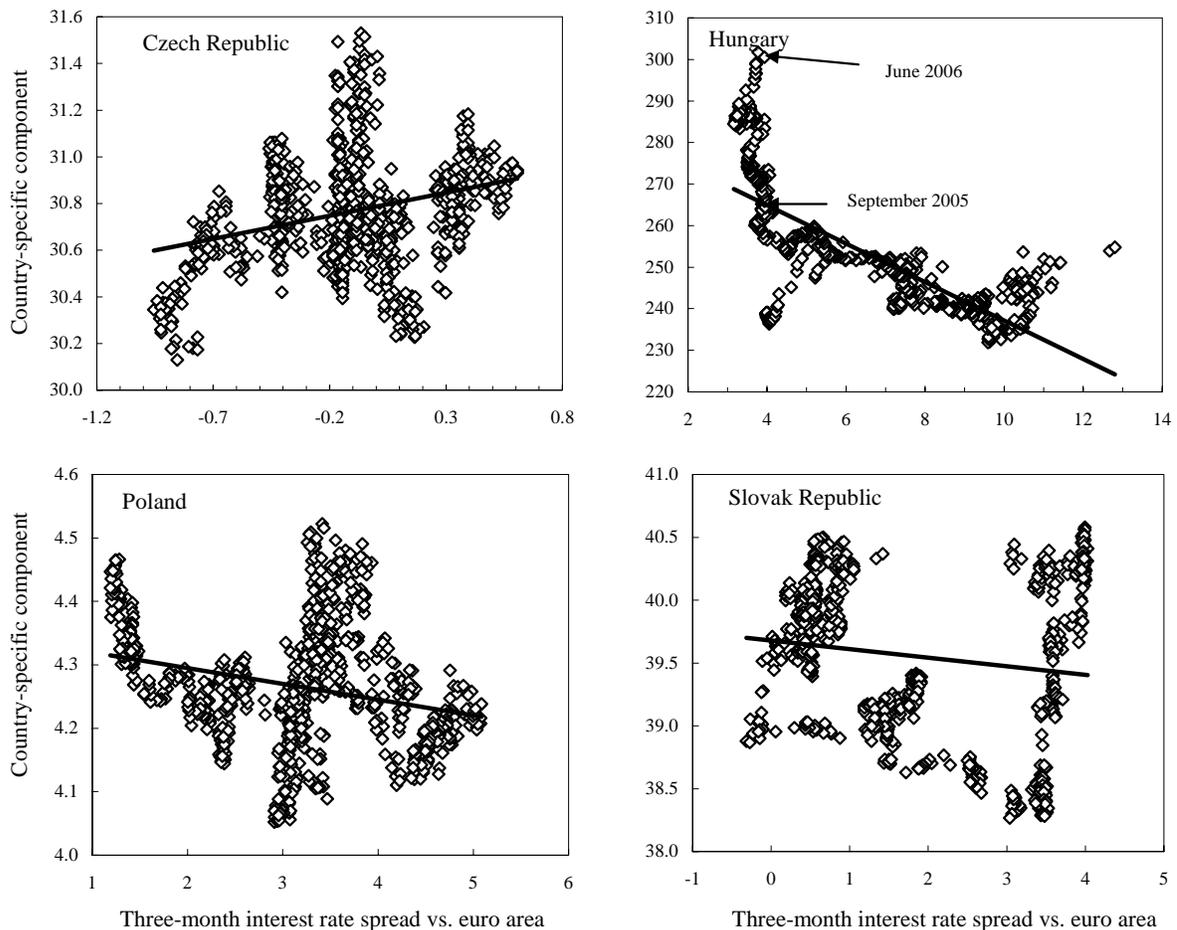


Sources: Bloomberg; and IMF staff calculations.

14. **Over the past three years, country-specific factors modestly strengthened the Czech and Slovak koruna, weakened the zloty slightly, and weakened the forint substantially.** The country-specific components of the Czech and Slovak koruna have added 2½ percent and 1¼ percent, respectively, to the total appreciation since 2003. In contrast, country-specific factors have weakened the zloty by 7 percent over the same period. For Hungary, the country-specific component of the forint has weakened by 22 percent over that period.

15. **Yield differentials can explain country-specific currency movements only for Hungary, and even there only for forint movements before September 2005.** Scatterplots of country-specific currency movements against three-month interest rate differentials vis-à-vis the euro area show at most a weak link between the two (Figure 5), and regressions of the former on the latter yield  $R$ -squareds of less than 10 percent for the Czech Republic, Poland, and the Slovak Republic. For Hungary, the link is stronger—the regression  $R$ -squared is 54 percent—suggesting that the tight monetary policy stance adopted in 2004 played a role in keeping the forint strong, and that the gradual easing in early 2005 played some role in the forint’s weakening. However, the upper-right scatterplot of Figure 5 also makes clear that the weakening of the forint between September 2005 and June 2006 was unrelated to any narrowing of the interest rate differential.

Figure 5. CE-4: Scatterplots of Country-Specific Currency Movements Against Interest Rate Differentials vis-à-vis the Euro Area, 2003-06



Sources: Bloomberg; and IMF staff calculations.

### C. The Global Factor Model of Emerging Market Currencies

16. **The state space model proves unwieldy in further disentangling the global and regional factors driving the common component in the CE-4.** To identify global and regional components of currency movements one needs to move beyond the CE-4 and include the wider set of emerging market currencies. While in principle a state space model could also be applied to this larger universe of currencies by specifying the dynamics of the global, regional, and country factors, the large number of parameters makes maximum likelihood estimation of this larger state space model unreliable. Moreover, the alternative approach adopted here to achieve that decomposition, the global factor model, provides a point of comparison with the results of the state space model, and overlapping findings enhance confidence that the results are not driven by the method employed.

17. **To identify global and regional factors, we use the following global factor model:**

$$\Delta \log(y_{it}) = \alpha_t + \sum_{i \in \text{region}(j)} \beta_t^{(j)} \cdot D_j + \varepsilon_{it},$$

where  $\Delta \log(y_{it})$  is the change (log difference) in the exchange rate  $y_{it}$  of country  $i$  at time  $t$ ,  $\alpha_t$  is a global factor common to all EM currencies,  $\beta_t^{(j)}$  is the regional factor common to countries in region  $j$ , and  $\varepsilon_{it}$  is the country-specific component. Similar factor models—often run on industry- or firm-level data and containing industry factors in addition to country factors—have been used to model comovements in industrial output (Stockman, 1988), employment (Marimon and Zilibotti, 1998), and stock returns (Brooks and Catão 2000; and Brooks and Del Negro 2004).

18. **The global factor model is estimated using cross-sectional ordinary least squares regressions, without imposing any dynamic specification on the factors.** Specifically, for each time period  $t$  the exchange rates for 35 emerging markets are regressed on a constant ( $\alpha_t$ ) and a full set of regional dummies  $D_j$  (which generates  $\beta_t^{(j)}$ ); the residual provides the estimate of the country-specific component,  $\varepsilon_{it}$ . Because a full set of dummies will be perfectly collinear with the constant term, instead of dropping one of the regional dummies to achieve identification we constrain the coefficients  $\beta_t^{(j)}$  to sum to zero in each period ( $\sum_{i \in \text{region}(j)} \beta_t^{(j)} = 0, \forall t$ ). This allows us to interpret the magnitude of the regional component  $\beta_t^{(j)}$  as region  $j$ 's over- or underperformance relative to the global average.

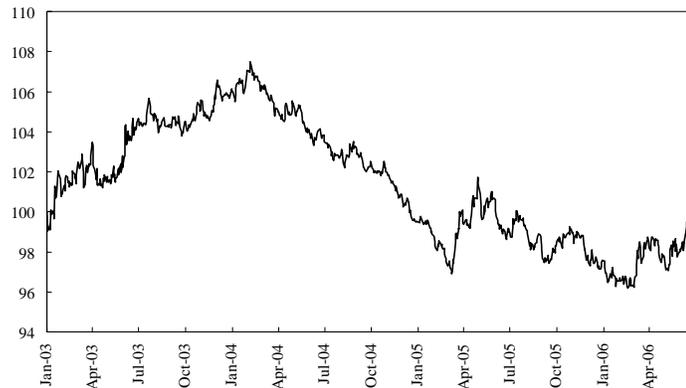
19. **The global factor model is estimated using daily exchange rates for the 35 emerging market countries listed in Table 3.** As before, daily exchange rates were obtained from Bloomberg, and days with missing data (e.g., holidays) were filled in with the previous day's value. The period covered is 1997 to 2006 to provide a long-term perspective. To allow comparisons with the state-space model results in the previous section, we continue to use the euro as our benchmark currency. Switching to U.S. dollar exchange rates only affects the global factor, since the euro per U.S. dollar cross rate will be common to all the currencies; all the estimates of the regional and country-specific factors will be identical.

Table 3. Emerging Markets Included in Global Factor Model

Argentina	Indonesia	Philippines
Brazil	Israel	Poland
Bulgaria	Jordan	Romania
Chile	Korea	Russia
China	Latvia	Slovak Republic
Colombia	Lebanon	Slovenia
Croatia	Lithuania	South Africa
Czech Republic	Malaysia	Sri Lanka
Egypt	Mexico	Thailand
Estonia	Morocco	Turkey
Hungary	Pakistan	Venezuela
India	Peru	

20. **The global factor model's estimates of the common and country-specific components for the CE-4 currencies are very similar to those obtained from the state-space model.** A plot of the CE-4 common component over the 2003–06 period shows the same common factor as derived from the state space model: weakness in 2003, followed by a steady appreciation from February 2004 to March 2006, with a brief interruption in March–April 2005 (Figure 6). Similarly, the global factor model's estimates of the country-specific components

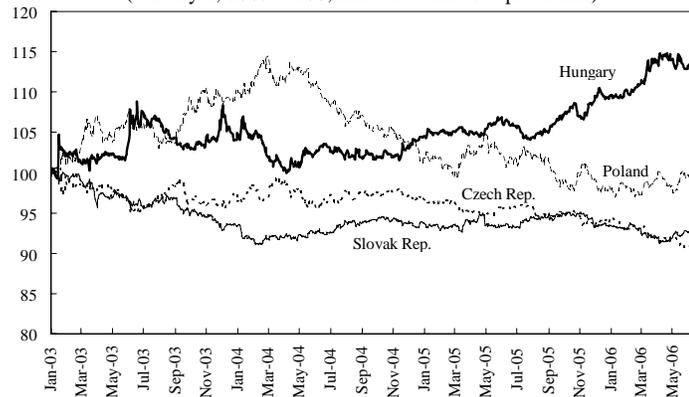
Figure 6. CE-4: Common Component (Regional + Global), 2003–06 (January 1, 2003 = 100; increase denotes depreciation)



Source: IMF staff calculations.

show the forint to be the outlier, as in the state space model (Figure 7). The magnitudes are slightly different in the two models—the country-specific depreciations are smaller (and the appreciations larger) in the global factor model—which is likely due to the assumption of equal weights on the common component, whereas this is

Figure 7. CE-4: Country-Specific Components, 2003–06 (January 1, 2003 = 100; increase denotes depreciation)



Source: IMF staff calculations.

allowed to vary in the state-space model (recall, the  $\gamma$  weighting on the common factor was country-specific).

21. **The global model shows that region-specific factors strengthened the CE-4 currencies until end-2004, and, thereafter, the positive sentiment toward emerging markets supported these currencies.** Over the past decade, the CE-4's common component has depreciated by 11 percent (Figure 8). The period from 1997 to 2003 was a difficult period for emerging markets, with currencies weakening by almost 60 percent on average (Figure 9). Once we filter out this global weakening, we are left with the CE-4's region-specific component (Figure 10). The relative strength of the Central European currencies—the EU accession effect—is now evident, as seen in the steady appreciation of these currencies by almost 50 percent between late 2000 and early 2005. It appears, however, that this process has come to an end: since early 2005, the CE-4's region-specific component has been flat. Instead, more broad-based EM appreciation vis-à-vis the euro supported the CE-4 currencies in 2005 and the first quarter of 2006. It is still unclear whether the weakening since March 2006 is a temporary blip, or a sign that this period of EM strength is ending.

Figure 8. CE-4: Common Component (Regional + Global), 1997–2006  
(January 1, 1997 = 100; increase denotes depreciation)



Figure 9. Global Emerging Market Component, 1997–2006  
(January 1, 1997 = 100; increase denotes depreciation)

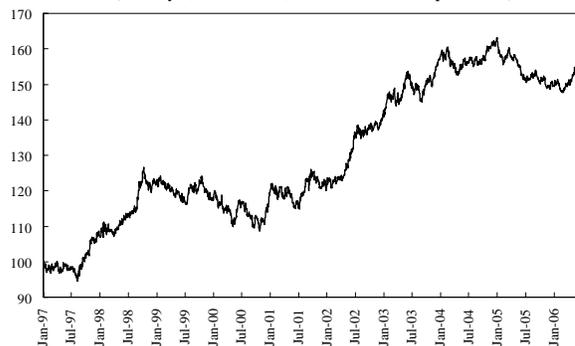
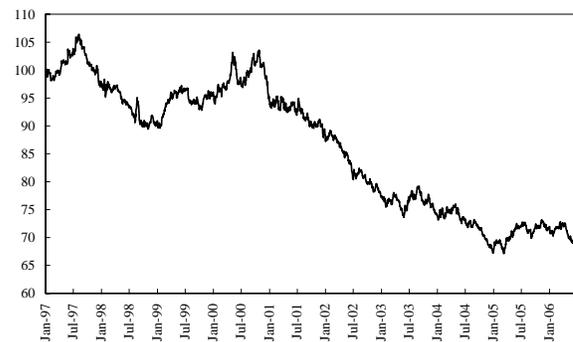


Figure 10. CE-4: Region-Specific Component, 1997–2006  
(January 1, 1997 = 100; increase denotes depreciation)



Source: IMF staff calculations.

## D. Correlates of the Hungary-Specific, Regional, and Global Components

22. **Surprises in monetary and exchange rate policy moved the Hungary-specific component in 2003.** Here we focus on the movements in the forint that are not attributable either to changes in the common component nor to yield differentials. We do this by regressing the Hungary-specific component on the three-month interest rate differential vis-à-vis the euro area, and taking the residual; this is plotted in Figure 11, along with selected news events. The first sharp drop, in June 2003, was due to the MNB's surprise devaluation of the central parity by 2.2 percent. The forint promptly fell by more than 9 percent, from Ft 246/euro to Ft 266/euro, forcing the MNB to hike the policy rate by 300 basis points. The second sharp drop, in late November and early December, followed a period where concerns about Hungary's imbalances and slowing growth weakened the forint outside the MNB's publicly declared "target range" of Ft 250-260/euro. The MNB hiked the policy rate by another 300 basis points between rate-setting meetings, but the forint weakened even further, to Ft 273/euro, before eventually recovering.

Figure 11. Hungary: Selected News Events that Depreciated the Forint, 2003-06  
(Hungarian forints per euro)

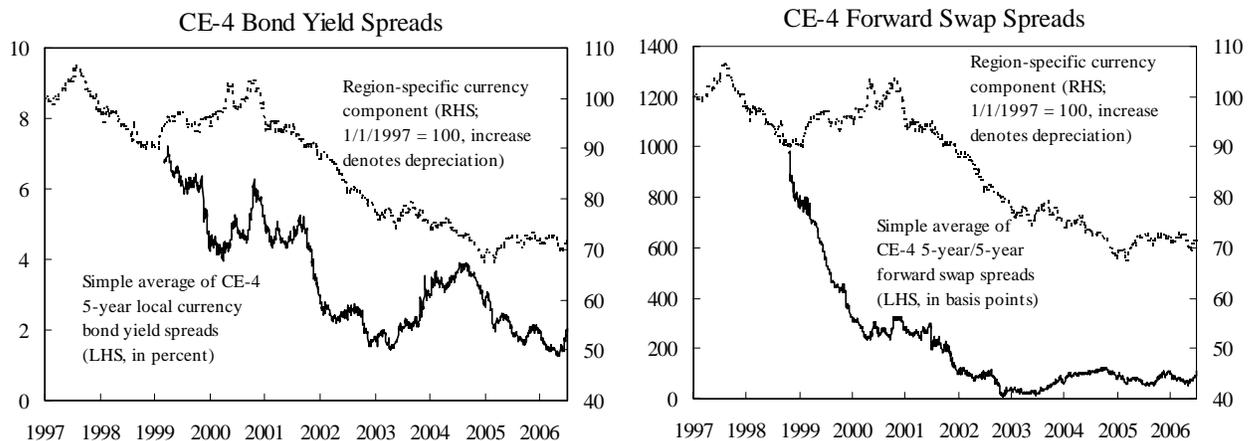


23. **The forint remained in a tight range from mid-2004 until September 2005, when fiscal disappointments and increased global sensitivity to EM imbalances weakened the forint.** In September–October 2005, a succession of negative fiscal news items—including upward revisions of the 2004 deficit outcome and 2005 deficit projection, and an EU request

for an updated Convergence Programme with a more realistic consolidation path—weakened the forint, and it has not recovered to its previous levels since. Increased global investor sensitivity to imbalances in selected emerging markets, initiated by the fall of the Icelandic krona in March 2006 and the Turkish lira in June 2006, have further weakened the forint.

24. **At the regional level, the CE-4 component shows a strong correlation with other “convergence indicators,” suggesting that EU accession probably played a central role in the region’s steady appreciation since 2001.** We look at two such indicators: the first is the simple average of CE-4 5-year local currency bond yield spreads vis-à-vis German bunds, an indicator of current interest rate convergence with the euro area; the second is the simple average of CE-4 5-year/5-year forward swap spreads vis-à-vis the euro, an indicator of *future* (i.e., five years forward) interest rate convergence that is frequently used as an indicator of euro adoption prospects. As seen in Figure 12, the appreciation of the CE-4 common component has mirrored the convergence of both current and expected interest rates.

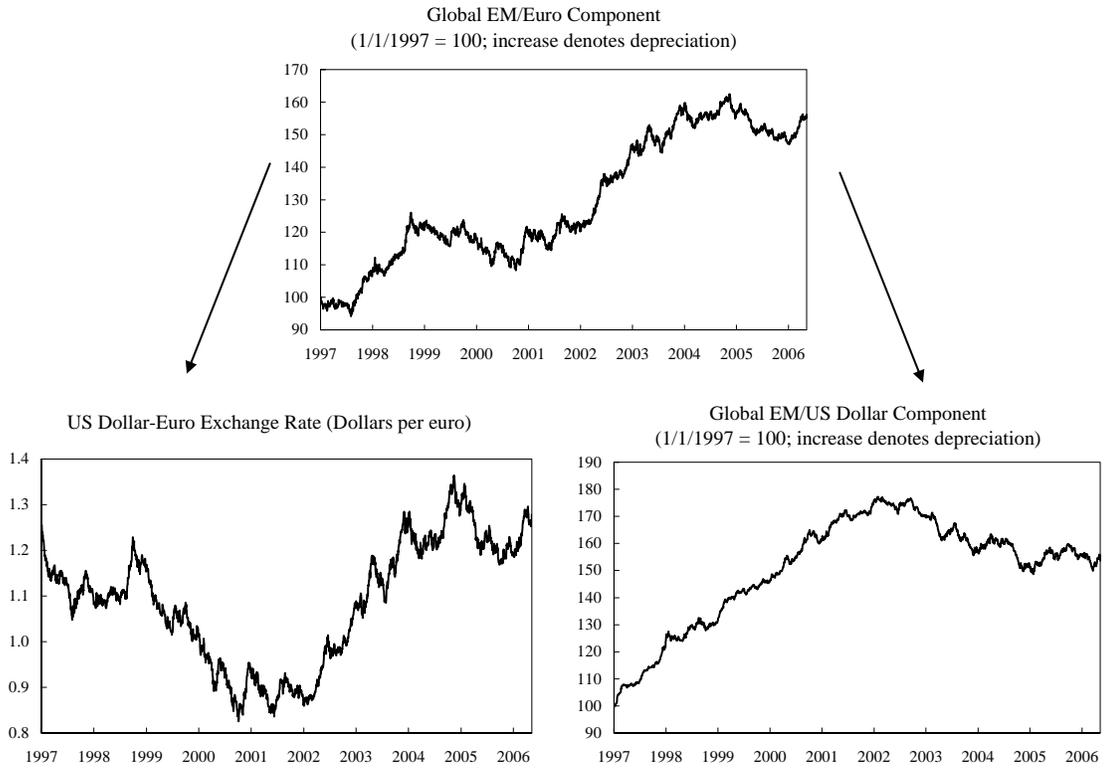
Figure 12. CE-4: Region-Specific Component and Selected "EU Accession" Indicators, 1997–2006



Sources: Bloomberg; JP Morgan; and IMF staff calculations.

25. **Finally, at the global level, since the U.S. dollar is the primary benchmark currency for most EM currencies, it is useful to decompose our global (EM/euro) component into two parts: the global EM/U.S. dollar component, and the U.S. dollar/euro exchange rate.** While the analysis in this chapter has focused on exchange rates vis-à-vis the euro, as this is the natural benchmark currency for the forint and the other CE-4 currencies, most emerging market currencies are primarily benchmarked against the U.S. dollar. To understand what drives global EM currency trends, therefore, the global EM/euro component shown in Figure 9 can be decomposed into two parts: the U.S. dollar per euro exchange rate (Figure 13, bottom-left panel), and a second part that measures the performance of global EM currencies against the U.S. dollar (Figure 13, bottom-right panel).

