Financial Convergence in Transition Economies: EU Enlargement

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ABSTRACT: This paper analyzes the financial effect of the enlargement of the European Union (EU) to include ten new Central and East European countries (CEECs) on firms’ business and financial structures. We employ quantitative analytic techniques and financial ratios to discover whether firms in the new EU member states tend to converge with businesses in the EU-15 in terms of the structure of their financial statements. We examine the extent to which the increasing integration of the former may foster the convergence of productive structures. We analyze the evolution of twelve financial ratios in a sample of firms obtained from the AMADEUS database, performing a dynamic factor analysis that identifies the determining factors of the joint evolution of deviations in financial ratios from the average values of EU-15 firms. This allows us to analyze the convergence in each of the CEECs toward the EU-15.

KEY WORDS: Bayesian inference, dynamic factor analysis, EU enlargement, financial convergence, financial ratios, financial structure.

In May 2004, ten new countries, including eight in Central and Eastern Europe as well as Malta and Cyprus, joined in the largest of the EU enlargements. These new EU members were obliged to walk a hard road throughout the 1990s before finally joining. The fall of the former Soviet Union, and with it, the demise of the planned economy, enabled the countries of Central and Eastern Europe to embark upon the transition to a market economy, resulting in the privatization of state firms and a gradual approach to the European Union. This paper considers the period 1998–2004, the years in which the process of privatization and convergence with the EU economy was consolidated.

Numerous studies have analyzed the transition of the new member states toward being market economies. Initially, the proximity and European vocation of the candidate countries suggested that convergence with the fifteen member states of the European Union—the EU-15—would be swift, and these studies therefore focused on integration processes, which at that time took the form of institutional agreements and accession negotiations (Grosfeld and Roland 1997). Current research is concerned mainly with enlargement and its consequences, as political and institutional integration has now become a reality (Deliktas and Balciar 2005; Sohinger 2005).

The countries’ integration into the European Union is observable in the degree of convergence in their firms’ productive structures and, thus, in the competence and capacity of these structures to adjust to activity in the European single market (Rivaud-Danset et al. 2005). The degree of approximation in companies’ financial structures is important because it shows the path that companies in the accession countries will need to walk to
achieve financial structures similar to those of firms in the EU-15. This concept of proximity suggests an idea of financial convergence in the structures of companies’ financial statements, which is used in this paper.

Factors specific to each country can determine the financial structures of local companies. Some studies have looked at international differences in capital structures (Aggarwal 1981; Park 1998; Rajan and Zingales 1995). Others address differences in the financial structures of companies in the European Union (Prasad et al. 1996). The results obtained are mixed in identifying consistent differences among countries. This is because the studies performed observe differences in structures from country to country, though this may be due more to the factors determining firms’ own capital structure than to differences among countries. Furthermore, some hypotheses fail to explain variations among countries’ capital structures, though studies show that national differences in the financial structures of companies are due to attitudes toward indebtedness, differences in the development of the banking system, different tax systems, and other local economic and social differences (Hall et al. 2004).

In light of previous studies, we depart from the hypothesis that the speed of convergence achieved by companies in each Central and East European country (CEEC) will be determined by the characteristics of each country’s political and economic system. Rather, we posit that the movement of financial ratios is affected by the legislation governing corporate progress. Thus, labor legislation in each country influences the evolution of wage costs. Likewise, profit ratios are affected by the local tax system, as well as by the evolution of interest rates, as they tend toward the European average. A positive evolution in these factors orients the new EU countries toward economic convergence and allows an increase in corporate profits (Landesmann and Stehrer 2000). Supposedly, those countries displaying significant improvement in their financial indicators gain advantages in the location of international investment projects, especially those using the receiving country primarily as a production and export center.