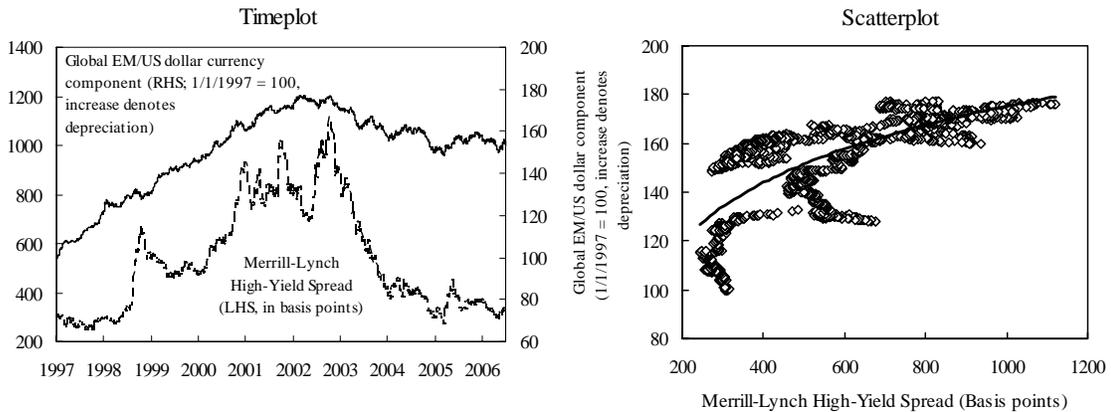
Figure 13. Decomposing the Global EM/Euro Component into the Global EM/US Dollar Component and the US Dollar/Euro Exchange Rate



Sources: Bloomberg; and IMF staff calculations.

26. **The global EM/U.S. dollar component shows a strong correlation with indicators of global risk appetite, such as the U.S. high-yield spread.** The U.S. high-yield spread is often used as a proxy for international investors’ attitude towards risk, but is also a leading indicator of U.S. economic activity (Gertler and Lown 1999; Mody and Taylor 2003). As can be seen in Figure 14, there is a strong correlation between the global EM/U.S dollar component and the U.S. high-yield spread.

Figure 14. The Global EM/US Dollar Component and the US High-Yield Spread, 1997–2006



Sources: Bloomberg; and IMF staff calculations.

## E. Conclusions

27. **The two legs that have held the forint up in recent years—a strong “EU accession effect” and positive sentiment toward emerging markets—may no longer be strong enough to offset Hungary’s weak fundamentals.** The CE-4’s common appreciation over the past two years can be segmented into two subperiods. From mid-2003 through 2004, there was a strong, region-specific appreciation—the so-called “convergence play,” reflecting the optimism associated with EU accession. Since 2005, this region-specific appreciation has ended, and CE-4 currencies have been influenced by global sentiment towards emerging markets. This link to emerging markets sentiment provided strong support through 2005 and early 2006 but, since March, has been a source of weakness and volatility.

28. **Within the CE-4, the Czech and Slovak koruna and the Polish zloty have largely moved together, but the Hungarian forint has moved substantially on its own.** Regional factors helped strengthen all the CE-4 currencies, to varying degrees. The Hungary-specific component of the forint has been particularly weak. The earlier weakening of the forint (in 2005) was related to monetary easing and the consequent narrowing of interest rate differentials vis-à-vis the euro area. However, the most recent period of forint weakness has been due to other factors, the most obvious candidate being the persistent slippages in fiscal outcomes and worries about Hungary’s growing public and external debt, especially in an environment of greater global volatility. With the increased global weakness and volatility since March 2006, the likelihood is increasing that fundamentals, in Hungary and elsewhere, will play a larger role in currency movements.

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## II. HUNGARY—DEVELOPING A MEDIUM-TERM FISCAL STRATEGY<sup>5</sup>

### A. Introduction

29. **Fiscal and external imbalances are eroding growth potential and exacerbating vulnerabilities.** Hungary today has the largest fiscal and current account deficits among sizable emerging markets, its public and external debt ratios have grown steadily in recent years, and foreign-currency mismatches are rapidly increasing. Following robust performance in 1997-2001, growth has slowed and is expected to lag behind regional peers in the years ahead. Reflecting concerns over rising vulnerabilities, financial markets have begun to differentiate Hungary. Economic and financial buffers built over the last decade offer some protection from a further slide in the currency and higher interest rates. However, if these safeguards weaken and global sentiment worsens, serious consequences could follow.

30. **In response to this alarmingly poor fiscal situation, the authorities announced an ambitious adjustment package in mid-2006.** Under a no-policy-change scenario, the 2006 fiscal deficit could reach 11 percent of GDP on a European System of Accounts 1995 (ESA 95) basis, compared with a target of 6.4 percent of GDP.<sup>6</sup> In response, the authorities announced an adjustment package that aims to bring the deficit down to the Maastricht limit of 3 percent of GDP by 2008. While the package contains some measures based on long-term principles, it relies heavily on higher taxes on labor and capital, which may not achieve the anticipated revenues, may complicate tax administration, and could be detrimental to growth potential and competitiveness. Fiscal consolidation efforts would, in that case, be undermined, requiring the authorities to undo the tax increases without having found a permanent solution for stabilizing public finances.

31. **Placing public finances on a sound footing will require sustaining consolidation beyond the authorities' plans and improving the quality of the adjustment strategy.** A fiscal consolidation in line with the authorities' plans but extended until 2010 would reverse the rising trend in the public debt-to-GDP ratio and bring it beneath the Maastricht limit of 60 percent of GDP. If accompanied by a significant reduction in government expenditure and an improvement in efficiency and targeting, the consolidation would elevate long-term growth potential by restoring macroeconomic balance, enhancing economic efficiency, and encouraging private savings. Given that fiscal consolidation needs are so large, revenues have to be increased, but the opportunity should be used to achieve a more stable and broad-based

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<sup>5</sup> Prepared by Ana Corbacho (FAD) on the basis of discussions held during the 2006 Article IV consultation. The paper therefore does not reflect information contained the Convergence Programme presented in September 2006.

<sup>6</sup> The deficit figures throughout the paper include the costs of the pension reform (about 1.5 percent of GDP in 2006) and the aircraft lease (0.3 percent of GDP in 2006). If recent public-private partnerships (PPPs) are treated on budget, in line with the ROSC recommendations, the 2006 deficit would rise by 0.6 percent of GDP. See Section C for further details.

tax system. Fiscal consolidation should also be accompanied by greater transparency and accountability and supported by stronger budget controls.

32. **This paper proposes a medium-term strategy aiming to achieve a sustainable and growth-promoting fiscal consolidation.** Section B discusses recent fiscal developments and fiscal consolidation needs, building the case for more ambitious and better-quality fiscal adjustment. Section C presents a medium-term strategy for fiscal reforms that would support consolidation and long-term growth. The first subsection deals with expenditure policy issues, the second with tax policy and tax administration reforms, and the third subsection with fiscal transparency and accountability. Section D concludes.

### B. Recent Fiscal Developments and Fiscal Adjustment Needs

33. **Fiscal consolidation has been elusive in recent years.** The fiscal deficit climbed to 7.6 percent of GDP in 2005, from 6.5 percent of GDP in 2004 and about 4 percent in 2001. The deterioration in the fiscal position over time reflects mainly an increase in primary current spending, driven by transfers to households, and also a decline in tax collection (Table 1). Capital expenditures have been compressed. After a substantial reduction in the 1990s, public debt has steadily increased since 2001, reaching 62 percent of GDP in 2005. On the positive side, public debt has long maturities and low foreign currency exposure, mitigating rollover risk and the costs of a large depreciation.

Table 1. Hungary: Consolidated General Government, 2002-06 1/  
(In percent of GDP)

	2002	2003	2004	2005		2006	
				Est.	Budget	Proj. Staff	Proj. Auth.
Total revenues	43.0	42.5	43.1	43.2	42.2	43.2	43.7
Current revenues and current grants	42.5	42.1	42.6	42.4	40.9	41.8	42.3
Tax revenues, total	38.4	38.2	38.0	37.7	36.2	36.7	37.2
Current nontax revenues, total	3.9	3.7	4.2	3.9	3.1	3.2	3.2
Current grants	0.2	0.2	0.3	0.8	1.6	1.9	1.9
Capital revenues and capital grants	0.5	0.4	0.5	0.8	1.3	1.4	1.4
Total expenditures	52.1	49.8	49.5	50.7	48.6	53.3	53.2
Current expenditures and current transfers	43.0	44.3	44.7	45.5	42.1	45.5	45.2
Goods and services	19.0	20.0	19.3	18.8	16.9	17.7	17.6
<i>Of which</i> : wages and salaries 2/	12.4	13.3	12.8	12.6	11.6	11.6	11.6
Transfers	20.0	20.2	21.0	22.6	21.7	23.8	23.6
<i>Of which</i> : to households	16.2	16.8	17.1	18.0	16.2	17.8	17.6
Interest payments	4.1	4.1	4.4	4.1	3.5	4.1	4.1
Capital expenditures 3/	4.9	3.3	3.3	3.3	3.1	4.2	4.2
Capital transfers	4.2	2.3	1.6	1.8	2.8	3.6	3.6
Other net expenditure	0.0	0.0	0.0	0.0	0.6	0.1	0.2
General government balance	-9.1	-7.3	-6.5	-7.6	-6.4	-10.1	-9.5
Primary balance	-5.5	-3.5	-2.5	-3.7	-3.1	-6.2	-5.6
Memorandum items:							
Gross debt (including the costs of pension reform)	56.6	58.9	60.2	62.4	63.2	67.8	...

Sources: Hungarian authorities; and staff estimates.

1/ Data are classified following the ESA 95 methodology.

2/ Including social security contributions.

3/ Including the cost of aircraft lease in 2006 of 0.3 percent of GDP.

34. **On current trends, the 2006 fiscal deficit and public debt will continue to rise.** As noted, the 2006 fiscal deficit could reach 11 percent of GDP on an ESA 95 basis, almost double the original target. The substantial deviation from the target reflects both endemic slippages in some expenditure (e.g., subsidies) and “one-off” items (e.g., emergency spending for floods and higher expenditures of local governments due to upcoming elections). The impact of expenditure overruns is compounded by a projected decline in tax revenues, given shortfalls from social security contributions and the 2005 tax reform.<sup>7</sup> Absent action, the public-debt-to-GDP ratio would rise to nearly 70 percent by end-2006. Even if the authorities’ package is fully implemented, public debt would remain above 60 percent of GDP in 2010.

35. **To reverse the upward trend in public debt, a cumulative reduction of 10 percent of GDP in the primary balance is needed over the next four years.** To meet the Maastricht fiscal deficit limit, a fiscal consolidation in the primary balance of 7 percent of GDP would be required. However, to reverse the upward trend in public debt and bring the debt-to-GDP ratio down to under 60 percent by 2010, a more ambitious fiscal consolidation in the primary balance of 10 percent of GDP is necessary. This effort is comparable in magnitude in the early phase to that proposed by the authorities, but stretches the consolidation by over two years. In addition, a greater reliance on expenditure consolidation, with revenues raised by broadening the tax base and addressing inefficiencies, would elevate long-term growth potential. The international experience with large fiscal adjustments supports this approach (Box 1). Under staff’s preferred scenario, public debt declines to under 60 percent of GDP, and growth, while suffering in the short run, recovers to 4.5 percent by the end of the period.<sup>8</sup>

### C. A Medium-Term Fiscal Strategy for Sustainable Growth

36. **This section proposes a medium-term strategy aiming to achieve a sustainable and growth-promoting fiscal consolidation.** A strategy focused on significantly reducing government expenditure, broadening the tax base, and improving transparency and accountability would increase the sustainability of the adjustment and support long-term growth potential. The first subsection discusses issues in expenditure policy; the next addresses issues in revenue policy and administration; and the third subsection deals with fiscal transparency and accountability.

#### Improving the efficiency and targeting of public spending

37. **Reducing current spending and improving the efficiency and targeting of public services will need to be at the heart of fiscal consolidation efforts.** As noted above, the deterioration in the fiscal position has been primarily driven by rising current primary spending.

<sup>7</sup> See the second subsection of C for further details on the 2005 tax reform.

<sup>8</sup> See IMF (2006a) for further details on debt sustainability analysis under the authorities’ scenario, staff’s baseline scenario, and staff’s proposed scenario.

### Box 1. Fiscal Adjustment in European Union (EU) Countries

Almost all EU countries went through episodes of significant fiscal consolidation in the 1990s; some countries had already carried out strong adjustments in the 1980s. For example, Sweden adjusted its overall budget balance by over 10 percent of GDP over a four-year period, and Greece adjusted by almost 12 percent of GDP over an eight-year period. Ireland, which adjusted its general government deficit from 8 percent of GDP to about 1½ percent of GDP during 1987–89, provides a useful example of a “contractionary expansion,” where fiscal tightening was accompanied by significant improvements in the country’s macroeconomic performance.<sup>1</sup>

**Much of the fiscal adjustment was driven by substantial reductions in current primary spending, which contributed both to the sustainability of the adjustment and to the improvement of economic performance.** Expenditure adjustments featured prominently not only in the high-spending Nordic countries (Denmark, Finland, and Sweden) and Ireland, but also in a number of other economies that had initially attempted to consolidate through higher taxes (e.g., Germany, Greece, Spain, France, Italy, and the Netherlands). Current primary

Fiscal Consolidation in EU Countries  
(In percent of GDP)

	Consolidation Period	Budget balance		Overall Adjustment
		Beginning	End	
Austria	1995-97	-5.3	-2.0	-3.3
Belgium	1992-97	-8.1	-2.0	-6.1
Denmark	1996-97	-1.0	0.4	-1.4
Finland	1993-96	-7.2	-2.9	-4.3
France	1995-97	-5.5	-3.0	-2.5
Germany	1993-97	-3.1	-2.7	-0.4
Greece	1990-97	-15.7	-4.0	-11.7
Ireland	1992-94	-3.0	-2.0	-1.0
Italy	1991-97	-11.7	-2.7	-9.0
Netherlands	1990-96	-5.3	-1.8	-3.5
Portugal	1993-96	-8.1	-4.8	-3.3
Spain	1993-97	-7.0	-3.2	-3.8
Sweden	1993-97	-11.4	-1.0	-10.4
United Kingdom	1993-97	-7.9	-2.2	-5.7
Average of the Above		-7.2	-2.4	-4.8

Source: OECD.

expenditures were cut significantly in all but a handful of EU economies. Spain reduced primary spending by over 6½ percent of GDP during 1994–97, mainly through cuts in subsidies and transfers. Finland consolidated social security and welfare payments by 8 percent of GDP during the 1990s through reforms of the pension system and unemployment benefits. Schuknecht and Tanzi (2005) conclude that OECD countries that succeeded in substantially reducing public spending, also experienced significant recoveries in trend output and employment. Ardagna (2004) also highlights the role of expenditure-based adjustments in supporting growth.

**More generally, mounting research evidence points to the key role that expenditure policies play in successful fiscal adjustments.** Successful fiscal consolidations anywhere have commonly relied more heavily on restraining government spending than on increasing revenues; have implemented permanent measures rather than relied on expenditure suppression; have put more emphasis on cutting current spending (instead of capital spending); and in particular, have tackled key issues related to the government wage bill, subsidies, and transfers. Revenue-based consolidations have often been reversed, except when they have emphasized broadening the tax base and strengthening tax administration. Following large, expenditure-based fiscal adjustments, GDP growth has recovered to trend during the first two years of the adjustment, driven by private investment and gains in consumption and trade balances (Tsibouris and others, 2006).<sup>2</sup>

<sup>1</sup> Drummond, Jenkner, and Schwartz (2003).

<sup>2</sup> These results are in line with previous studies (e.g., Alesina and Perotti (1997); Alesina and Ardagna (1998); and Alesina, Perotti, and Tavares (1998)).

To increase the sustainability of fiscal adjustment and support growth, this trend needs to be reversed. In addition, there is considerable scope to modernize and better target the delivery of public services. The steps under consideration by the authorities go in the right direction, and the task is to rapidly establish supporting legislation and administrative procedures. However, bolder efforts are needed, particularly to redirect budget support to families to the poor, restructure higher education, phase out the housing subsidy scheme, and address the fiscal implications of an aging population by reforming the pension system. This subsection discusses expenditure reform options in the areas of health care, education, government employment and wages, pensions, social benefits, and subsidies (Table 2).<sup>9</sup>

### *Health care*

38. **Hungary has a comprehensive insurance-type health care system, based on the principle of social solidarity.** Compulsory contributions are paid according to earnings rather than individual health risks. Coverage is close to universal in terms of treatments provided, with virtually all citizens benefiting from the service irrespective of contributions. Still, the health status of the Hungarian population has remained poor by European standards.<sup>10</sup>

39. **Health services are provided primarily through the Health Insurance Fund (HIF).** The fund receives health care contributions from employers and employees, and deficits are covered by the state budget.<sup>11</sup> The Fund is used to finance the majority of current spending on health care services and general subsidies on prescription drugs. Capital spending and certain other health expenditures (e.g., ambulance services and high-tech interventions) are funded directly by the budget. The fund is burdened with a mix of different expenditure responsibilities, some of an insurance nature and some of a social transfer nature. This setup reduces the transparency of the financing arrangements.

40. **Although public health care spending is in the middle range among EU countries, it is relatively inefficient.** Public spending on health care is about 5 percent of GDP, compared with an average of close to 6 percent in the EU. A comparison across EU countries suggests that there is significant scope to increase the efficiency of public spending on health care in Hungary (Figure 1). Formal copayments remain very limited, but there is widespread use of informal user charges. This is an inefficient way to provide medical services, encourages corruption, and limits access to poor segments of the population.

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<sup>9</sup> This section draws from Technical Assistance (TA) provided by the Fiscal Affairs Department (FAD).

<sup>10</sup> Until recently, the life expectancy of men had remained unchanged since the 1960s, and the life expectancy of women, while rising, is still relatively low. (OECD, 2001).

<sup>11</sup> Fund deficits have been fluctuating at around 1½ percent of GDP in recent years.

Spending pressures for health care are expected to become more pronounced in coming years due to a combination of aging, rising incomes, and technological developments.

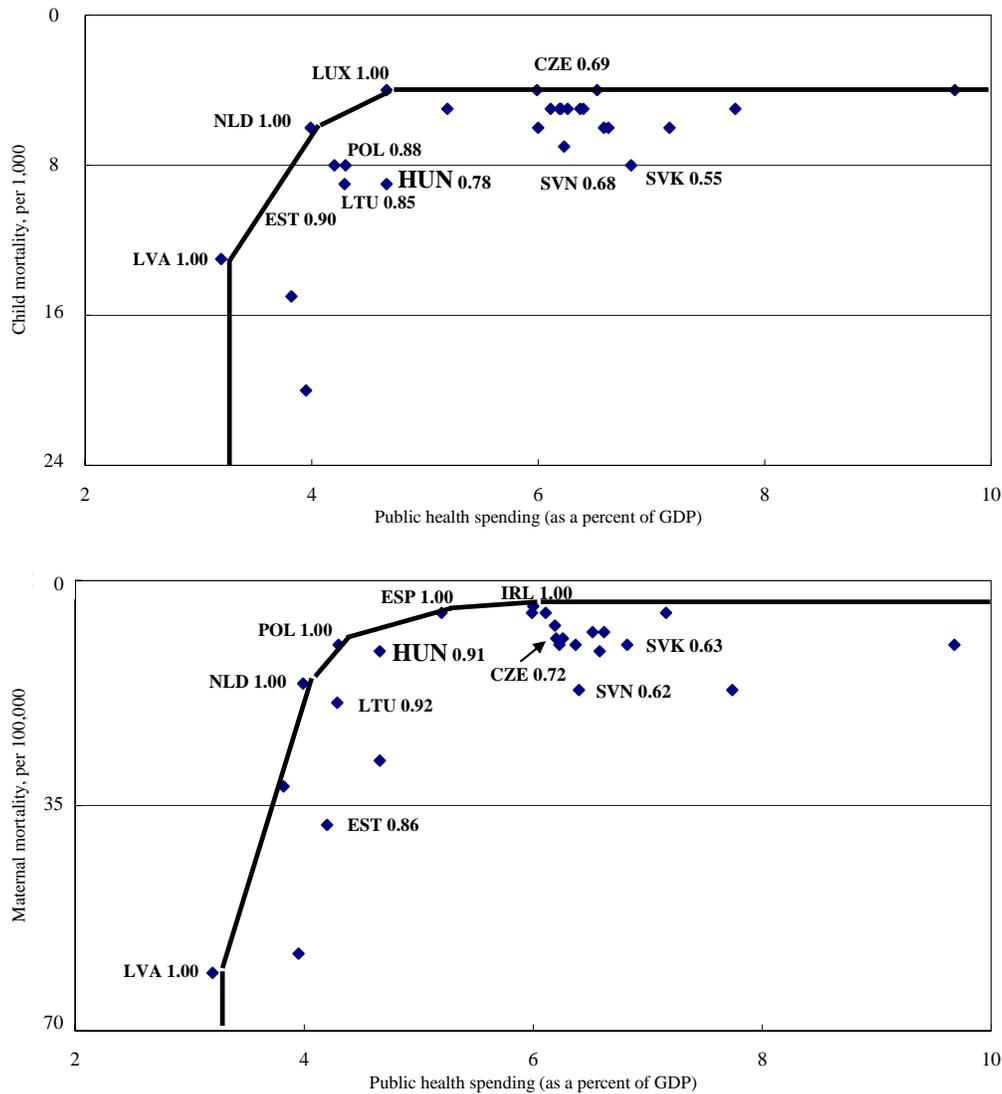
Table 2. Hungary: Menu of Reform Options and Potential Budgetary Savings  
(Total in percent of GDP over 2006-10)

Reform Options	Savings	Similar Measures Considered in Authorities' Plans? 1/
<b>Total overall savings</b>	<b>13.8</b>	
<b>Total savings--expenditure reforms</b>	<b>7.7</b>	
Health care	0.9	
Help finance nonbasic health care services by co-payments	0.4	
Separate health care activities of the Health Insurance Fund from social insurance activities		
Advance privatization of hospitals and reform of inpatient care	0.1	Yes
Reform pharmaceutical subsidies	0.4	Yes
Education	1.0	
Reduce employment	0.4	Yes
Change the structure of higher education	0.4	
Merge underutilized schools to obtain economies of scale and administrative efficiency gains	0.1	Yes
Increase private contributions to higher education	0.2	
Government employment and wages; and public administration	1.5	
Implement a temporary hiring freeze and layoffs	0.4	Yes
Abolish unusual benefits and bonuses, such as for meals, transportation, and clothing	0.2	
Provide incentives for intergovernmental cooperation and privatization at the local level		Yes
Freeze wages temporarily	0.4	Yes
Restrict operating costs of budget institutions	0.4	Yes
Pensions	2.1	
Gradually move toward full price indexation of pensions	0.3	
Gradually raise the early retirement age	0.5	
Phase out 13th-month pension	0.8	
Tighten eligibility for disability pensions	0.4	
Social benefits	0.6	
Abolish tax deduction for children and introduce means testing for family allowance	0.6	
Government subsidies	1.5	
Reform housing subsidies	0.3	
Reform transport subsidies and state support for public transport	0.5	Yes
Reform electricity and gas tariffs	0.7	Yes
<b>Total savings--tax reforms</b>	<b>2.1</b>	
Tax pensions under the PIT	0.1	Yes
Tax interest income and capital gains without exemption threshold	0.1	Yes
Increase 15 percent VAT rate to 20 percent	0.5	Yes
Eliminate tax exemptions	0.8	
Strengthen real estate tax	0.5	Yes
<b>Total savings--containing deterioration in the baseline</b>	<b>4.1</b>	
Delay pending items of 2005 tax reform	2.8	Yes
Cap expenditures from carryover funds and open-ended items	1.2	Yes

Sources: Technical Assistance from the Fiscal Affairs Department; and staff estimates.

1/ Based on discussions held during the 2006 Article IV Consultation. It does not reflect measures in the Convergence Programme presented in September 2006.

Figure 1. Selected European Countries: Efficiency of Public Health Spending, 1998-2002



Source: Mattina and Gunnarson (2006).

41. **High spending on pharmaceuticals remains an ongoing problem.** Hungary spends about 1.5 percent of GDP on pharmaceuticals, accounting for more than 30 percent of total health expenditures. This places Hungary second in the OECD (OECD, 2005). Despite efforts to contain overruns, pharmaceutical subsidies are expected to once again exceed budget allocations in 2006.<sup>12</sup>

<sup>12</sup> In 2004, the government negotiated a two-year agreement with producers. A 5 percent maximum annual increment in the state budget for financing pharmaceutical expenses was defined for 2005 and 2006. Any medicine expense above the given level is supposed to be paid jointly by the state and the producers according to a risk-sharing scheme involving a regressive government contribution.

42. **Several reforms have been introduced since the 1990s, but achievements so far have been mixed.**<sup>13</sup> Problems are particularly acute in hospital care, where the structure of incentives remains poor and progress to prevent uneconomic access to hospital services has been slow. There is virtually no competition among health care providers. Hospitals are largely owned and operated by local governments, which bear much of the responsibility for primary and secondary health care. Private institutions are limited to the provision of various specialized medical services.

43. **Options to rationalize health care spending and increase the efficiency of the health system include the following:**

- **Introducing a co-payment system for nonbasic health care services.** To reduce risks from curtailing access to low-income families, co-payments should not apply to clearly cost-effective preventive services, a limit could be set on total household co-payments, and the lowest-income families could be exempted.<sup>14</sup> Table 3 presents examples of cost-sharing arrangements in the health sector in selected countries.<sup>15</sup>
- **Separating health care activities from social insurance activities in the HIF.** This would increase transparency.
- **Fostering hospital privatization and increasing efficiency in inpatient care.** This would enhance competition and create a base for a better system of reference cost computation.<sup>16</sup> Publicly owned hospitals should be legally organized as public benefit corporations or limited liability corporations and compete on a level playing field with privately owned hospitals.

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<sup>13</sup> See Goglio (2005) for further details.

<sup>14</sup> Potential savings from introducing co-payments vary depending on their design. As a first step, co-payments could be introduced for services that are clearly nonbasic (e.g., spa treatments). A more generalized co-payment system on all specialist visits and in-kind services could be based on a lump sum. Eventually, the co-payment system could consist of a cost-sharing price, with the share varying typically between 10 and 30 percent.

<sup>15</sup> In the Slovak Republic, the introduction of co-payments seems to have eliminated surplus demand for medical services with only a negligible impact on availability (Pažitný, Zajac, and Marcinčin, 2003).

<sup>16</sup> CEMI (2006) estimate savings of 0.2 percent of GDP from the reform of inpatient care.

- **Reforming pharmaceutical subsidies.** Several actions would be advisable: (i) restricting the number of subsidized drugs and determining the specific drug(s) to be subsidized for each illness by periodic competitive tenders; (ii) reducing normative subsidization; (iii) putting family doctors in charge of issuing all prescriptions; and (iv) strengthening administrative procedures for limiting excessive drug prescription and consumption patterns.<sup>17</sup>

Table 3. Exclusion from Coverage and Cost-Sharing in Selected Countries

Country	Exclusion from Coverage	Cost Sharing Arrangements in the early 2000s			
		Primary Care Physician	Specialist	Hospital	Drugs
Canada	Outpatient dental care and pharmaceutical; some prosthetic devices;	None	None	None	Discretion of Provinces
France	Eyeglasses; some dental care	30 percent	30 percent	EUR 11 per day and 20 percent up to 30 days	0 percent for some drugs; 35 percent for most drugs; 65 percent for "comfort" drugs
Germany	None	None	None	US\$3 for 14 days (many exemptions)	US\$3 per medicine prescribed (many exemptions)
Italy	None	None	US\$7–8 (max of US\$41)	None	0-100 percent depending on the category of medication
Japan	Inoculations; eyeglasses	20–30 percent	20–30 percent	20–30 percent	US\$0-1.2 depending on category and number of drugs
U.K.	Dental and vision	None	None	None	US\$9 per prescription or free with a "season ticket"

Sources: Cutler (2002), and Docteur and Oxley (2003).

## *Education*

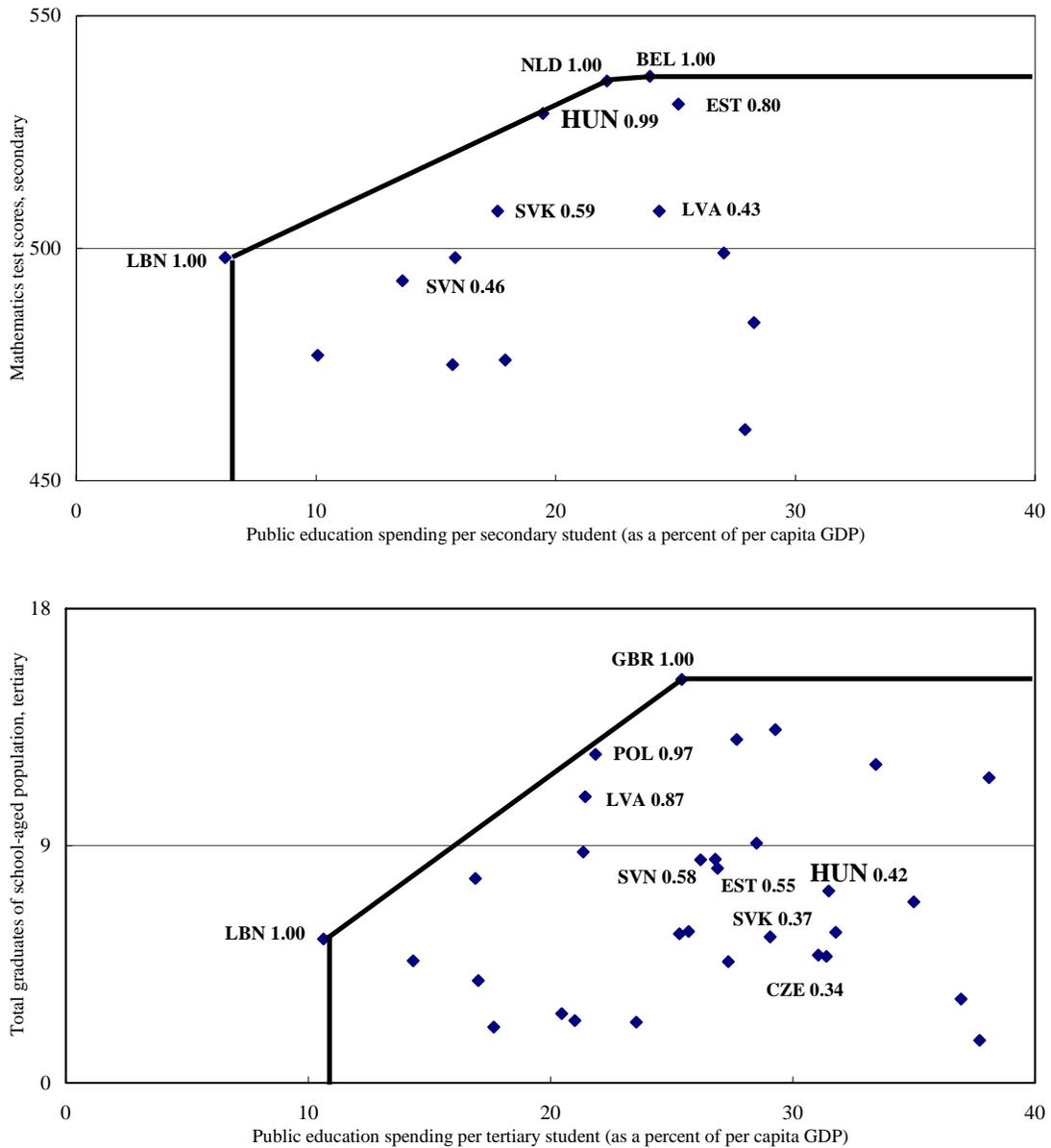
44. **Hungary's education system has undergone significant changes over the past decade.** Participation rates in upper secondary and tertiary education have increased considerably; there has been a devolution of schooling decisions to the local level; and a significant number of university students now pay cost recovery fees. In 2001, several reforms to enhance the quality of education were introduced, including a new national framework curriculum, quality development systems for schools, a comprehensive evaluation scheme, and a teacher career model.

45. **Public spending on education in Hungary is slightly above averages in the EU-15, with employment levels significantly higher.** Public spending on education amounted to under 6 percent of GDP in 2004, close to the average in New Member States (NMS) and slightly above the average in the EU-15. Student-teacher ratios and mandatory teaching loads are significantly below international standards. Public spending on tertiary education is relatively high, both in per student and absolute terms, but the number of

<sup>17</sup> Several of the actions mentioned aim at improving incentives to use cheaper generic drugs and restrict excessive consumption of drugs. However, the most direct way to achieve savings on pharmaceutical subsidies is to reduce the normative subsidization rates. At a minimum, co-payments for fully subsidized drugs should be introduced (except for patients who receive free drugs due to social reasons).

graduates has not increased accordingly compared with other countries (Figure 2). Finally, the structure of public higher education has lagged behind labor market developments, with low enrollment in the more practical curricula.

Figure 2. Selected Countries: Efficiency of Public Education Spending, 1998-2002



Source: Mattina and Gunnarson (2006).

46. **Options to modernize the education system include the following:**

- **Reducing education employment.** With student-teacher ratios significantly below OECD averages, reducing education sector employment is an important priority, especially given demographic trends.<sup>18</sup> In addition, if mandatory teaching hours were aligned with international standards, there would be an even stronger need for staff adjustments.<sup>19</sup>
- **Merging small and underutilized schools to obtain economies of scale and efficiency gains in administration.** Relatively low student performance in small districts indicates that the present model of quality assurance needs to be improved. In general, larger school districts have demonstrated a greater capacity to adjust to changing student numbers, resulting in more cost-effective school operations. Local governments are already being given financial incentives to form associations, but these have been insufficient to achieve results. In this sense, linking the normative grant financing formula to performance indicators could encourage more efficient management.<sup>20</sup>
- **Aligning the higher-education system more closely with labor market needs.** Changing the characteristics of existing state-financed places to OECD averages in terms of duration and fields of study would significantly reduce outlays on tertiary education.<sup>21</sup> Less emphasis should be put on expensive areas of studies (e.g., agricultural and science degrees) and study times should be shortened.
- **Increasing private contributions to higher education.** Ideally, a moderate tuition fee should be introduced to reflect the private benefits to the individual of higher education. At the same time, student grants and housing benefits should be channeled to the truly needy.

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<sup>18</sup> The number of full-time students in primary education has decreased by about 300,000 since the beginning of the 1990s, while the number of teachers has decreased by less than 10,000. As a result, the student-teacher ratio in elementary school went from an already low 12.2 in 1990 to 10.2 in 2005 (Ministry of Education, 2005).

<sup>19</sup> As an example, having student-teacher ratios at around OECD averages (about 30 percent higher) would reduce the wage bill by roughly 0.4 percent of GDP (FAD TA). CEMI (2006) estimates that reducing education employment by about 40,000 staff would yield savings of about 0.4 percent of GDP by 2010.

<sup>20</sup> The grant scheme could be linked to performance indicators, such as student-teacher ratios, student-classroom ratios, student performance, etc. In some countries, for instance, the wage norm takes into account average class size and average number of hours taught, allowing schools to pay higher wages and attract more qualified personnel as long as they decrease employment and increase the workload of teachers. CEMI (2006) estimates savings of about 0.2 percent of GDP from merging schools in towns and the city of Budapest.

<sup>21</sup> FAD TA estimated savings of around 0.4 percent of GDP.

### *Government employment and wages*

47. **Government wages and employment have been on the rise.** In recent years, there have been substantial wage increases in the public sector, ranging between 15 and 55 percent (Table 4). Rising wages have been accompanied by rising employment levels until 2004, further aggravating the situation.<sup>22</sup> As a result, the wage bill grew from 11 percent of GDP in 2001 to nearly 13 percent of GDP in 2005, and the average salary of public administration employees is estimated to be 25 percent higher than in the private sector.<sup>23</sup>

Table 4. Hungary: Public Sector Pay Increases, 2001–03

Date	Groups Covered	Increase (In percent)
Jul-01	Civil servants; Public order officers	35 to 55
Jan-02	Public order officers	15
	Army officers	55
Sep-02	Public servants	50
Jul-03	Civil servants	15
	Judiciary system	25
Nov-03	Judiciary system	25

Source: OECD.

48. **The high degree of decentralization seems to have generated inefficiencies.** Large-scale decentralization in the early 1990s has resulted in a significant number of autonomous local governments. Of a total of 3,200 local governments, roughly half govern fewer than 1,000 inhabitants. Many of the smaller communities cannot meet minimum service standards because they lack qualified personnel.

49. **Measures to achieve a long-lasting reduction in the size of government include the following:**

- **Implementing a medium-term civil service reform.** Wage freezes, hiring freezes, and employment cuts as proposed by the authorities could yield short-term budgetary savings.<sup>24</sup> However, these measures should be seen as partial solutions. A civil

<sup>22</sup> Hungary's public employment accounts for over 20 percent of total employment, one of the highest ratios in the OECD.

<sup>23</sup> CEMI (2006).

<sup>24</sup> The authorities estimate that a two-year wage freeze, coupled with a targeted reduction in employment, could yield about 0.7 percent of GDP in budgetary savings by 2008. CEMI (2006) estimates that sizing down public administration employment by 50,000 staff could yield 0.4 to 0.6 percent of GDP in budgetary savings by 2010, while a wage freeze could save 0.8-1 percent of GDP over the same period.

service reform should be integrated into a medium-term strategy that aims to achieve a sustained reduction in the wage bill. The sequencing of the reforms is particularly important, and the following principles apply: (i) civil censuses and functional reviews should precede the design of retrenchment programs; and (ii) the monetization of benefits should precede the reform of pay structures.

- **Abolishing various allowances and bonuses, and monetizing the bonuses that are retained.** Several noncash benefits, for instance, for meals and transportation, have little economic justification and are generally not related to merit.<sup>25</sup> Also, extending performance-related pay to the entire public service would be advisable.
- **Providing incentives for intergovernmental cooperation and privatization in local service delivery.** Budget constraints should be tightened and fiscal responsibility increased. This could be achieved, for instance, by introducing penalties for local governments that are not able to provide services due to lack of cooperation. As noted in Section B, strengthening local revenue sources is an urgent priority and would improve accountability.

### *Pensions*

#### 50. **Hungary faces important pressures stemming from age-related expenditures.**

Hungary is among the NMS that will face the most significant increases in age-related expenditures in the coming decades (Table 5 and Figure 3). Particularly acute will be pressures stemming from pension benefits, which are expected to rise from about 11 percent of GDP in 2005 to 15 percent of GDP by 2035.

Table 5. Age-Related Expenditures in NMS, 2005-50  
(In percent of GDP)

	2005	2050	Increase over 2005-50
Hungary	17.4	26.0	8.6
Czech Republic	15.5	24.9	9.4
Estonia	13.7	17.5	3.8
Latvia	12.3	16.5	4.2
Lithuania	11.0	15.4	4.4
Poland	18.4	22.5	4.1
Slovak Republic	12.9	17.4	4.5
Slovenia	19.0	29.9	10.9

Source: Standard and Poor's.

#### 51. **Reforms in the late 1990s sought to improve the sustainability of the pension system, but more recent changes have reversed some of the benefits.**

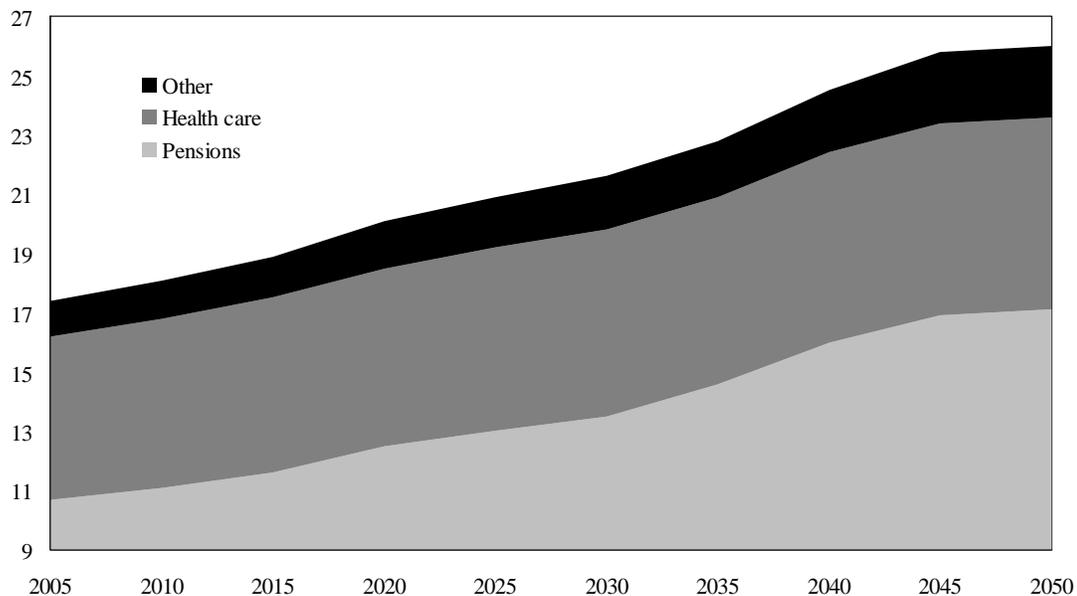
A major overhaul of the pension system was implemented in 1998, introducing both parametric and paradigmatic changes. A critical component of the reform was the creation of second-pillar mandatory pension funds.<sup>26</sup> The parametric changes helped contain pension

<sup>25</sup> Eliminating these payments could save 0.2 percent of GDP (FAD TA).

<sup>26</sup> Impavido and Rocha (2006) conclude that the second pillar has had a mixed performance since its introduction in 1998.

expenditures in the short run and reduced long-term liabilities. However, following the reform, employer contributions were reduced during 1998-2002. This reduction was not accompanied by a tightening of benefits. On the contrary, a 13-month pension was introduced in 2003.<sup>27</sup> As a result, and despite the reform, the Pension Insurance Fund continued to post deficits of around 2 percent of GDP. Orbán and Palotai (2005) estimate that net implicit liabilities (NIPs) of the pension system were around 60 percent of 2004 GDP in 1998. The cuts in social security contributions up to 2002 increased NIPs to 150 percent of GDP, while the 13-month pension led to a further deterioration to nearly 200 percent of GDP.<sup>28</sup>

Figure 3. Hungary: Age-Related Expenditures, 2005–50  
(In percent of GDP)



Source: Standard and Poor's.

52. **Despite some improvements, the effective retirement age remains low, and the current indexation formula for pension benefits is fairly generous.** One of the most important changes in the 1998 reform was the gradual increase in the statutory retirement

<sup>27</sup> The 13-month pension increased the effective replacement rate, further encouraging early retirement and weakening incentives to remain in the labor market.

<sup>28</sup> Estimates based on a real discount rate of 3 percent.

age.<sup>29</sup> However, early retirement is possible, and data on effective retirement age suggest that most individuals, especially males, take advantage of this opportunity.<sup>30</sup> The 1998 reform also replaced wage indexation by “Swiss” indexation of pension benefits (combining wages and prices). This formula still allows pensioners to participate in productivity gains that are passed on to real wages and is more costly than alternative options used elsewhere in Europe.