To address such concerns, we perform a statistical analysis of the joint evolution of ratios via a dynamic factor analysis based on accounting data from European firms, obtained from the balance sheets and income statements contained in the AMADEUS database. Given the small sample size available by series (at most, seven observations per series), missing data, and different periods of observations for each country and analyzed ratio (see below), we use a Bayesian approach to estimate the parameters of the model, allowing us to make exact inferences using Markov chain Monte Carlo (MCMC) methods (see, e.g., Robert and Casella 2004). We identify three factors—productivity, indebtedness, and returns versus cost of debt—that synthesize the joint evolution of the ratios over the period of study. Using this information, we examine the gaps between the ratios of each of the new member states and European average ratios. The results reveal that convergence between the new EU countries and the EU-15 is still a long way off in the financial structures of their firms. Only the ratios related to returns versus cost of debt exhibit some approximation of EU-15 values at the end of the period analyzed. This process has been driven largely by falling interest rates, which have benefited Central and East European enterprises. The other ratios analyzed, which are related to productivity and indebtedness, show scant signs of convergence because of the structural differences in the economic systems of the CEECs, where labor regulation, the situation of the financial system, and tax reform prevent firms from catching up.

The differences may be relevant for the purposes of deciding the moment at which the countries analyzed should join the European Monetary Union (EMU). Entry criteria
and requirements were established in Maastricht and were associated with the optimum currency areas (OCA) researched by Mundell (1961), McKinnon (1963), and Kenen (1969). Compliance was considered necessary to ensure that countries seeking EMU entry would have sufficient characteristics in common to facilitate the process. One of these characteristics was to have enough business cycle synchronization with other member states. As Eickmeier and Breitung argue, “If business cycles are not synchronized among countries, possibly as a result of asymmetric shocks or differences in the transmission of common shocks due to differences in economic structures and policies, forming a monetary union could be costly” (2006, p. 539). In our opinion, this synchronization would be facilitated by prior convergence in firms’ financial structures. Our results show that such convergence has not yet been achieved, especially in the areas of productivity and indebtedness. Thus, the countries analyzed should seek to improve their legal and financial systems.

Data

The information utilized in this study is drawn from AMADEUS, a pan-European database containing financial information on European companies. AMADEUS contains harmonized annual financial figures for firms in the twenty-five EU member states in 2004, and information on over 140,000 large firms for the years 1998–2004. AMADEUS has improved its extensive coverage of firms over this period, which also coincides with the privatization processes undertaken by the new member states in the early 1990s. We include only large privately owned firms in this analysis because AMADEUS’s coverage of small and medium-sized firms (SMEs) in Central and Eastern Europe varies depending on country-level filing requirements.

The database contains 95 percent of all companies in each country complying with one of the following inclusion criteria: operating revenue equals at least 15 million euros for the United Kingdom, Germany, France, Italy, or Spain, and equals at least 10 million euros for all other countries; total assets equal at least 30 million euros for the former countries and at least 20 million euros for all other countries; and the number of employees equals at least 200 for the four countries mentioned and at least 150 for all other countries. Table 1 presents the number of firms analyzed in each country and certain key figures regarding size. We account for all sectors except financial intermediation, classification J in the Classification of Economic Activities in the European Community (NACE).

Although financial reporting standards differ between EU countries, uniformity is achieved by standardization of accounting information, enabling easy cross-border analysis. The standardized data are received from a number of providers across Europe, allowing us to use information about both the EU-15 and the eight CEECs. The local source for this data is the local companies register, which requires all firms to submit annual filings. The database includes firm-level accounting data in standardized financial format, comprising twenty-two balance sheet items and twenty-two income statement items, as well as ratios and other financial profiles. We construct our own ratios from the standardized items from the balance sheet and income statement.

Table 2 defines the ratios employed, which are those used by the European Commission’s directorate general for economic and financial affairs in its annual report on the financial situation of European enterprises. The ratios measure various matters related to firms’ activities, such as returns (ratios R1 to R3), the cost of debt (ratios R4 to R5), productivity (ratios R6 to R9), and the level and structure of indebtedness (ratios R10 to R12).
In choosing this group of ratios, we analyze the same financial variables as the European Union for studies of a similar nature, published on a regular basis, to obtain results on the convergence of business structures as a result of the development of the single market. We also considered it best to use a set of ratios that had been tested in earlier research focusing on the financial aspects of European convergence.