53. **Eligibility criteria for disability pensions remain lax.** A disability pension can be obtained by those who have lost at least 67 percent of their working capacity due to damage to their health or as a result of reduced physical or mental abilities. Disability benefits have often been used to finance premature labor market withdrawal and as a substitute for unemployment insurance. The fastest-growing group of disability pensioners is composed of workers between 46 and 60 years of age, and the regional distribution of beneficiaries shows a strong correlation with regional unemployment rates.

54. **Options to place the pension system on better financial footing include the following:**

- **Introducing further parametric changes in the pay-as-you-go system.** In particular, (i) replacing the Swiss indexation formula for pension benefits by price indexation; (ii) raising the early retirement age until early retirement provisions have been eliminated; and (iii) phasing out the 13-month pension. These actions would not only generate savings to the budget in the short run but also enhance the long-term sustainability of the pension system.<sup>31</sup>
- **Implementing a system of notional defined contributions (NDCs),** without altering the pay-as-you-go nature of the first pillar of the reformed system. NDCs link individual future pension entitlements with individual contributions paid into the system.<sup>32</sup> This system would prevent manipulation of pension benefits, encourage later retirement, and greatly enhance transparency. The extent to which NDCs improve fiscal sustainability would depend on the design of the system.<sup>33</sup>

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<sup>29</sup> The reform of 1998 raised the statutory retirement age for men from 60 to 62 years; for women the retirement rate is rising from 57 to 62 years in 2009. However, effective retirement ages are close to 60 for men and 58 for women.

<sup>30</sup> Orbán and Palotai (2005).

<sup>31</sup> Potential savings could amount to under 2 percent of GDP in the short run. Due to compounding effects, savings would grow over time.

<sup>32</sup> This has been implemented by several countries, including Sweden and Poland.

<sup>33</sup> See Holzman and Palmer (2006) for a description of issues and country studies.

- **Tightening eligibility criteria for disability pensions.** Specific measures include increasing the number of referrals to vocational rehabilitation programs provided by the public employment service; emphasizing “inability to work” rather than “damage to health” as the key criterion for granting disability pensions; and reexamining disability benefits granted for those under 40 years of age.<sup>34</sup>

### *Social transfers*

55. **Hungary maintains a comprehensive and complex system of social protection.** Apart from social insurance and unemployment benefits, the central and local governments administer a wide array of social cash transfers (family allowance, pregnancy and maternity benefits, child care benefits, and several others). In general, locally administered benefits are means tested,<sup>35</sup> while the central government mostly allocates universal family benefits. The administration of social benefits is fragmented, with many overlapping institutions involved.

56. **Contrary to international trends, the system is moving away from greater targeting and is becoming more generous.** Means testing for family benefits has been eliminated and most of the general budget support to families is offered as an entitlement, granted to everyone as a family allowance based solely on the number of children.

57. **Improving the targeting of social transfers could yield budgetary savings while redirecting support to those most in need.** In particular, the following measures could be considered:

- **Abolishing the tax deduction for children and introducing means testing for the family allowance.**<sup>36</sup> These measures would not increase poverty. While it can be argued that family benefits are to some extent self-targeting due to the high correlation between poverty and the number of children, the tax deduction is regressive: only those who pay taxes can benefit from the deduction, and minimum wages became tax-exempt in 2002. Abolishing the family allowance for the top two income quintiles would generate savings to the budget while protecting the poorest segments of the population.<sup>37</sup>

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<sup>34</sup> FAD TA estimates savings of about 0.2 percent of GDP, somewhat lower than those in CEMI (2006).

<sup>35</sup> Local governments receive normative grants from the central government to cover a large part of their expenses.

<sup>36</sup> These measures could generate 0.6 percent of GDP in savings (FAD TA).

<sup>37</sup> Still, problems related to identifying true income levels, given that tax returns are often a poor measure of income, would need to be resolved. To restore some progressivity, uniform family benefits could at least take the form of refundable tax credits, replacing the combination of tax deductions and cash benefits, these credits could be paid out in cash to those families that do not pay taxes.

- **Streamlining and simplifying benefits through a unified administration of welfare services.** A unified social need benefit could be introduced, aimed at supplementing household income to reach minimum living standards, defined according to the age profile and size of the household. While this reform would require frequent household budget surveys and in-depth poverty analyses, issues of means testing could be alleviated by compiling a central database. A single institution with decentralized branches could be assigned the administration of welfare benefits.

### *Government subsidies*

58. **Explicit and implicit subsidies have remained fairly pervasive.** The government maintains major explicit subsidies in support of pharmaceutical prices, agriculture, housing, and transportation. In addition, it maintains implicit subsidies in some of the very same areas (e.g., transportation), as well as for public utilities, mainly through the maintenance of low end-user prices. While the overall incidence of the various subsidies is unclear, large-scale subsidy operations for a wide range of activities suggests the scope for efficiency gains can be significant.

59. **There is a strong need to rationalize government subsidies, improve targeting, and enhance transparency.**<sup>38</sup> The following would be steps in this direction:

- **Reforming housing subsidies.** Important measures would include consolidating various housing support mechanisms and reevaluating their overall size; limiting government exposure to financial risks under the two mortgage subsidy schemes; and reevaluating the size of housing-related support to local governments.<sup>39</sup>
- **Reforming transport subsidies and state support to state-owned enterprises.** This would require introducing cost recovery fares, on the basis of which subsidies could be provided to specific population groups. At a minimum, incentives for overconsumption should be curtailed by requiring all passengers to pay fares, even at highly subsidized rates. Providing lump-sum nominal subsidies (not linked to the ticket price) would insulate the state budget from fare increases. Structural reforms of state-owned transport companies would limit capital transfer needs in the future.<sup>40</sup>

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<sup>38</sup> See subsection on health care for details on pharmaceutical subsidy reform.

<sup>39</sup> These measures could reduce subsidy amounts by 0.2 percent of GDP (FAD TA).

<sup>40</sup> Budgetary savings could amount to 0.5 percent of GDP. As noted by IMF (2006b), the railways and the Budapest Transport Company undertake, on behalf of the government, quasi-fiscal activities that are not governed by transparent arrangements. There is scope for further savings depending on the nature and depth of the reform of these companies, which have relied on budget support to cover operating losses.

- **Reforming electricity and gas price subsidies.** Gradually increasing electricity tariffs and natural gas prices could produce important budgetary savings. These measures should be accompanied by targeted assistance to vulnerable households.<sup>41</sup>

### Creating a more equitable and efficient tax system

60. **Hungary has a modern tax system and an effective tax administration.** The country has made important progress in improving its tax system and tax administration over the last years, relying on the three pillars of the income tax, the value-added tax (VAT) complemented by excises, and social security contributions. In the process of accession to the EU, Hungary adjusted its tax legislation to comply with the *acquis communautaire*, for instance by clearing the corporate income tax of tax privileges for offshore companies, increasing the VAT rate on certain goods to the minimum EU level of 15 percent, and transforming zero rating under the VAT into a lower rate of 5 percent (except for exports). The tax authority (APEH) has reached a high level of development when compared to tax administrations in peer countries.

61. **Nevertheless, problems in both tax policy and tax administration have developed recently.** The tax revenue-to-GDP ratio has followed a downward trend in recent years. Particularly worrisome is the continuing deterioration in VAT performance. The dismantling of border controls and adoption of self-assessment procedures following accession in 2004 seem to have exacerbated existing administrative problems.<sup>42</sup> In the area of tax policy, the package approved in 2005 was conceived to quickly grant tax relief without regard for the integrity of the tax system and the macrofiscal framework (Box 2).

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<sup>41</sup> The authorities' program incorporates savings of about 1 percent of GDP from the reform of gas and electricity subsidies. The schedule of price increases beyond 2007 has yet to be defined. Staff savings' estimates are more modest (Table 2).

<sup>42</sup> Initially, the authorities had also adopted self-assessment procedures for imports from third countries. Subsequently, in part due to concerns about possibly increasing fraudulent behavior, they have reinstated the payment of VAT and excises on imports at the border for most of the third countries.

### **Box 2. Main Features of the Tax Package Approved at End-2005**

- **Value added tax.** The standard rate was reduced from 25 percent to 20 percent on January 1, 2006.
- **Personal income tax.** The higher rate was reduced from 38 to 36 from on July 1, 2006.
- **Capital income and gains** will be taxable at 10 percent from 2007 onward (18 percent from 2010).
- **The corporate income tax will be** reduced to 10 percent for the first Ft 5 million under certain conditions.
- The tax rate on **dividends sourced in the EU** will be reduced from 25 to 10 percent in 2007.
- The **municipal business tax** will be eliminated in January 2008.
- A **luxury tax** was introduced in January 2006.
- Employers' **contributions to social security** will be reduced gradually by 7 percentage points by 2009.
- The 4 percent individual **contribution to health security** will be levied from 2006 onward, also on part-time jobs and certain benefits of corporate managers.

62. **The authorities' tax strategy under the new adjustment package raises concerns.** Hungary's tax burden is heavy, especially when its level of development is controlled for (Figure 4). The tax wedge, and particularly social security contributions, exceeds the average in the euro area and in neighbor countries, and is significantly above levels in other emerging market economies (Table 6). As noted above, the authorities' fiscal package relies heavily on tax increases, particularly related to labor and capital.<sup>43</sup> However, this strategy may not deliver the anticipated revenues, as it may burden the tax administration<sup>44</sup> and undermine growth potential and competitiveness.<sup>45</sup> Fiscal consolidation efforts would, in that case, be thwarted, requiring the authorities to undo the tax increases without having found a permanent solution for stabilizing the public finances.

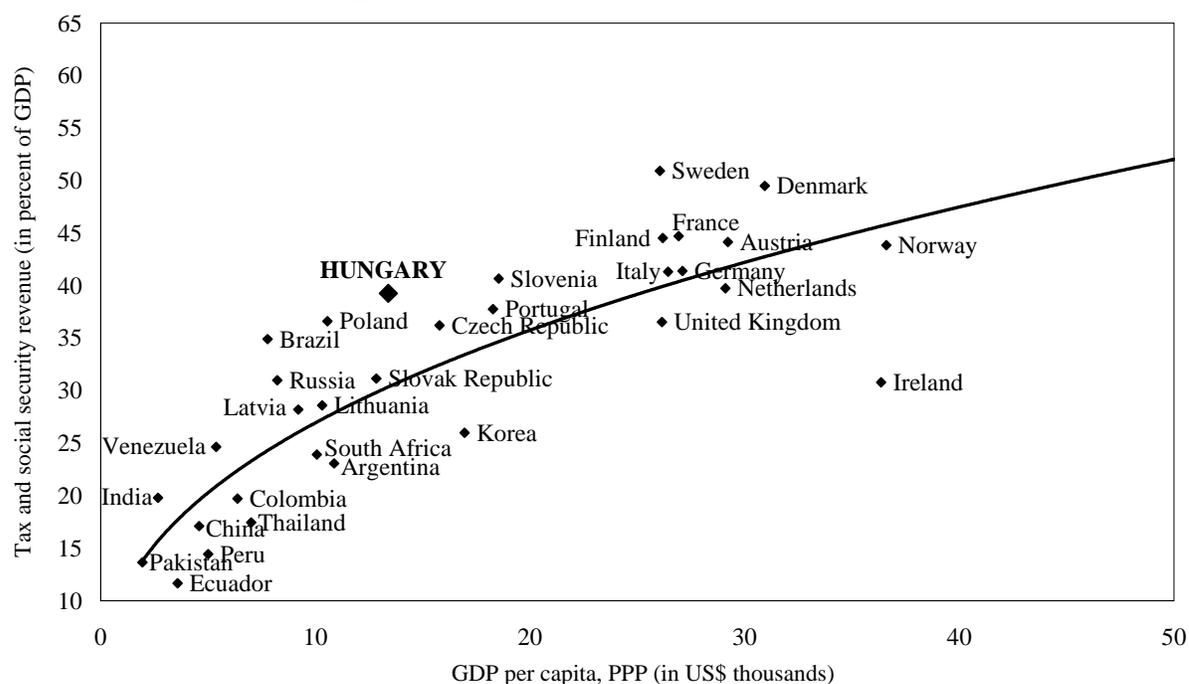
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<sup>43</sup> See IMF (2006a) for further details on the authorities' tax package.

<sup>44</sup> The tax administration is considering changing the jurisdictional structure, from counties to regions, and the effectiveness of tax collection could suffer during the transition. Frequent changes in the tax code would be difficult to implement and enforce. In contrast, efforts should focus on improving VAT compliance.

<sup>45</sup> For instance, the World Bank (2006) reports that a wider tax wedge tends to be associated with lower employment in the EU-8, which, in turn, is associated with lower per capita income. Using a panel of OECD countries, Ardagna (2004) stresses that the impact of fiscal adjustment on growth depends largely on the composition of the adjustment and its bearing on the labor market: reductions in public employment and wages are associated with higher growth rates, while increases in labor taxes have the opposite effect.

Figure 4. Selected Countries: Tax Burden, 2003



Sources: IMF, *World Economic Outlook*; OECD; World Bank, *World Development Indicators*; IMF, *Government Finance Statistics*; and IMF, *Database on Emerging Market Economies*.

Table 6. Selected Countries: Tax Wedge, 2003

Income Tax Plus Employee and Employer Contributions Less Cash Benefits (In percent of labor costs)	
Hungary	45.7
Czech Republic	43.8
Poland	42.9
Slovak Republic	41.4
Ireland	24.5
Korea	14.1
Mexico	17.3
Euro area	41.1

Source: OECD.

1 / Single person without children at 100 percent of average earnings.

63. **Because fiscal consolidation needs are so large, revenues have to be increased, but the opportunity should be used to achieve a more stable and equitable tax system.** While a significant share of fiscal adjustment should rely on expenditure consolidation, revenue measures will be essential to reverse the expected decline in tax collection in the coming years. In this sense, putting on hold even the desirable elements of the 2005 tax

reform seems unavoidable. At the same time, efforts to raise additional revenues should focus on creating a more equitable and efficient tax system.

64. **The following measures would be steps in that direction:**<sup>46</sup>

- **Eliminating tax exemptions.** Countries that have implemented successful revenue-based fiscal adjustment have generally relied on broadening the tax base by phasing out exemptions and strengthening tax administration. In Hungary, several exemptions and deductions apply under both the PIT and CIT.<sup>47</sup> Eliminating some of these exemptions would not only bring budgetary savings but also create a simpler tax system, thereby promoting the sustainability of the adjustment.
- **Strengthening the real estate property tax.** The real estate tax should provide an independent source of revenue for municipalities, since the local business tax is to be abolished in 2008.<sup>48</sup> Own-source revenues for local governments are essential for accountability and could reduce dependency on transfers from the central government.
- **Taxing pension benefits under the personal income tax (PIT).** Contrary to the current practice in most countries, pension benefits are not subject to income taxes in Hungary. At the same time, contributions to pension schemes are deductible from the PIT when contributed by individuals and deductible as operating costs of employer enterprises under the corporate income tax (CIT). This complete exclusion of pension benefits in the formation and use of pension resources lacks justification.
- **Taxing interest income and capital gains.** The combined taxation of entrepreneurial activity—comprising the CIT and the PIT on distributed dividends—is excessive when compared with the taxation of fixed capital income. Adoption of this measure would rebalance income taxation. To facilitate implementation, no exemption threshold should be introduced on the withholding tax on interest paid by financial institutions.<sup>49</sup>

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<sup>46</sup> Several of these measures are under consideration in the authorities' program. Staff estimates of their yield are presented in Table 2.

<sup>47</sup> These include, for instance, tax credits for small and medium-sized enterprises, development projects, and small investments, as well as exemptions for pension contributions, minimum wages, insurance premiums, and purchases of computer equipment. The cost of these exemptions and deductions can be roughly estimated at over 3 percent of GDP.

<sup>48</sup> The local business tax amounts to 1½ percent of GDP, while the real estate property tax currently yields only 0.3 percent of GDP.

<sup>49</sup> Such withholding should be final; alternatively, individuals could be given the option to consider the tax as final or as an advance payment creditable against their annual (interest-inclusive) income tax.

- **Increasing the intermediate VAT rate from 15 to 20 percent.** This would partially compensate for the decline in VAT revenues stemming from the 2005 reform. In addition, simplifying the rate structure could be beneficial administratively.

65. **Revenue mobilization will need to be accompanied by efforts to strengthen tax administration.**<sup>50</sup> As noted, APEH has reached a high level of development when compared to tax administrations in peer countries and has adopted many practices used by effective tax administrations around the world. However, the changing post-EU accession environment is posing new challenges that need to be addressed.

66. **In the short term, measures should aim to protect the VAT revenue base and strengthen the enforcement of tax arrears.** This involves (i) setting up revenue targets agreed by the Ministry of Finance and APEH and a mechanism to reward good performance, in order to provide incentives for APEH to accurately forecast and achieve targets; (ii) reallocating resources from routine checks to audits in areas where the risk of noncompliance is highest (such as the VAT); (iii) strengthening the authorities' legal capacity to recover tax arrears; (iv) introducing expedited procedures for appeals and assessments in case of failure to submit a tax return; and (v) implementing a more agile and secure handling of VAT refunds.<sup>51</sup>

67. **In the medium term, APEH should adopt a modernization strategy.** Some of the key elements of such a strategy would include (i) reducing APEH's responsibilities for performing nontax functions; (ii) restructuring its organizational structure; (iii) removing from the law all provisions that mandate the auditing of specific categories of taxpayers; (iv) simplifying administrative procedures, promoting electronic filing of tax returns, and improving taxpayer services; (v) making greater use of risk-based techniques for the audit and collection of tax arrears; and (vi) setting up dedicated teams to focus on the "shadow economy" and to investigate criminal violations of tax laws.

### **Strengthening fiscal transparency and accountability**<sup>52</sup>

68. **Fiscal slippages will continue unless fiscal transparency, accountability, and budget controls are strengthened.** Persistent deficit overruns have become characteristic in Hungary, with the projected 2006 excess a new record high. Reestablishing fiscal credibility

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<sup>50</sup> This section draws from TA provided by FAD.

<sup>51</sup> This would involve, for instance, broadening VAT audit coverage and accelerating audit techniques; allowing APEH to suspend the timetable for paying VAT refunds under certain conditions; strengthening powers to legally enforce central assessments when returns are filed late; and speeding up processes to remove from the VAT register businesses that have no genuine economic activity.

<sup>52</sup> This section draws from IMF (2006b).

is, therefore, an important priority. And while the country complies with many requirements of the IMF *Code of Good Practices on Fiscal Transparency*, creative accounting and other adjustments in fiscal data in recent years have complicated policy analysis and weakened transparency in many areas. These have included, for instance, (i) changes in the schedule of wage payments and VAT reimbursements; (ii) off-budget motorway investments;<sup>53</sup> (iii) the impact of pension reform;<sup>54</sup> (iv) one-off balance sheet operations from nonbudget entities;<sup>55</sup> and (v) adjustments for military spending.<sup>56</sup>

**69. Key areas for improving fiscal transparency and accountability include the following:**

- **Adopting the ESA 95 basis for the budget and undertaking quarterly reviews.** Given that Hungary's Convergence Program for euro adoption is framed in terms of ESA 95, and this is the key statement of the government's medium-term fiscal policy objectives, the internal fiscal policy debate should ideally be based on ESA 95 concepts. The budget documents and financial statements should therefore shift to an ESA 95 basis in terms of coverage, and gradually adopt its accounting principles and practices. To aid monitoring of fiscal policy implementation, and to ensure timely and appropriate responses when fiscal policy goes off track, the government should undertake quarterly reviews on an ESA 95 basis.
- **Developing a three-year rolling budgetary framework with expenditure ceilings.** Given the need for fiscal adjustment to focus primarily on expenditure reforms, the medium-term budget framework could take the specific form of multiyear expenditure targets. These would anchor the adjustment effort, guide the formulation and implementation of structural measures, and sustain fiscal discipline while allowing automatic stabilizers to operate on the revenue side. Stronger budgetary

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<sup>53</sup> Following Eurostat's decision to disallow revenues from the sale of existing motorways to the state-owned enterprise, AAK (under an alleged PPP), the 2005 fiscal deficit was revised upward by almost 2 percent of GDP. IMF (2006b) concluded that government ownership of motorways, irrespective of who builds them, implies that this investment should be recorded on budget. On budget classification of these expenditures would increase the fiscal deficit by 0.6 percent of GDP in 2006, 0.9 percent of GDP in 2007, and 0.1 percent of GDP in 2008.

<sup>54</sup> In September 2004, Eurostat temporarily allowed Hungary and other EU member states to calculate fiscal balances excluding the cost of pension reform from compulsory funded pension schemes. This treatment has lowered fiscal balances since 2000 but will be discontinued in a few years. The impact amounted to about 1½ percent of GDP in 2006.

<sup>55</sup> These relate primarily to the assumption of debt from railways and other nonbudget entities that perform quasi-fiscal activities but do not receive sufficient budget support to cover operating losses.

<sup>56</sup> A recent Eurostat decision on the classification of the expenditure of a recently acquired military aircraft has moved about 0.3 percent of GDP back to the budget.

controls are also needed to curtail expenditure overruns, including by imposing limits on expenditures financed by carryover funds and by discontinuing the practice of allowing additional expenditures without appropriations and parliamentary approval.

- **Improving fiscal risk analysis.** Fiscal risks are pervasive and need to be fully taken into account when formulating fiscal policy. A supplementary report to the budget should identify and quantify to the extent possible different sources of fiscal risk.<sup>57</sup> Special attention needs to be paid to PPPs, in general because of the hidden costs that long-term contracts can entail, and more specifically because the desire to keep PPPs off budget can transfer risk to private partners at excessive cost to the government. Fiscal risk analysis should also look at other factors affecting fiscal outcomes, such as uncertainty on short-term macroeconomic forecasts and medium-term projections, including to take into account the implications of an aging population.
- **Strengthening independent scrutiny of fiscal policy.** An independent body that reports to parliament and reviews the time consistency and transparency of budgets would strengthen transparency and accountability. Needed in this context is an assessment of the budget quality and risks, and a requirement of a response to that assessment before parliamentary approval of the budget. One option is to strengthen the mandate of the State Audit Office. An alternative would be to set up an expert council with a mandate to provide an independent view on fiscal policy.
- **Moving toward the implementation of performance budgeting.** Budgeting decisions should be based on better information about the benefits of alternative expenditure options. This is an area where little progress has been made. Advancing the implementation of performance budgeting requires the following: clearly specifying the objectives of public expenditure in terms of intended outcomes; classifying expenditure in terms of objectives; developing performance indicators, program evaluation, and other methods of obtaining information about program performance; and modifying the budget process to give greater attention to choices about the best allocation of limited resources between competing purposes.

#### **D. Concluding Remarks**

70. **Placing public finances on a sound footing is an urgent priority.** By quickly proposing sizable fiscal measures, the government has acknowledged the urgency of containing growing public indebtedness and macroeconomic imbalances. However, a more ambitious and better-quality fiscal consolidation is needed to reduce vulnerabilities, thereby allowing euro entry from a position of strength. A stronger focus on expenditure reforms,

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<sup>57</sup> Sources of fiscal risk include guarantees and other contingent liabilities that may end up adding to government spending and debt, quasi-fiscal activities that undermine the financial position of state-owned enterprises necessitating bailouts, and tax expenditures that weaken the tax base. At present, Hungary reports only guarantees in a transparent fashion.

including to improve targeting and efficiency, will achieve sustainable consolidation and support long-term growth potential. Revenue measures are also required, but this opportunity should be used to create a more stable and equitable tax system, including by broadening the tax base and strengthening tax administration. An ad hoc strategy to raise the already high taxes on labor and capital could undermine the sustainability of the adjustment and be detrimental to growth and competitiveness. Fiscal consolidation efforts should be supported by stronger budget controls and greater transparency and accountability to stem the endemic fiscal slippages of recent years.

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### III. EMPLOYMENT DYNAMICS IN THE NEW EUROPEAN MEMBER STATES: THE CASE OF HUNGARY<sup>58</sup>

#### A. Introduction

71. **Low employment is a key economic and social issue in Hungary.** Hungary, like most of the central and eastern European countries, experienced a sharp decline in employment in the initial years of the transition, as job shedding in government and state-owned enterprises more than offset job creation in the nascent private sector (see Schiff and others, 2006, for a description of labor market performance in transition in central and eastern European countries). A third of jobs were destroyed in Hungary from 1987 to 1995 (Kézdi, 2002). The period after the transition saw a rebound in employment, which has stabilized at a rate, low by international standards, of about 50-55 percent after 2000 (Table 1).

72. **This paper is an effort to shed light on Hungary's employment dynamics, placed in the European Union (EU) context.** Following Marimon and Zilibotti (1998), the evolution of employment generation is decomposed into country, industry, and temporal components. A similar decomposition is conducted for GDP growth. Comparing GDP and employment growth, the results suggest that, while convergence in the New Member States (NMS) is occurring in real economic growth terms, employment creation is lagging. The evidence for the NMS indicates that there is more variability in the evolution of employment across industries than across countries, suggesting that differences in aggregate employment rates are due to a large extent to differences in the initial employment structure than in the aggregate economic performance of the individual country. In this context, Hungary's employment generation has been relatively strong, partly due to the country's favorable initial employment distribution across sectors.

Table 1. 20 EU Countries: Employment Rates, 1995-2004 1/  
(In percent of total population 15-64 years old)

	1995	2004	Change
Belgium	56.1	60.3	4.2
<b>Czech Republic</b>	73.6	67.0	-6.6
Denmark	73.4	75.7	2.3
Germany	64.6	65.0	0.4
<b>Estonia</b>	65.9	64.6	-1.3
Greece	54.7	59.4	4.7
Spain	46.9	61.1	14.2
France	59.5	63.1	3.6
Ireland	54.4	66.3	11.9
Italy	51.0	57.6	6.6
<b>Latvia</b>	58.8	63.3	4.5
<b>Lithuania</b>	68.4	61.9	-6.5
<b>Hungary</b>	51.8	55.8	4.1
Netherlands	64.7	73.1	8.4
Austria	68.8	67.8	-1.0
<b>Poland</b>	57.9	48.9	-8.9
<b>Slovenia</b>	66.0	65.0	-1.0
<b>Slovak Republic</b>	59.3	53.9	-5.4
Finland	61.6	67.6	6.0
United Kingdom	68.5	71.6	3.1

Sources: Eurostat, and IMF staff calculations.

1/ NMS in bold.

<sup>58</sup> Prepared by Stefania Fabrizio.

73. **The paper also examines the determinants of a country's employment dynamics.** In this sense, the analysis makes an effort to go beyond what Marimon and Zilibotti (1998) did for the old member states of the EU. An effort is made to explain the determinants of the country-specific evolution of employment. In this context, unit labor costs per employee, real GDP, the tax wedge, and the real effective exchange rate are found to be key determinants of employment generation.

74. **The paper is organized as follows.** Section B provides the analytical framework. Section C describes the data used in the panel regressions. Section D reports on the results of the analysis and discusses other key determinants of employment that other studies have found to be particularly relevant for Hungary. Section E concludes.

## B. Analytical Framework

75. **In order to analyze employment dynamics, employment generation is decomposed into country, industry, and temporal effects.** A statistical model that disentangles country-specific and industry-specific components of the generation of employment at the sectoral level is used, as in Marimon and Zilibotti (1998). Two motivations prompted the use of such a model. First, there are significant comovements of employment at the industry level across countries. These can be thought as sector (or industry) specific (e.g., worldwide sectoral technological trends) or aggregate effects (e.g., the international business cycle). Second, the generation of employment is affected by country-specific factors, such as labor costs, exchange rate movements, technology and quality upgrading of the production structure, labor legislation, and fiscal and monetary policies. Country-level effects can have either an aggregate or sector-specific nature. The model also allows to decompose employment growth into short and long term components.

76. **Six different factors affecting employment are identified.** The specification used is the following (see Appendix):

$$E(i, n, t) = H(i) + M(i, n) + B(t) + F(i, t) + G(n, t) + u(i, n, t),$$

where  $E(i, n, t)$  represents the growth rate of employment for sector  $i$ , country  $n$ , at time  $t$ . The first factor,  $H(i)$ , is a time-invariant trend component specific for each sector and shared by all countries. It represents effects such as worldwide sectoral technological trends or movements in the international price system. The second effect,  $M(i, n)$ , gives the deviations between country-specific employment trends in a specific industry and the average rate across all countries for the same industry. This component represents, for example, different initial sectoral and country conditions. The third component,  $B(t)$ , is a time effect shared by all countries and all sectors. It captures aggregate effects, such as the international business cycle. The fourth,  $F(i, t)$ , represents industry-specific effects that cause temporary deviations from the employment trend in a specific industry in all countries at a specific time. The fifth component,  $G(n, t)$ , gives country-specific aggregate effects, or the country's transitory

deviation of employment growth from the international business cycle. The last component,  $u(i,n,t)$ , is a country-specific disturbance.

77. **The evolution of employment in different economies is assessed against a benchmark constructed from the industry and temporal effects.** The benchmark, or “virtual” employment, is created by filtering out all country-specific effects from actual employment. It is obtained by taking as initial condition the actual employment level at the beginning of the period and applying to it the growth rate formed by the sum of the average of the European employment in a specific industry,  $H(i)$ , the average overall international business cycle,  $B(t)$ , and the business cycle specific to that industry and common to all countries,  $F(i,t)$ . Virtual employment provides a picture of what employment levels would have been observed in each country in the absence of any country-specific effect. The idea is to compare the actual employment performance with the level predicted by the respective initial employment structure if all local industries had behaved like the European average. The country-specific employment rate is the difference between the actual and virtual employment rates.

### C. Data

78. **The sample covers the period 1996-2004 and includes 20 countries of the EU.** Employment data, from Eurostat and country yearbooks, are used, for the following 14 sectors (NACE (Classification of Economic Activities in the European Community) classification): agriculture, hunting, fishing, and forestry (A); mining and quarrying (C); manufacturing (D); electricity, gas, and water supply (E); construction (F); wholesale and retail trade, repair of motor vehicles, motorcycles, and personal and household goods (G); hotels and restaurants (H); transport, storage, and communication (I); financial intermediation (J); real estate, renting and business activities (K); public administration and defense, and compulsory social security (L); education (M); health and social work (N); and other community, social, and personal service activities (O). The countries considered are the EU countries, excluding Cyprus, Luxembourg, Malta, Portugal, and Sweden, for which data were not available.

79. **Real GDP and real labor costs per employee are also analyzed.**<sup>59</sup> Sectoral data for real GDP, following the same classification described above, are from Eurostat, and for labor costs from Eurostat, country yearbooks, and the OECD structural analysis (STAN) database. Data are available for 18 countries (the 20 mentioned above, excluding Ireland and the United Kingdom). For the old member countries of the EU, the period available is 1996-

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<sup>59</sup> Real labor cost per employee is calculated as total labor costs by sector divided by the number of employees by sector and deflated using the value-added deflator by sector (value added at current prices divided by value added at constant prices).

2003. Other variables considered in the analysis are the tax wedge, defined as the relative tax burden for an employed person with low earnings, as published by Eurostat; the real effective exchange rate from the IMF's Information Notice System; and the unit value ratio, calculated as the ratio of a country's export unit values relative to the global average (58 countries, or almost 94 percent of world trade).<sup>60</sup> The trade data for the unit value ratio are from the UN Comtrade database.

#### D. Explaining Employment Generation

80. **Employment generation has been generally weaker in the NMS than in the old member states of the EU.** As noted, the employment benchmark is the so-called “virtual” employment (obtained by filtering out the country-specific components): it is also the employment that would have prevailed if the dynamics were dictated purely by sectoral factors and shocks common to the region. Figures 1 and 2 show that the employment benchmark constructed from the group of old and new member states is higher than the one built considering only the NMS. The implication is that employment growth would have been higher in the NMS if its pace had been the same as in the old member states. At the same time, the reverse situation is shown for real GDP growth (Figures 3 and 4). In this case, the benchmark is higher when only the NMS are considered. This would suggest that, while real growth in the NMS is converging to western European levels, employment is lagging.

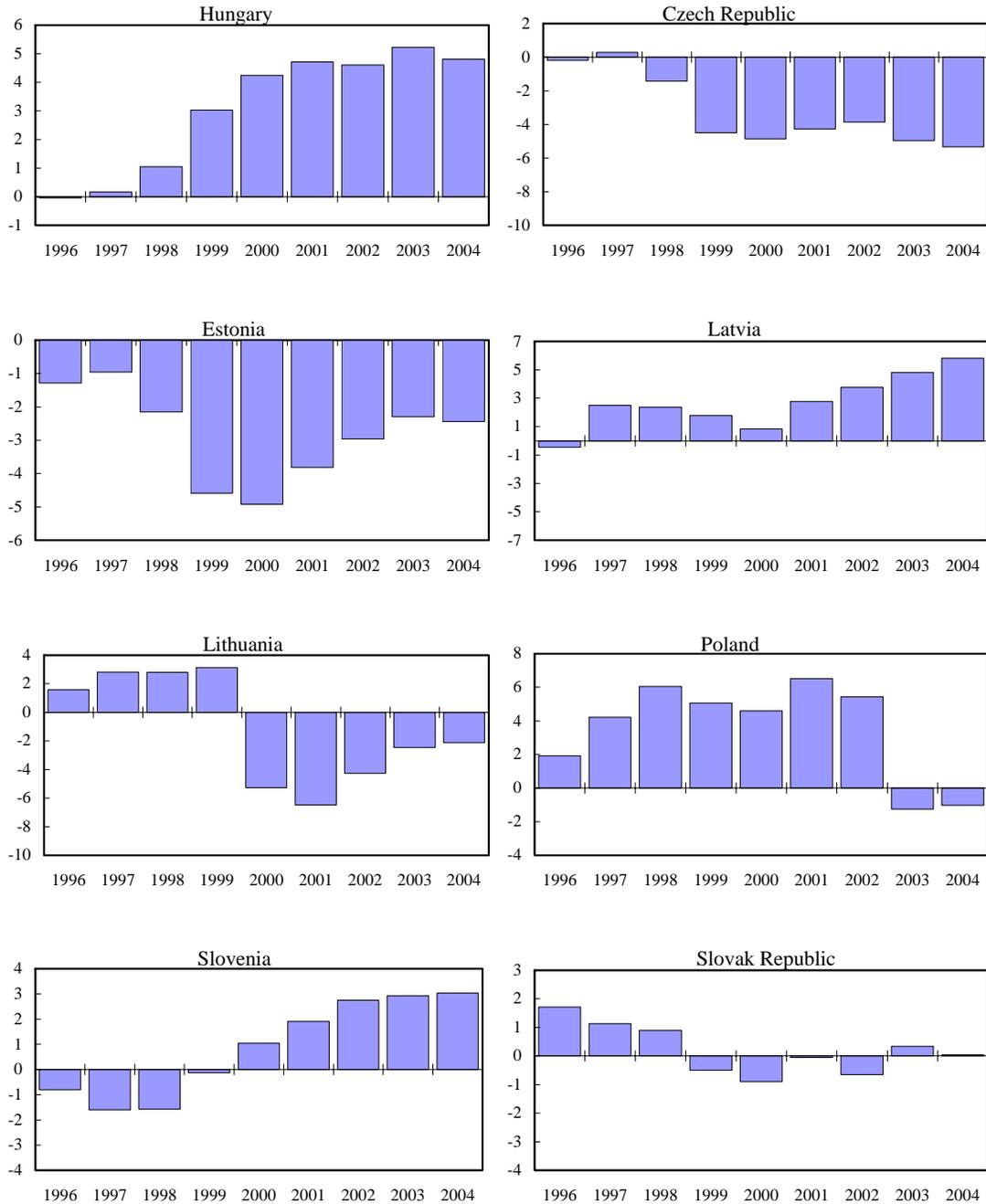
81. **Employment generation trends differ substantially across sectors.** The long-term trend components of employment growth identified by the model are the yearly average European sectoral growth rates  $H(i)$  and the country-specific deviations from it  $M(i,n)$  (Table 2). Looking at the  $H$  component, employment in agriculture fell steadily, as expected, at an annual rate of 3½ percent. The decline in employment in agriculture was particularly severe during the period 2000-04 (Tables 3 and 4). The other industries that appear to have expelled labor force in net terms, though at varying speeds, have been manufacturing; mining and quarrying; and electricity, gas, and water supply. The annual decline in employment in these sectors, in particular agriculture, appears to have been much more severe than if the analysis were conducted only among the NMS (Table 5). Moreover, taking into consideration only the NMS (Table 5), more industries seem to have expelled labor force than when the old member countries are also considered (Table 2). Meanwhile, real estate and business activities, hotels and restaurants, and construction appear to be the sectors where more employment has been generated. Looking at the international business cycle effects,  $B(t)$ , for the restricted group of the NMS (Table 5), it can be noted that 2000 recorded

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<sup>60</sup> For a detailed description of this variable see Chapter I “The Dynamics of Product Quality and International Competitiveness” of the accompanying multi-country Selected Issues Paper on export structure and credit growth.

the worst slump, as several NMS were going through a restructuring phase, partly triggered by the 1998 Russian crisis.

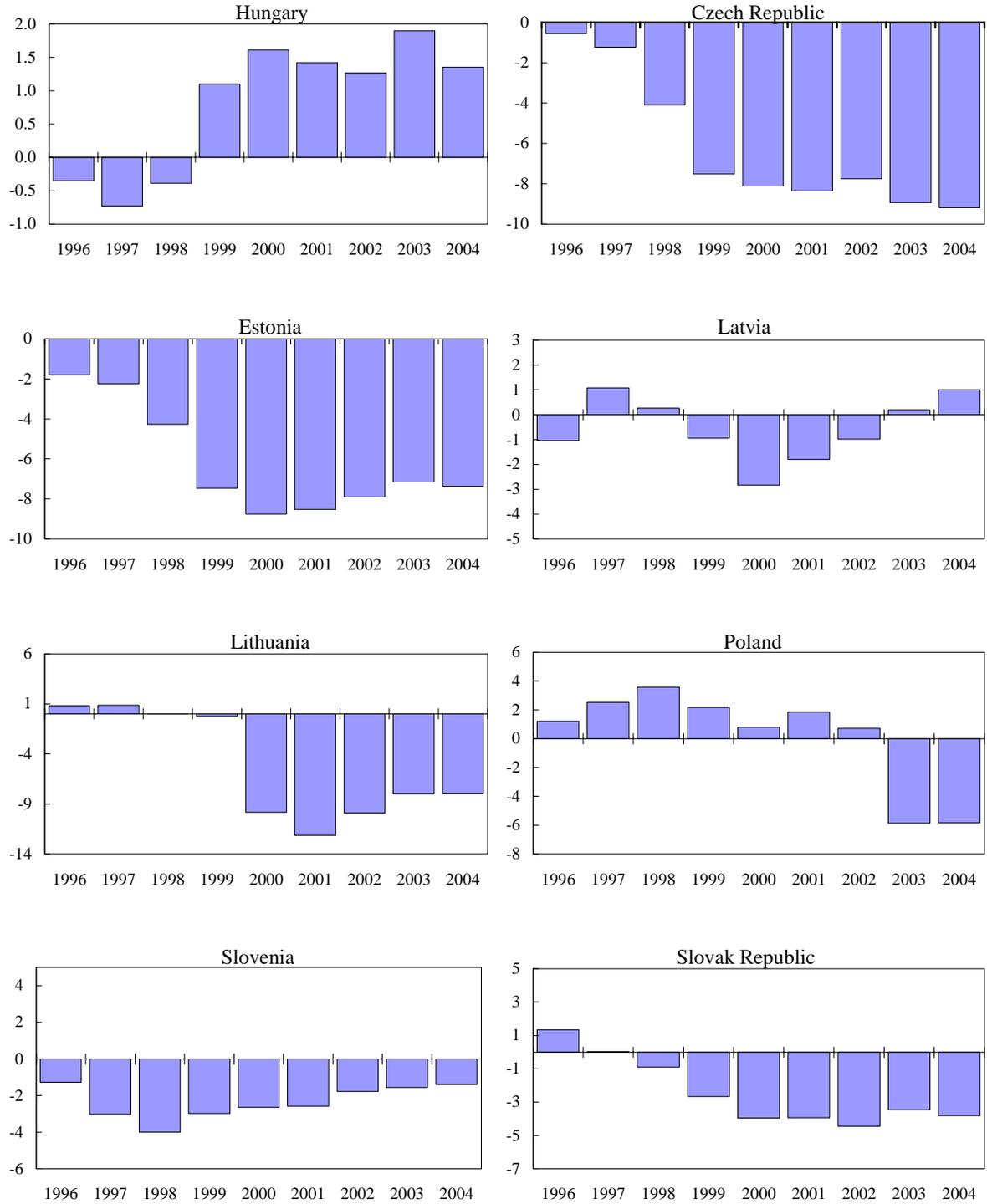
Figure 1. NMS: Employment Growth Relative to Virtual Employment Growth, Using NMS Benchmark, 1996-2004 1/



Sources: Eurostat; country yearbooks; and IMF staff calculations.

1/ Benchmark constructed from the New Member States of the EU. Cyprus and Malta are not included.

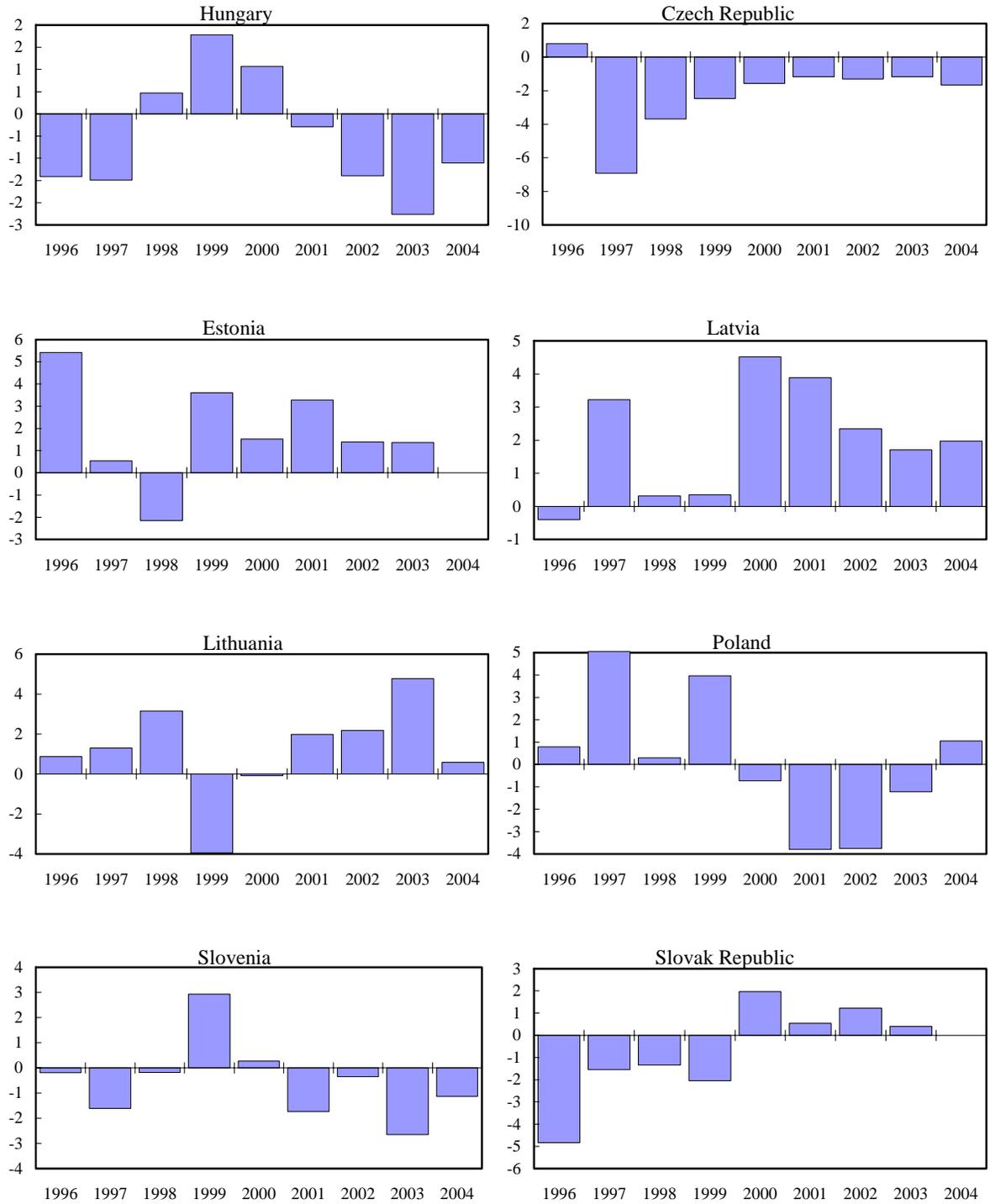
Figure 2. NMS: Employment Growth Relative to Virtual Employment Growth, Using EU Benchmark, 1996-2004 1/



Sources: Eurostat; country yearbooks; and IMF staff calculations.