Existing papers show that these ratios are key indicators for the evolution of industrial firms (see European Commission 1995, 1997, 1998, 2001). A similar group of ratios, utilized in multivariate studies of the European economy based on the analysis of financial statements (Gallizo and Salvador 2002; Serrano et al. 2002, 2005), has served as the basis for comparison between the financial structures of SMEs and large firms in the EU (Rivaud-Danset et al. 2001, 2005).

### Table 1. Description of firms

| Country         | Number of firms | Mean turnover (thousands of euros) | Mean assets (thousands of euros) |
|-----------------|-----------------|----------------------------------|----------------------------------|
| Czech Republic  | 4,289           | 37,495.62                        | 34,068.71                        |
| Estonia         | 583             | 30,526.80                        | 27,657.19                        |
| Hungary         | 2,052           | 81,164.82                        | 45,881.95                        |
| Latvia          | 612             | 19,937.26                        | 16,317.40                        |
| Lithuania       | 745             | 23,173.60                        | 23,231.81                        |
| Poland          | 6,570           | 43,256.83                        | 38,580.35                        |
| Slovakia        | 1,041           | 42,233.85                        | 40,118.52                        |
| Slovenia        | 506             | 62,416.98                        | 78,004.68                        |
| EU–15           | 123,970         | 180,172.28                       | 223,579.35                       |
| Total           | 140,368         |                                  |                                  |

### Table 2. Ratios analyzed

| Ratio | Denomination                                    | Meaning                                                                 |
|-------|-------------------------------------------------|-------------------------------------------------------------------------|
| R1    | Return on assets, ROA                           | EBIT to total assets                                                    |
| R2    | Return on sales, ROS                            | EBIT to net sales                                                       |
| R3    | Return on equity, ROE                           | Profit or loss for the financial year to equity capital                 |
| R4    | Relative share of financial charges             | Financial charges on net turnover                                       |
| R5    | Apparent rate of interest on financial debt     | Ratio of interest charges to debt owed to credit institutions           |
| R6    | Value-added ratio, VAR                          | Value added (operating income – cost of materials) to net sales          |
| R7    | Relative share of purchases                     | Consumption of goods and services to net sales                          |
| R8    | Relative share of staff costs                   | Staff costs to net sales                                                |
| R9    | Staff costs relative to value added             | Staff costs to value added (operating income – cost of materials)       |
| R10   | Gearing                                         | Ratio of long- and short-term debt to total assets                      |
| R11   | Financial indebtedness                         | Ratio of financial debt to total balance                                |
| R12   | Debt structure                                  | Ratio of total noncurrent liabilities to total debt                     |

*Source:* European Commission (2001).

*Note:* EBIT = Earnings Before Interest and Taxes
The data selected comprise average financial ratios values for each of the new CEEC members (i.e., excluding Malta and Cyprus) in each year. The values were calculated by aggregating the various lines of the balance sheet for firms in each country and year based on the figures obtained from the AMADEUS database. Table 3 shows the period analyzed for each country and ratio. Certain data are missing for various ratios and countries. No reliable information was available for Hungary on the cost of goods sold and the cost of employees, necessary for calculating ratios R6 to R9. For Lithuania, Slovenia, and Slovakia, no breakdowns of expenses—financial expenses, cost of goods sold, and employee costs—were available. Finally, there was no detailed data on the structure of debt for Slovenia.

The missing data and the relative scarcity of data for the series and countries considered mean that a classic analysis of observed data based on asymptotic results would be difficult, if not impossible, to justify in this context. To solve this problem, we adopt a statistical Bayesian methodology, described in the following section.

Dynamic Factor Analysis

This section presents the model to analyze the convergence of firms’ financial structures through an analysis of the overall evolution of financial ratios. We perform a dynamic analysis of deviations in the ratios for each country as compared to the average values in the countries of the EU-15, seeking to establish the common factors underlying developments, which allow us to describe the situation in more parsimonious and intelligible terms. The statistical Bayesian methodology used to estimate the parameters of the model is also briefly described. Mathematical details are given in Gallizo et al. (2009).