1/ Benchmark constructed from 20 EU countries. The 20 countries are the EU-15, excluding Luxembourg, Portugal, and Sweden, and the new EU-10, excluding Cyprus and Malta.

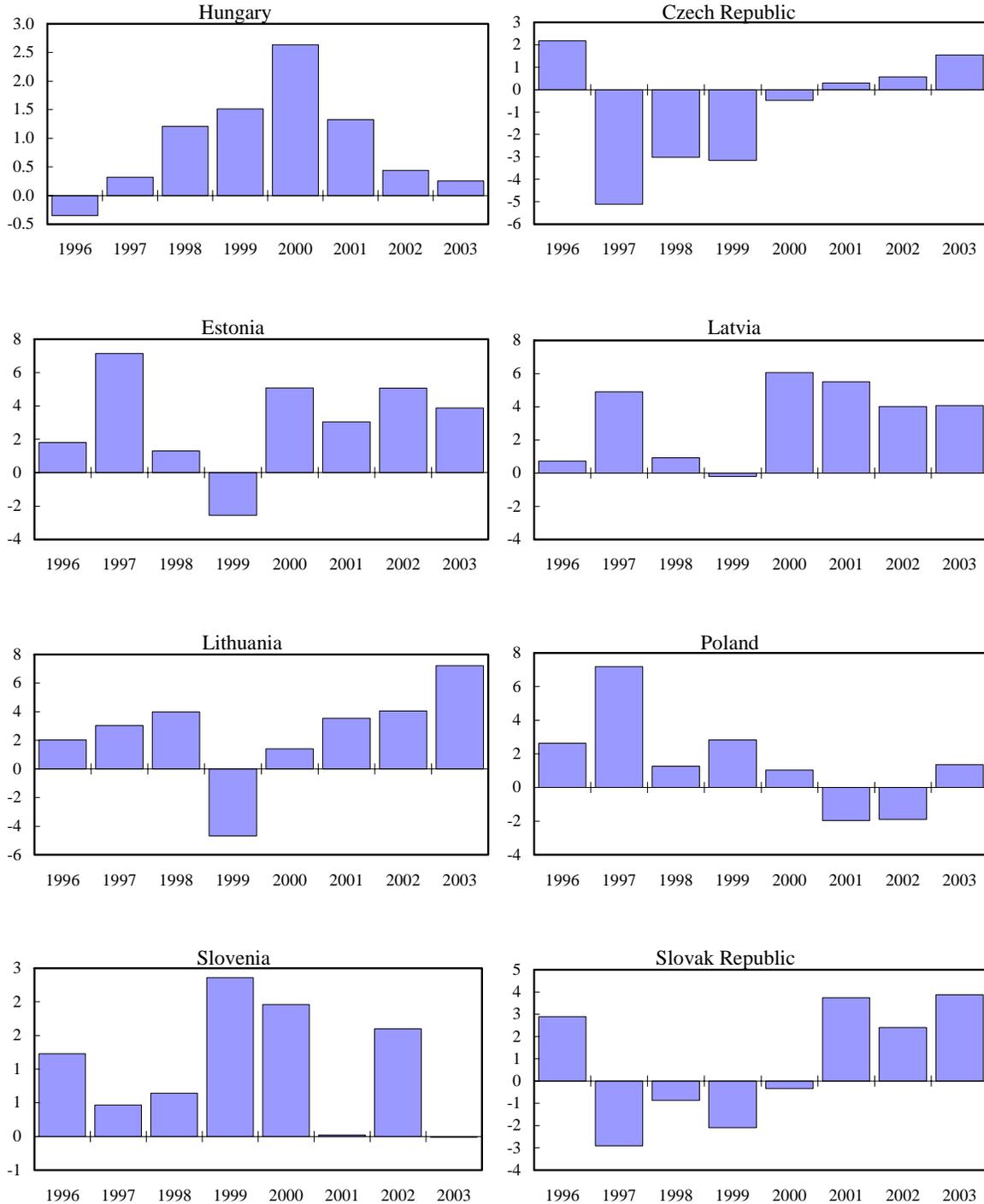
Figure 3. NMS: Real GDP Growth Relative to Virtual GDP Growth, Using NMS Benchmark, 1996-2004 1/



Sources: Eurostat; and IMF staff calculations.

1/ Benchmark constructed from the New Member States of the EU. Cyprus and Malta are not included.

Figure 4. NMS: Real GDP Growth Relative to Virtual GDP Growth, Using EU Benchmark, 1996-2003 1/



Source: Eurostat; and IMF staff calculations.

1/ Benchmark constructed from 18 EU countries. The 18 countries are the EU-15, excluding Ireland, Luxembourg, Portugal, Sweden, and the United Kingdom, and the new EU-10, excluding Cyprus and Malta.

Table 2. 20 EU Countries: Employment Generation Components, 1996-2004  
(In percent)

	A: Agriculture, hunting, fishing, and forestry	C: Mining and quarrying	D: Manufacturing	E: Electricity, gas, and water supply	F: Construction	G: Wholesale and retail trade; repair of motor vehicles	H: Hotels and restaurants	I: Transport, storage, and communication	J: Financial intermediation	K: Real estate, renting and business activities	L: Public administration and defense; compulsory social security	M: Education	N: Health and social work	O: Other community, social, and personal service activities
Sectoral trends $H(i)$	-3.5	-3.7	-1.0	-1.9	1.8	1.5	2.1	0.5	0.7	4.7	1.3	1.0	1.3	1.4
Country deviations $M(i, n)$	A	C	D	E	F	G	H	I	J	K	L	M	N	O
Belgium	0.0	0.5	-0.3	0.6	-1.9	-1.0	-2.1	-0.1	-0.9	-0.7	-0.1	-0.6	1.4	-0.3
Czech Republic	-1.2	-4.4	0.4	-1.3	-4.3	-2.5	-1.3	-0.8	-1.4	-2.9	-0.7	-0.3	-2.2	-0.6
Denmark	0.4	0.5	-0.8	-0.9	-0.7	-0.8	-0.2	-0.1	-0.5	-0.4	-2.3	-0.3	-0.2	-0.2
Germany	1.1	-4.6	-0.2	-0.6	-5.8	-1.1	0.6	-0.9	-0.7	0.4	-2.5	0.2	1.0	0.6
Estonia	-3.8	2.4	-0.3	-0.6	1.3	-1.5	-2.8	-2.9	0.8	-2.2	-0.7	-1.0	-1.0	-1.8
Greece	0.9	0.7	-0.2	1.1	1.1	-0.1	-0.5	0.2	1.4	-0.2	0.1	1.9	1.3	-0.3
Spain	3.2	0.3	3.0	1.2	5.5	1.7	2.4	1.9	-0.2	2.6	0.1	1.7	1.7	3.9
France	1.7	-2.4	0.1	1.5	-1.1	0.2	-0.2	0.9	-0.3	-1.4	-1.2	-0.1	0.3	1.5
Ireland	1.7	6.9	1.4	3.6	7.4	3.0	2.9	5.7	5.2	3.2	1.6	1.8	4.4	4.3
Italy	0.4	3.2	0.9	-0.8	0.3	-0.7	0.5	0.7	-0.8	1.0	-1.9	-0.8	0.7	0.4
Latvia	-0.5	-0.8	-1.1	2.5	4.6	1.6	1.8	0.2	3.0	0.4	0.2	-1.5	-2.5	0.2
Lithuania	-2.6	3.7	-0.9	-1.9	0.4	-0.6	4.0	-0.7	-4.4	-3.2	1.1	-1.1	-1.9	-5.6
Hungary	-0.9	-4.7	1.5	-3.3	2.0	0.5	0.6	-1.6	-0.9	3.5	-0.2	-1.2	0.4	-2.5
Netherlands	2.7	3.7	-0.5	-1.4	-1.0	0.1	-0.9	1.3	1.1	-0.7	-0.4	0.2	2.0	0.6
Austria	2.3	2.2	0.0	0.5	-2.9	-0.7	-0.9	-0.4	-0.6	1.8	-1.5	0.4	0.8	-0.1
Poland	-1.3	-3.6	-1.6	-0.3	-5.3	-0.5	-0.9	-2.6	-0.3	0.8	7.5	0.6	-5.4	0.2
Slovenia	0.1	-5.3	-0.7	1.0	-0.2	-1.8	-1.4	-0.3	1.7	0.5	2.7	0.9	-0.1	0.8
Slovak Republic	-6.0	-4.0	-0.2	1.3	-2.5	3.7	-2.4	-1.7	1.4	-1.5	-0.6	-2.5	-1.7	-2.5
Finland	0.4	3.7	1.4	-0.6	1.4	0.8	0.3	0.4	-3.3	0.5	-0.1	0.9	0.9	1.5
United Kingdom	1.3	2.2	-1.7	-1.9	1.6	-0.3	0.3	0.8	-0.3	-1.6	-0.9	0.9	0.1	0.0

Table 2. 20 EU Countries: Employment Generation Components, 1996-2004 (concluded)  
(In percent)

	1996	1997	1998	1999	2000	2001	2002	2003	2004
Business cycle $B(t)$	-0.2	0.4	0.6	0.4	-0.5	-0.7	0.5	-0.5	0.0
Sector $F(i, t)$									
A: Agriculture, hunting, fishing, and forestry	1.3	1.6	0.1	-1.7	-1.6	1.5	1.0	-2.2	0.0
C: Mining and quarrying	2.2	-3.9	-3.8	3.9	-1.9	-4.1	7.0	-1.9	2.6
D: Manufacturing	-0.1	0.2	0.9	-1.0	0.6	1.3	-1.3	0.1	-0.7
E: Electricity, gas, and water supply	0.5	2.7	-0.6	-1.4	-1.4	-0.5	-1.5	0.4	1.7
F: Construction	-0.9	1.2	0.9	-1.5	0.5	-0.2	-3.2	2.4	0.7
G: Wholesale and retail trade; repair of motor vehicles	0.6	0.5	-0.1	-0.4	-0.4	1.0	-0.9	-0.2	-0.2
H: Hotels and restaurants	-0.7	0.7	0.5	-0.3	2.2	-0.3	-0.7	-1.4	0.1
I: Transport, storage, and communication	0.3	-0.9	1.0	1.2	0.1	0.1	-1.0	0.7	-1.4
J: Financial intermediation	-1.6	1.1	1.0	0.2	0.8	-2.4	0.6	0.7	-0.4
K: Real estate, renting and business activities	-0.5	-0.1	4.0	0.3	0.7	-0.5	1.1	-2.3	-2.7
L: Public administration and defense; compulsory social security	-0.1	-0.8	-1.5	-0.6	0.5	2.5	-0.3	0.4	-0.2
M: Education	0.0	-1.4	-0.9	-0.1	0.7	1.0	-0.5	0.8	0.4
N: Health and social work	-0.8	-0.4	-0.6	-0.3	-0.5	0.9	0.7	1.2	-0.1
O: Other Community, social, and personal service activities	-0.2	-0.5	-0.7	1.9	-0.5	-0.4	-0.9	1.3	0.0
Country-specific fluctuations $G(n, t)$									
Belgium	0.2	-0.3	0.6	0.3	1.0	-0.6	-1.1	0.1	-0.2
Czech Republic	0.5	1.9	-2.3	-4.9	1.4	0.1	0.9	1.2	1.3
Denmark	0.6	0.4	-1.4	0.1	0.8	0.4	-0.7	-0.3	0.1
Germany	-0.6	-1.3	0.3	0.5	1.6	0.0	-0.7	-0.3	0.3
Estonia	-1.3	1.0	0.3	-2.7	-1.0	-2.6	2.8	1.3	2.2
Greece	-1.3	-1.0	2.7	-1.8	0.1	-0.1	-0.4	-1.3	3.1
Spain	-1.7	-0.7	-0.4	-0.5	4.4	0.3	-1.0	0.5	-1.0
France	-0.4	-1.0	-0.6	0.4	2.0	0.8	-0.3	-0.3	-0.6
Ireland	-0.7	-0.2	3.3	1.3	1.5	-0.5	-2.6	-1.6	-0.5
Italy	-0.4	-1.1	-0.7	-0.1	1.3	1.9	0.2	-0.3	-0.9
Latvia	-0.7	-4.2	-4.1	4.2	-0.8	1.4	3.4	-1.5	2.2
Lithuania	0.7	3.4	-0.8	1.2	-14.0	-3.2	6.7	5.7	0.3
Hungary	-1.6	-0.6	0.9	2.5	-0.3	-1.9	-0.4	1.0	0.5
Netherlands	0.4	0.4	0.1	0.9	1.5	0.2	0.2	-1.3	-2.3
Austria	0.5	0.1	-0.1	0.7	-0.3	0.6	-1.3	0.2	-0.4
Poland	2.3	3.8	2.7	-2.2	-1.6	2.0	-2.2	-4.2	-0.7
Slovenia	-0.9	-1.9	-0.5	2.4	0.6	-0.2	0.9	0.9	-1.3
Slovak Republic	4.0	-0.7	0.9	-2.1	-0.7	0.7	-1.6	0.9	-1.4
Finland	0.2	1.2	-0.7	0.7	0.9	0.6	-1.3	-0.9	-0.7
United Kingdom	0.0	0.8	0.1	-0.7	1.4	0.1	-1.6	0.0	-0.1

Source: IMF staff calculations.

Table 3. 20 EU Countries: Employment Generation Components, 2000-04  
(In percent)

	A: Agriculture, hunting, fishing, and forestry	C: Mining and quarrying	D: Manufacturing	E: Electricity, gas, and water supply	F: Construction	G: Wholesale and retail trade; repair of motor vehicles	H: Hotels and restaurants	I: Transport, storage, and communication	J: Financial intermediation	K: Real estate, renting and business activities	L: Public administration and defense; compulsory social security	M: Education	N: Health and social work	O: Other community, social, and personal service activities
Sectoral trends $H(i)$	-3.9	-3.6	-1.2	-2.4	1.6	1.1	1.9	0.0	0.3	3.8	1.7	1.3	1.5	1.0
Country deviations $M(i, n)$	A	C	D	E	F	G	H	I	J	K	L	M	N	O
Belgium	-0.2	-2.2	-0.2	0.1	-1.6	-0.1	-2.0	0.1	-1.3	-1.0	-0.3	-0.3	1.4	-0.1
Czech Republic	1.0	-3.0	0.2	-1.1	-1.5	-1.0	-3.3	-0.2	-1.8	-0.9	0.0	1.2	-0.2	0.8
Denmark	1.5	3.6	-1.1	-0.3	-1.6	-1.1	-0.7	-0.3	0.2	-0.3	-3.4	-0.7	-1.3	-0.1
Germany	2.3	-3.7	0.2	0.7	-6.4	-1.1	0.3	0.3	-0.4	0.1	-3.1	-0.3	0.6	0.7
Estonia	-2.5	3.6	3.8	-4.6	1.2	-1.6	2.3	-2.9	-2.7	-2.7	-0.6	0.3	2.0	-1.7
Greece	0.3	0.7	-0.6	0.4	2.1	0.3	-0.3	1.1	2.3	0.7	0.9	2.5	0.4	0.5
Spain	3.9	0.6	2.1	2.9	6.2	2.2	4.0	2.5	0.8	4.3	-0.2	1.8	1.8	5.5
France	2.2	-2.2	0.1	2.2	0.6	0.9	0.6	1.6	0.8	-1.3	-1.9	-0.1	-0.4	0.7
Ireland	0.4	9.3	0.2	3.8	6.0	2.0	-0.8	2.8	5.2	-0.6	2.4	2.3	6.1	3.6
Italy	1.8	2.6	1.1	0.0	1.8	0.0	2.2	0.3	-0.1	1.4	-2.3	-0.6	0.4	0.8
Latvia	-1.7	3.6	0.5	2.4	6.0	1.4	3.1	1.9	6.2	-2.3	-2.3	-2.2	-0.8	5.5
Lithuania	-3.6	3.6	-0.9	-3.4	3.0	-1.9	2.1	-2.2	-1.6	-3.4	1.2	-3.5	-4.0	-11.6
Hungary	-1.7	-8.3	0.3	-4.3	2.5	-0.3	-0.1	-0.9	-0.3	4.2	0.3	-0.3	0.2	-1.3
Netherlands	3.2	5.7	-1.6	-1.1	-2.4	-0.6	-1.0	1.2	-1.1	-2.2	-0.1	0.1	1.9	0.0
Austria	2.4	0.9	0.1	0.5	-3.4	-0.6	-0.7	-0.2	-0.3	0.3	-2.4	0.6	0.7	-0.4
Poland	-5.1	-3.1	-2.1	0.1	-9.8	-2.3	-1.3	-4.0	-4.0	-0.1	10.5	0.3	-8.7	-1.8
Slovenia	1.2	-7.6	0.2	2.4	-0.7	-0.7	-0.5	0.4	1.7	4.0	1.8	0.2	0.6	-2.4
Slovak Republic	-5.3	-7.0	0.4	-0.5	-2.2	4.3	-3.0	-2.7	-2.5	0.1	-0.6	-2.2	-2.9	-0.8
Finland	1.2	3.6	0.3	-1.1	-0.6	0.1	-1.1	0.1	-1.3	0.9	-0.3	0.0	1.2	1.4
United Kingdom	-1.3	-0.6	-3.0	0.8	1.0	0.0	0.2	1.3	0.2	-1.2	0.3	0.8	0.9	0.6

Source: IMF staff calculations.

Table 4. 20 EU Countries: Employment Generation Components, 1996-99  
(In percent)

	A: Agriculture, hunting, fishing, and forestry	C: Mining and quarrying	D: Manufacturing	E: Electricity, gas, and water supply	F: Construction	G: Wholesale and retail trade; repair of motor vehicles	H: Hotels and restaurants	I: Transport, storage, and communication	J: Financial intermediation	K: Real estate, renting and business activities	L: Public administration and defense; compulsory social security	M: Education	N: Health and social work	O: Other community, social, and personal service activities
Sectoral trends $H(i)$	-2.8	-3.8	-0.7	-1.3	2.0	1.9	2.5	1.2	1.1	5.9	0.8	0.7	1.1	1.8
Country deviations $M(i, n)$														
	A	C	D	E	F	G	H	I	J	K	L	M	N	O
Belgium	0.3	3.8	-0.4	1.3	-2.1	-2.1	-2.1	-0.2	-0.4	-0.3	0.1	-0.9	1.5	-0.7
Czech Republic	-4.0	-6.1	0.5	-1.5	-7.8	-4.2	1.1	-1.7	-0.8	-5.3	-1.5	-2.2	-4.6	-2.5
Denmark	-1.0	-3.4	-0.5	-1.6	0.6	-0.3	0.4	0.2	-1.4	-0.6	-0.9	0.2	1.2	-0.3
Germany	-0.5	-5.6	-0.5	-2.3	-5.1	-1.1	1.1	-2.4	-1.1	0.8	-1.8	0.7	1.5	0.4
Estonia	-5.3	0.9	-5.4	4.4	1.4	-1.3	-9.2	-2.9	5.2	-1.5	-0.8	-2.6	-4.8	-1.8
Greece	1.6	0.7	0.3	1.9	-0.1	-0.6	-0.7	-1.0	0.4	-1.4	-0.9	1.3	2.3	-1.2
Spain	2.4	0.0	4.1	-1.0	4.8	1.2	0.4	1.1	-1.4	0.4	0.4	1.5	1.6	1.9
France	1.1	-2.8	0.0	0.6	-3.1	-0.8	-1.1	-0.1	-1.5	-1.6	-0.5	-0.2	1.1	2.4
Ireland	3.4	3.8	2.8	3.3	9.1	4.2	7.6	9.3	5.2	8.0	0.6	1.1	2.4	5.0
Italy	-1.3	3.8	0.5	-1.8	-1.6	-1.6	-1.5	1.2	-1.6	0.6	-1.3	-0.9	1.0	-0.1
Latvia	1.0	-6.3	-3.1	2.7	2.7	1.8	0.1	-1.8	-1.1	3.7	3.3	-0.7	-4.7	-6.4
Lithuania	-1.3	3.8	-0.9	0.1	-2.8	1.0	6.3	1.3	-7.9	-3.0	1.0	2.0	0.8	1.9
Hungary	0.1	-0.2	3.1	-2.0	1.4	1.4	1.5	-2.3	-1.8	2.7	-0.9	-2.3	0.7	-4.0
Netherlands	2.2	1.2	1.0	-1.8	0.8	0.9	-0.7	1.3	3.8	1.1	-0.8	0.3	2.2	1.2
Austria	2.2	3.8	-0.3	0.6	-2.3	-0.9	-1.2	-0.6	-0.9	3.8	-0.4	0.2	0.9	0.3
Poland	3.5	-4.2	-1.0	-0.7	0.3	1.6	-0.4	-0.8	4.3	2.0	3.8	1.0	-1.3	2.6
Slovenia	-1.3	-2.5	-1.9	-0.7	0.5	-3.1	-2.5	-1.2	1.7	-3.9	3.8	1.8	-1.1	4.9
Slovak Republic	-7.0	-0.3	-1.0	3.6	-2.9	2.9	-1.6	-0.4	6.3	-3.4	-0.6	-2.9	-0.2	-4.6
Finland	-0.7	3.8	2.8	0.0	3.8	1.7	2.1	0.8	-5.7	0.0	0.1	1.9	0.6	1.6
United Kingdom	4.6	5.7	-0.2	-5.4	2.4	-0.6	0.4	0.3	-1.0	-2.1	-2.5	1.0	-0.9	-0.7

Source: IMF staff calculations.

Table 5. NMS: Employment Generation Components, 1996-2004  
(In percent)

	A: Agriculture, hunting, fishing, and forestry	C: Mining and quarrying	D: Manufacturing	E: Electricity, gas, and water supply	F: Construction	G: Wholesale and retail trade; repair of motor vehicles	H: Hotels and restaurants	I: Transport, storage, and communication	J: Financial intermediation	K: Real estate, renting and business activities	L: Public administration and defense; compulsory social security	M: Education	N: Health and social work	O: Other community, social, and personal service activities
Sectoral trends $H(i)$	-5.5	-5.8	-1.3	-2.2	1.3	1.3	1.8	-0.8	0.7	4.2	2.4	0.3	-0.5	-0.1
Country deviations $M(i, n)$														
	A	C	D	E	F	G	H	I	J	K	L	M	N	O
Czech Republic	0.8	-2.3	0.7	-1.0	-3.8	-2.3	-1.0	0.4	-1.4	-2.3	-1.8	0.5	-0.4	0.8
Estonia	-1.7	4.5	0.1	-0.3	1.8	-1.3	-2.5	-1.6	0.8	-1.6	-1.9	-0.3	0.8	-0.3
Latvia	1.6	1.3	-0.8	2.8	5.1	1.7	2.1	1.5	3.0	0.9	-1.0	-0.8	-0.7	1.7
Lithuania	-0.6	5.8	-0.5	-1.6	0.9	-0.5	4.3	0.6	-4.4	-2.7	-0.1	-0.3	-0.1	-4.1
Hungary	1.1	-2.6	1.9	-3.0	2.5	0.6	0.9	-0.3	-0.9	4.1	-1.4	-0.4	2.2	-1.0
Poland	0.7	-1.5	-1.2	0.0	-4.8	-0.4	-0.6	-1.3	-0.3	1.4	6.3	1.4	-3.6	1.6
Slovenia	2.1	-3.2	-0.4	1.3	0.3	-1.6	-1.1	1.0	1.7	1.1	1.5	1.7	1.7	2.3
Slovak Republic	-4.0	-1.9	0.2	1.6	-2.0	3.8	-2.1	-0.4	1.4	-0.9	-1.8	-1.7	0.1	-1.0
Year	1996	1997	1998	1999	2000	2001	2002	2003	2004					
Business cycle $B(t)$	0.2	0.8	0.2	0.2	-2.5	-1.1	1.8	0.1	0.4					
Sector $F(i, t)$														
A: Agriculture, hunting, fishing, and forestry	3.6	2.1	0.5	-4.0	-2.2	4.2	2.5	-5.8	-0.9					
C: Mining and quarrying	1.9	-8.5	-4.5	10.2	-5.7	-5.5	11.8	-1.7	1.8					
D: Manufacturing	-1.4	-0.1	0.4	-2.4	1.2	2.2	-1.2	1.3	0.0					
E: Electricity, gas, and water supply	1.4	6.4	-0.5	-2.0	-1.8	-1.4	-4.0	-1.3	3.2					
F: Construction	0.1	1.6	0.7	-4.4	0.2	-0.1	-5.8	5.5	2.3					
G: Wholesale and retail trade; repair of motor vehicles	1.5	0.8	-0.4	-0.7	-0.9	2.3	-1.6	-0.7	-0.2					
H: Hotels and restaurants	-0.9	1.4	-0.1	-1.5	5.3	-0.3	-1.8	-3.8	1.8					
I: Transport, storage, and communication	0.3	-1.1	0.5	1.9	0.0	-1.6	-0.5	2.1	-1.6					
J: Financial intermediation	-1.8	2.5	2.3	0.5	0.9	-6.8	2.1	0.9	-0.7					
K: Real estate, renting and business activities	-0.9	-2.0	5.6	-1.2	-0.3	-2.4	5.8	-1.3	-3.3					
L: Public administration and defense; compulsory social security	-0.5	-0.4	-1.6	-1.3	2.5	5.1	-2.0	-0.7	-1.1					
M: Education	0.0	-1.8	-0.5	0.0	2.4	2.0	-2.9	0.2	0.8					
N: Health and social work	-2.7	0.6	-0.2	-0.3	0.2	2.2	0.4	1.6	-1.7					
O: Other Community, social, and personal service activities	-0.4	-1.5	-2.0	5.1	-1.9	0.0	-2.7	3.8	-0.4					
Country-specific fluctuations $G(n, t)$														
Czech Republic	0.1	1.5	-1.9	-4.7	3.5	0.6	-0.5	0.5	0.9					
Estonia	-1.7	0.7	0.7	-2.5	1.0	-2.2	1.5	0.7	1.8					
Latvia	-1.1	-4.5	-3.7	4.4	1.2	1.9	2.1	-2.1	1.8					
Lithuania	0.3	3.1	-0.5	1.4	-11.9	-2.7	5.4	5.0	-0.1					
Hungary	-2.0	-0.9	1.3	2.7	1.7	-1.5	-1.7	0.3	0.1					
Poland	2.0	3.5	3.1	-1.9	0.5	2.5	-3.5	-4.9	-1.1					
Slovenia	-1.3	-2.3	-0.1	2.6	2.7	0.3	-0.4	0.2	-1.7					
Slovak Republic	3.6	-1.0	1.2	-1.9	1.4	1.1	-2.9	0.3	-1.8					

Source: IMF staff calculations.

82. **Sectoral effects in the NMS account for almost two-thirds of the long-run differentials across countries and industries in employment growth; this is less the case for the large group of 20 European countries.** By decomposing the variance of the time-average employment

$$e(i, n) = 1/T \sum_{t=1}^T E(i, n, t)$$

into sectoral effects,  $he(i)$ , and country-specific deviations,  $me(i, n)$ , we find that more than 60 percent of the total variation in long-term trends is explained by industry effects, which are country independent (Table 6). This would suggest that the initial employment structure played a key role in the uneven performance of aggregate employment rates. However, this becomes less of a factor in the larger group of European countries, where approximately half of the total variation in trends is explained by industry-specific factors and half by country-specific deviations (Table 7). Also different is the picture regarding the relevance of the components of short-term variability explained by the model for the smaller and the larger groups of countries. When only the NMS are considered, the international business cycle effects account for 8 percent of the total short-term variability ( $be(t)$ ), while the temporary industry-specific effects account for 50 percent ( $fe(i, t)$ ), and the country-specific effects account for 42 percent ( $ge(n, t)$ ). For the larger group of EU countries, the business cycle effects appear to be even less relevant, while the country-specific effects account for almost two-thirds of the short-term variability explained by the model.

Table 6. NMS: Analysis of Variations, 1996-2004

	Long-Run Variations		Short-Run Variations	
	Percent Explained By		Percent Explained By	
Employment	$e(i, n)$	100	$efl$	100
	$he(i)$	62	$be(t)$	8
	$me(i, n)$	38	$fe(i, t)$	50
			$ge(n, t)$	42

Source: IMF staff calculations.

Table 7. 20 EU Countries: Analysis of Variations, 1996-2004

	Long-Run Variations		Short-Run Variations	
	Percent Explained By		Percent Explained By	
Employment	$e(i, n)$	100	$efl$	100
	$he(i)$	52	$be(t)$	3
	$me(i, n)$	48	$fe(i, t)$	35
			$ge(n, t)$	61

Source: IMF staff calculations.

83. **Among the 20 European countries, Hungary's employment performance has been relatively good.** The country-specific deviations of employment growth from the long-term sectoral trends are shown in Table 4 (matrix  $M(i,n)$ ). Among the NMS, Hungary has been one of the best performers, with manufacturing, construction, and real estate and business activities generating substantially more employment than the European average. However, in the larger group of countries, Ireland and Spain have been by far the best performers, having generated more employment than average in all sectors. The Czech Republic appears to have had the worst employment generation performance. Hungary, meanwhile, compared with its virtual path by sector (Figure 5), has outperformed in all sectors in employment generation since 1998, with the exception of agriculture, in which it has performed in line with its virtual expectations.

84. **Hungary's relatively good employment generation is partly explained by its favorable initial employment distribution across sectors.** A comparison of employment allocation across sectors in the NMS in 1995 shows that Hungarian employment in agriculture, the sector where the greatest decline in employment occurred, was small relative to total employment (Table 8). This favorable employment structure reflects in part Hungary's status as one of the first economic reformers among the NMS: it began reallocating labor from agriculture to other sectors, in particular services, earlier than the other countries.

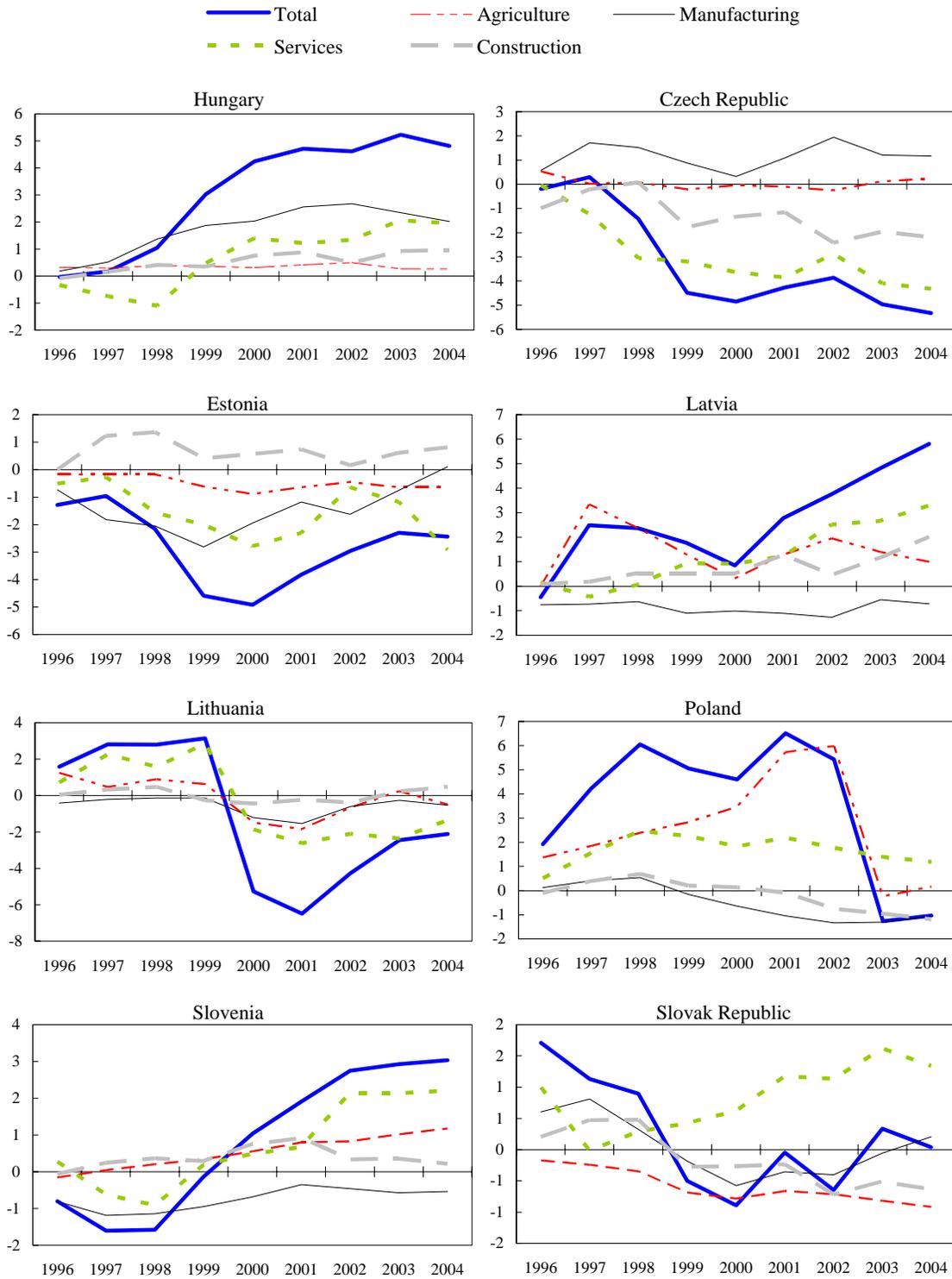
Table 8. NMS: Employment Allocation, 1995  
(In percent of total employment)

	Agriculture	Manufacturing	Services 1/	Construction	Mining	Electricity
Czech Republic	6.0	26.4	54.1	10.1	1.8	1.6
Estonia	10.2	24.7	55.9	5.4	1.4	2.4
Latvia	17.7	20.4	54.8	4.9	0.3	1.8
Lithuania	24.1	18.6	48.6	5.8	0.2	2.6
<b>Hungary</b>	8.2	23.5	58.7	6.0	0.9	2.7
Poland	26.1	21.1	42.7	5.7	2.5	1.9
Slovenia	14.3	31.2	45.9	6.3	1.0	1.4
Slovak Republic	8.9	27.4	53.9	6.9	0.9	1.9

Sources: Eurostat; and country yearbooks.

1/ Includes wholesale and retail trade, repair of motor vehicles, motorcycles, and personal and household goods; hotels and restaurants; transport, storage, and communication; financial intermediation; real estate, renting and business activities; public administration and defense, and compulsory social security; education; health and social work; and other community, social and personal service activities.

Figure 5. NMS: Employment Growth Relative to Virtual Employment Growth by Industry, Using NMS Benchmark, 1996-2004 1/



Source: IMF staff calculations.

1/ Benchmarks are constructed from the New Member States of the EU, excluding Cyprus and Malta.

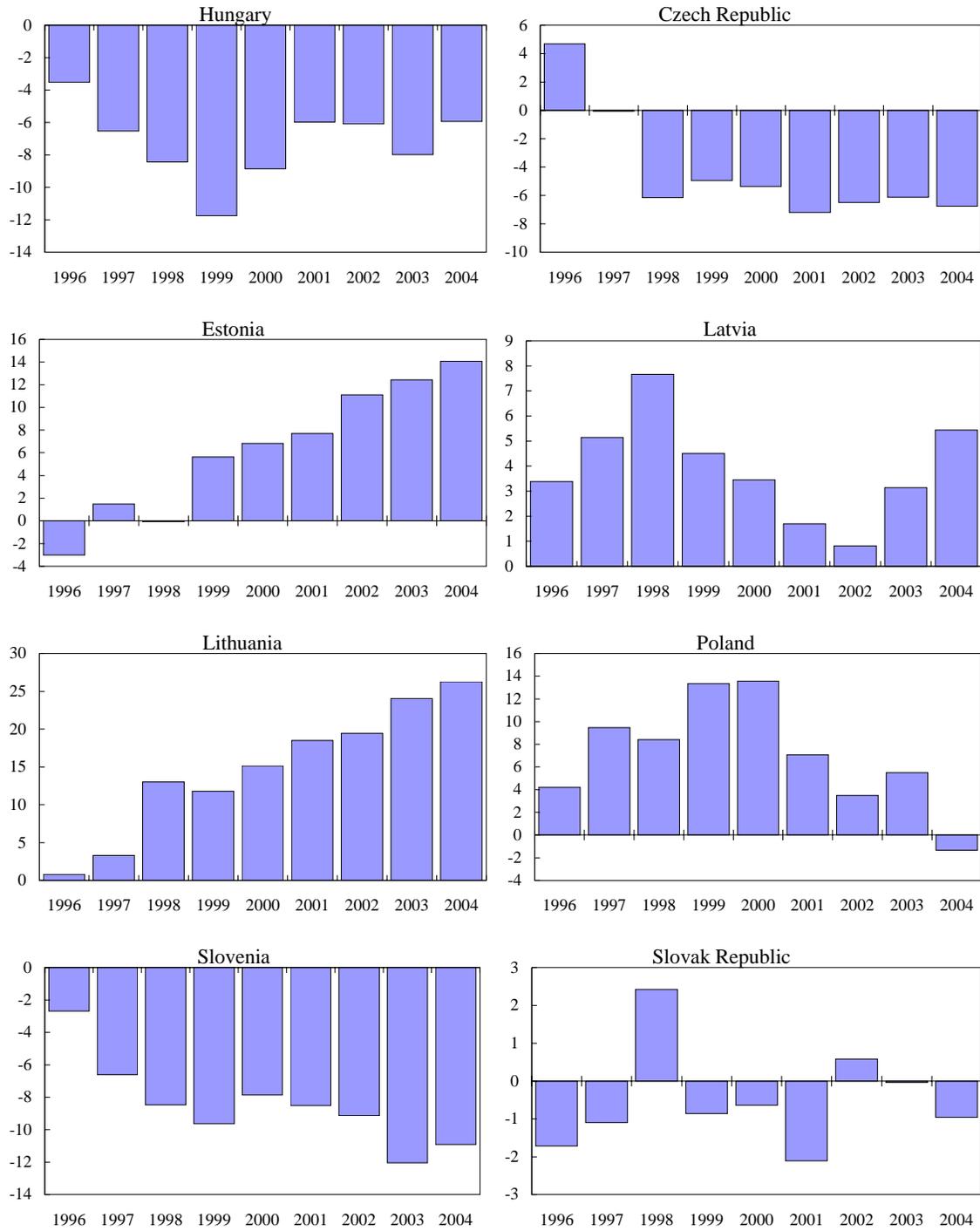
85. **The sharp decline in Hungary's real labor costs in the second half of the 1990s and the relatively good real GDP performance may have also helped employment generation.** Real labor costs appear to have been lower than the virtual real costs, in particular toward the end of the 1990s, reflecting the impact of the 1995-97 stabilization package. This was followed by a period of positive but low growth rates of real earnings (1998-2000) (Figures 6 and 7).<sup>61</sup> The contained real labor costs, together with relatively good real GDP growth, as shown by the deviations from their virtual path (Figures 6 and 7, and Figures 3 and 4), appear to have helped employment generation.

86. **Panel regression results confirm that real labor costs per employee and real GDP are key determinants of the employment rate for the NMS.** Table 9 shows the results of regressing the country-specific component of the employment rate on the country-specific components of real labor costs per employee and real GDP, using a fixed-effects estimator. Both these latter variables present the expected sign and are highly significant, suggesting that lower labor costs and higher GDP growth would favor labor generation. Fitted values are presented in Table 10.

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<sup>61</sup> See Fazekas and Varga (2005) for an overview of different trend periods of the Hungarian economy.

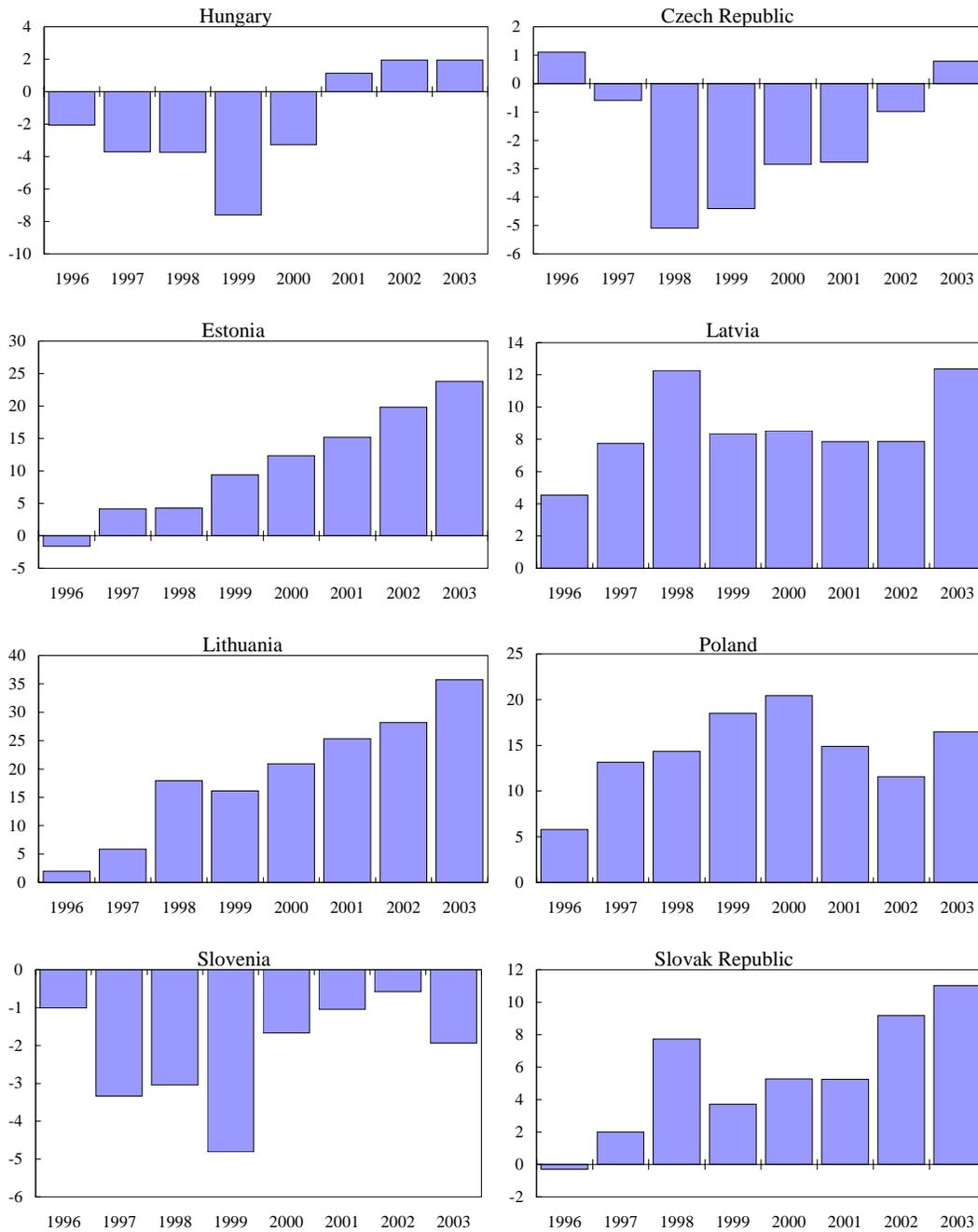
Figure 6. NMS: Growth of Real Labor Costs per Employee Relative to Virtual Growth of Real Labor Costs per Employee, Using NMS Benchmark, 1996-2004 1/



Sources: Eurostat; country yearbooks; and IMF staff calculations.

1/ Benchmark constructed from the New Member States of the EU. Cyprus and Malta are not included.

Figure 7. NMS: Growth of Real Labor Costs per Employee Relative to Virtual Growth of Real Labor Costs per Employee, Using EU Benchmark, 1996-2003 1/



Sources: Eurostat; OECD STAN database; country yearbooks; and IMF staff calculations.

1/ Benchmark constructed from 18 EU countries. The 18 countries are the EU-15, excluding Ireland, Luxembourg, Portugal, Sweden, and the United Kingdom, and the new EU-10, excluding Cyprus and Malta.

Table 9. NMS: Explaining the Country-Specific Component of Employment,  
Evidence from Panel Data Regressions (Fixed Effects)

	(1)	(2)	(3)	(4)	(5)	(6)
Real unit labor cost per employee 1/	-2.05** (0.78)	-2.92*** (0.78)	-2.35*** (0.78)	-2.95*** (0.78)	-2.4*** (0.78)	-0.91 (0.96)
Real GDP 1/		0.0003*** (0.0001)	0.0004*** (0.0001)	0.0003*** (0.0001)	0.0003*** (0.0001)	0.0004*** (0.0001)
Tax wedge			-0.67** (0.26)		-0.65* (0.26)	-0.87* (0.27)
Unit value ratio				-2.20 (1.96)	-1.80 (1.88)	
Real effective exchange rate						-1.33** (0.56)
$R^2$	0.12	0.25	0.33	0.27	0.34	0.40

Source: IMF staff estimates.

Notes: Standard errors are in parentheses, \* significant at 10 percent; \*\* significant at 5 percent; \*\*\* significant at 1 percent.  
1/ The regression is performed on the country-specific component of the variable.

Table 10. NMS: Employment Generation, 1996-2004  
(In percent of total population 15-64 years old)

	Actual	Country-Specific Component	Predict		
			(1)	(2)	(3)
Czech Republic	-5.7	-5.9	-2.2	-2.5	-3.3
Estonia	-1.3	-0.1	-1.4	0.3	-1.8
Latvia	1.0	6.5	-1.8	0.1	-0.9
Lithuania	-8.7	-1.9	-3.7	-4.6	-3.0
Hungary	4.6	4.9	3.1	1.5	2.7
Poland	-10.6	-4.6	-5.7	-5.6	-5.5
Slovenia	1.7	2.2	5.6	5.5	5.9
Slovak Republic	-4.3	-6.9	0.4	-0.6	0.1

Sources: Eurostat; country yearbooks; and IMF staff calculations;

Notes: (1) results from fixed effects considering real labor costs per employee, real GDP, and the tax wedge.  
(2) Results from fixed effects considering real labor costs per employee, real GDP, the tax wedge, and the real effective exchange rate. (3) Results from fixed effects considering real labor costs per employee, real GDP, the tax wedge, and the unit value ratio.

**87. The tax wedge and the real effective exchange rate are also important determinants of the employment rate.** The coefficient of the tax wedge is negative and statistically significant and appears to be robust across specifications (Table 9), suggesting that lowering the tax wedge favors employment generation. This is particularly relevant for Hungary, which, although it has decreased, has one of the widest tax wedges among the NMS (Table 11). Lowering the tax wedge should reduce employee costs and help generate employment. The real effective exchange rate is also a relevant determinant (Table 9), suggesting that a depreciation of the real effective exchange rate would improve competitiveness and help employment creation.

Table 11. NMS: Tax Wedge, 1996-2004 1/  
(In percent)

	1996	2000	2004
Czech Republic	41.4	41.6	41.9
Estonia	38.5	38.2	38.9
Latvia	39.3	41.4	41.1
Lithuania	37.6	42.0	40.0
Hungary	46.8	46.2	41.5
Poland	43.6	41.9	41.9
Slovenia	40.9	41.0	39.8
Slovak Republic	40.3	39.6	38.8

Source: Eurostat.

1/ The tax wedge on the labor cost measures the relative tax burden for an employed person with low earnings.

88. **Although it presents the expected sign, technological upgrading does not appear to be statistically significant.** Higher product technology (or higher product quality), proxied by the unit value ratio presents the right sign, suggesting that upgrading the production structure with higher technology would reduce employment generation. However, trade specialization does not appear to be statistically significant. In the context of Hungary, this would be in line with the firm-level results of Köllő (2006), who shows that there is no straightforward linkage between product quality and the skill composition of the labor force manufacturing the product. In particular, he shows that the labor demand effects of trade specialization in the late stage of the transition were not necessarily detrimental to low-skilled labor, which is the group that would be expected to have suffered most from technological upgrading. Since our sample period covers mostly the late stage of the transition, our results would not contradict the presumption that the rapid shift of the Hungarian output structure to relatively skill-intensive activities lowered the demand for unskilled workers, at least in the initial phase of the process.

89. **The robustness of these results is confirmed when the analysis is performed on country-specific employment growth at the industry level; however, some differences across sectors emerge.** Regressions for the 14 NACE sectors of the eight NMS, for the period 1997-2004, confirm that the country-specific growth rate of the labor costs and of real GDP, the changes in the tax wedge, and the real effective exchange rate are relevant for

explaining the country-component of employment generation<sup>62</sup> (Table 12). However, changes in real labor costs and real GDP growth appear to have the largest effects on sectors such as construction, business activities, and health.<sup>63</sup> The tax wedge, meanwhile, seems equally relevant for all sectors.

Table 12. NMS: Explaining the Country-Specific Component of Employment at Sectoral Level, Evidence from Panel Data Regressions (Fixed Effects) 1/

	All Sectors		G-E-J-H	F-K-L-N-O	A-D	G-I-M
$\Delta$ logarithms of real unit labor cost per employee 1/	-0.44*** (0.02)	-0.45*** (0.02)	-0.35*** (0.05)	-0.58*** (0.03)	-0.45*** (0.09)	-0.45*** (0.05)
$\Delta$ logarithms of real GDP 2/	0.45*** (0.03)	0.48*** (0.03)	0.39*** (0.05)	0.62*** (0.04)	0.45*** (0.09)	0.48*** (0.06)
$\Delta$ Tax wedge	-0.30*** (0.04)	-0.33*** (0.04)	-0.34*** (0.08)	-0.32*** (0.06)	-0.32*** (0.10)	-0.32*** (0.08)
Real effective exchange rate		-0.0005*** (0.0001)	-0.0005* (0.0003)	-0.0007*** (0.0002)	-0.0005 (0.0003)	-0.0005* (0.0003)
$R^2$	0.35	0.37	0.25	0.52	0.31	0.37

Source: IMF staff estimates.

Notes: Standard errors are in parentheses, \* significant at 10 percent; \*\* significant at 5 percent; \*\*\* significant at 1 percent.

1/ Sectors A-O defined in para. 6.

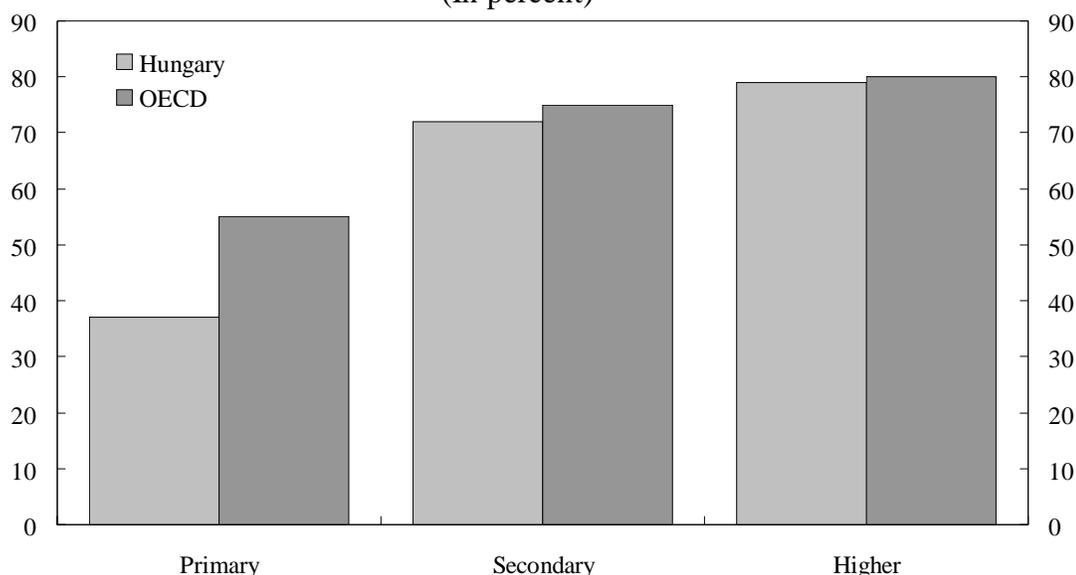
2/ The regression is performed on the country-specific component of the variable.

90. **Other researchers have found education to be an important factor for employment generation.** As observed by Commander, Köllő, and Tolstopiatenko (2004), while in general minimally educated workers flow in and out of low-wage unstable jobs with relative short periods of unemployment between jobs, in central Europe the large majority of the minimally educated remains unemployed for protracted periods. This phenomenon appears particularly severe in Hungary, where the employment ratio is very low among workers with only primary education (Figure 8).

<sup>62</sup> The analysis at the sectoral level was performed using the real effective exchange rate index and the differences of the logarithms of the country-specific components of the employment rate, of the country-specific components of the unit labor costs per employee, of the country-specific components of real GDP, and of the tax wedge.

<sup>63</sup> The sectors in Table 11 have been clustered on the basis of the magnitude of the coefficients of real labor cost changes and real GDP growth.

Figure 8. Hungary: Employment-Population Ratios by Education, 2002  
(In percent)



Source: OECD (2005b).

91. **Similarly, structural factors and labor institutions have also been found to be key determinants of employment.** Focusing on faster-growing sectors, such as services, for the OECD countries, Messina (2005) finds evidence that laws and institutions, such as product and labor market regulations, hamper the expansion of services employment. Pierre and Scarpetta (2006) show that strict employment protection regulations can have negative effects on job creation because they weaken a firm's ability to take advantage of the opportunities offered by new technologies and the access to new markets, which often require a change in the skill composition of the workforce. While Hungary does not stand out for the strictness of its labor regulations, at least among the NMS (Table 13), the welfare system—in particular, the disability pension—is quite generous (Table 14), and both men and women have dropped out of the labor force to take advantage of the system (Figure 9). The number of benefit recipients has grown massively over the past decade, as the number of disability benefits awarded to those below the standard age of retirement has increased to over 10 percent of the working-age population since the early 1990s (OECD, 2005a). In this context, Cseres-Gergely (2006), based on a model of retirement decision, presents evidence that incentives provided by the pension system, especially the disability pension, make retirement very attractive, thereby reducing the labor supply.

Table 13. NMS: Indicators of the Strictness of Employment Regulation, 2005  
(Scale: 0-100, with 100 the most restrictive)

	Difficulty of Hiring Index	Rigidity of Hiring Index	Difficulty of Firing Index	Overall Rigidity of Employment Index	Hiring Costs (Percent of salary)	Firing Costs (Weeks of wages)
Czech Republic	33.0	20.0	20.0	24.0	37.0	21.6
Estonia	33.0	80.0	40.0	51.0	33.0	33.2
Hungary	11.0	80.0	20.0	37.0	33.5	33.5
Latvia	67.0	40.0	70.0	59.0	22.4	17.0
Lithuania	33.0	60.0	40.0	44.0	28.0	33.8
Poland	11.0	60.0	40.0	37.0	25.8	24.9
Slovenia	61.0	80.0	50.0	64.0	16.6	43.0
Slovak Republic	17.0	17.0	17.0	17.0	17.0	17.0

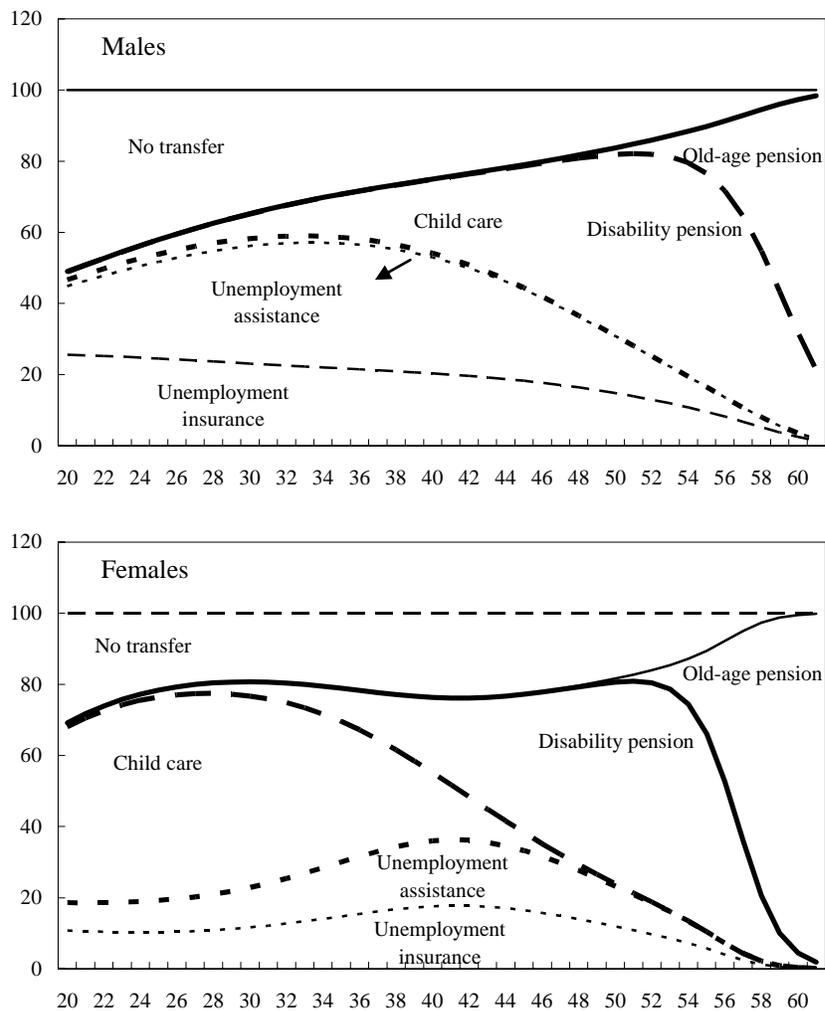
Source: <http://rru.worldbank.org/DoingBusiness/ExploreTopics/HiringFiringWorkers>.

Table 14. NMS: Welfare Indicators, 2003  
(In percent of GDP)

Social Protection	Total
Invalidity	
Czech Republic	1.6
Estonia	1.2
Latvia	1.1
Lithuania	1.3
Hungary	2.2
Poland	2.6
Slovenia	2.0
Slovak Republic	1.6
Total	
Czech Republic	19.8
Estonia	13.2
Latvia	13.1
Lithuania	13.1
Hungary	21.0
Poland	21.3
Slovenia	24.0
Slovak Republic	17.8

Source: Eurostat.

Figure 9. Hungary: Distribution of Transfers to Nonemployed Persons, by Age and Transfer Status, 2001  
(In percent of transfers, by gender)



Source: Hungarian Labor Force Survey.

## E. Conclusions

92. **Employment generation in the NMS has been relatively poor over the last decade, but this has been less so for Hungary.** By analyzing the sectoral, country, and temporal effects of employment generation, this chapter finds that while the NMS are converging in real economic terms, employment generation is lagging. This is partly due to the unfavorable initial allocation of resources and the production structure, but also to country-specific factors. In this context, Hungary did better than the predicted level based on the average for the new and old member states of the EU across all sectors, in particular services, since 1998. This good performance was helped by the country's relatively favorable initial resource distribution, as Hungary had reformed its economic structure, shifting away from agriculture to services, earlier than other NMS. The sharp decrease in real costs per

employee after 1995 and the respectable economic performance have given a fillip to employment generation over the last decade. However the employment rate remains among the lowest in Europe.

93. **Several factors can explain employment dynamics.** Lower real labor costs and good real GDP growth favor employment generation. At the same time, a widening tax wedge and an appreciating real effective exchange rate are detrimental to employment. The findings of other studies with a specific focus on the Hungarian labor market indicate that education and welfare system—in particular the disability pension—are also crucial factors for labor creation.

94. **Based on these findings, three relevant policy areas can be identified for Hungary.** The tax wedge is wide, and lowering it should reduce employee costs and help employment generation. In this context, the recently approved fiscal package, which relies heavily on increasing labor and capital taxation, goes in the opposite direction: there is a risk that the contemplated taxes may not be sustainable if they reduce competitiveness, slow economic growth, and worsen employment prospects. Instead, reforms in areas such as the welfare system, in particular the disability pension, would create incentives for people to remain active in the labor market, while helping restore public finances. Finally, a greater effort to raise the productivity of unskilled workers and maintain the economic relevance of higher education must be priorities.

## Appendix. Decomposing the Evolution of Employment

### The statistical model

Employment in sector  $i$  and country  $n$  and in is decomposed as the sum of the following components:

$$E(i, n, t) = H(i) + M(i, n) + B(t) + F(i, t) + G(n, t) + u(i, n, t), \quad (1)$$

for sector  $i=1,2,\dots,I$ , country  $n=1,2,\dots,N$  and time  $t=1,2,\dots,T$ ,

where

- $E(i, n, t)$  represents the growth rate of total employment in sector  $i$  in country  $n$  at time  $t$ .
- $H(i)$  represents the sectoral trends of employment growth. More precisely,  $H(i_a)$  is the unweighted overall mean over the yearly average employment growth rates in industry  $i_a$ .
- $M(i, n)$  is a time-invariant effect specific to sector  $i$  and country  $n$ . It gives the differences between country-specific employment trends in industry  $i$  and the average across the country rate for the same industry:  

$$M(i_a, n) = 1/T \left( \sum_{t=1}^T (E(i_a, n, t) - H(i_a)) \right).$$
- $B(t)$  is a pure time effect shared by all countries and all sectors. This effect is assumed to average zero over time.
- $F(i, t)$  gives the deviations across time from  $H(i)$  and deviations across sectors from  $B(t)$ .
- $G(n, t)$  represents the interaction of a specific country and a time effect  $B(t)$ .
- $u(i, n, t)$  is an idiosyncratic error term orthogonal to all other effects.

In order to be able to identify model (A1), the following assumptions are made:

$$\begin{aligned} \sum_{n=1}^N M(i, n) &= 0, \quad i=1,\dots,I, \quad \sum_{i=1}^I F(i, t) = 0, \quad t=1,\dots,T, \\ \sum_{t=1}^T F(i, t) &= 0, \quad i=1,\dots,I, \quad \sum_{n=1}^N G(n, t) = 0, \quad t=1,\dots,T, \text{ and} \\ \sum_{t=1}^T G(n, t) &= 0, \quad n=1,\dots,N, \quad \sum_{t=1}^T B(t) = 0. \end{aligned}$$

This gives a set of  $2T \times 2I \times 2N + 1$  restrictions, of which all but two are independent. This guarantees exact identification of the model. These restrictions make all components orthogonal.

The model is estimated using a dummy variable regression method for a panel data of employment growth rates.

### **Virtual economies**

By filtering out of the actual series all country-specific effects, a series, called “virtual” employment, is constructed. This means to set the country-specific effects equal to zero:

$$M(i, n) = G(n, t) = u(i, n, t) = 0.$$

The virtual employment of a specific industry, country, and year is the level of employment obtained by taking, as initial condition, the actual level of employment at the beginning of the period and applying to it, up to the end of the sample period, the sequence of growth factors that do not represent country-specific effects.

The virtual employment of industry  $i$ , country  $n$ , and year  $T$  is the level of employment obtained taking as initial condition the actual level at time  $t_0$  and applying to it, up to year  $T$ , this sequence of growth factors:

$$E_{\text{virtual}}(i, t) = H(i) + B(t) + F(i, t).$$

Since different activities generate (destroy) employment at different rates, a crucial determinant of the evolution of aggregate employment is the initial distribution of employment across industries.

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