Setting Up the Problem

Let \( \{ R_i; i = 1, \ldots, p \} \) be the financial ratios analyzed, \( N \) the number of countries, and \( T \) the length of the period considered in the study. Our data set is given by

\[
\{ d_{i,j,t} = R_{i,j,t} - R_{EU,i,j}; t = t_{\text{min},j}, \ldots, t_{\text{max},j}; j \in J_i \subseteq \{1, \ldots, N\}; i = 1, \ldots, p \},
\]

where \( R_{i,j,t} \) is the value of the ratio \( R_i \) corresponding to the \( j \)th country in the period \( t \); \( R_{EU,i,j} \) is the value of ratio \( R_i \) corresponding to the EU firms in the period \( t \); \( J_i \) is the set of countries with observed data of the ratio \( R_i \); and \( T_{i,j} \) is \( \{ t_{\text{min},i}, t_{\text{min},i} + 1, \ldots, t_{\text{max},i} \} \) with \( 1 \leq t_{\text{min},i} < t_{\text{max},i} \leq T \), the observation’s period of ratio \( R \) corresponding to the \( j \)th country.

In our case, \( p = 14 \), \( N = 8 \) (Czech, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia), and \( T = 7 \), where \( t = 1 \) corresponds to year 1998, \( t = 2 \) to year 1999, and so on.

The Model

Our model is a dynamic factor analysis model with \( K \) factors, given by

\[
d_{i,j,t} = \alpha_i + \beta_{i,j} f^{(j)}_{i,t} + \epsilon_{i,j,t} \quad \text{with} \quad \epsilon_{i,j,t} = N(0, \sigma^2_{i,t})
\]

\[
i \in I_k = \left\{ i_{k,1}, \ldots, i_{k,p_k} \right\} \subseteq \{1, \ldots, p\}; j \in J_i \subseteq \{1, \ldots, N\}; k = 1, \ldots, K
\]
Table 3. Period analyzed for each country and each ratio

| Ratio/country | Czech Republic | Estonia | Hungary | Latvia | Lithuania | Poland | Slovenia | Slovakia |
|---------------|----------------|---------|---------|--------|-----------|--------|----------|----------|
| R1            | 98–04          | 98–04   | 98–04   | 98–04  | 98–04     | 98–04  | 98–04    | 98–04    |
| R2            | 98–04          | 98–03   | 98–04   | 98–04  | 98–04     | 98–04  | 98–04    | —        |
| R3            | 98–04          | 98–04   | 98–04   | 98–04  | 98–04     | 98–04  | 98–04    | 98–04    |
| R4            | 98–04          | 98–03   | 98–04   | 00–04  | —         | 98–04  | 98–04    | 98–04    |
| R5            | 98–04          | 98–03   | 98–04   | 00–04  | —         | 98–04  | —        | 98–03    |
| R6            | 98–04          | 98–04   | —       | 98–04  | 98–04     | 98–04  | 98–04    | 98–04    |
| R7            | 98–04          | 98–04   | —       | 98–04  | 98–04     | 98–04  | 98–04    | 98–04    |
| R8            | 98–04          | 98–03   | —       | 98–04  | 98–04     | 98–04  | —        | 98–03    |
| R9            | 98–04          | 98–03   | —       | 98–04  | 98–04     | 98–04  | 98–04    | —        |
| R10           | 98–04          | 98–04   | 98–04   | 98–04  | 98–04     | 98–04  | —        | 98–04    |
| R11           | 98–04          | 98–04   | 98–04   | 98–04  | 98–04     | 98–04  | —        | 98–04    |
| R12           | 98–04          | 98–04   | 98–04   | 98–04  | 98–04     | 98–04  | —        | 98–04    |
\[ f_{k,t}^j = f_{k,t-1}^j + u_{k,t}^j \text{ con } u_{k,t}^j \sim N \left( 0, \left( \sigma_{f,k}^j \right)^2 \right); t = 2, ..., T \]

\[ f_{k,1}^j \sim N (0,1); j \in JF_k = \bigcup_{k \in I_k} \{1, ..., N\}, \]

where \( \beta_i \) is the factor loading of the ratio \( R_i \) with respect to the factor \( F_k \); \( f_{k,t}^j \) is the \( k \)th factor score of the \( j \)th country in the period \( t \); \( \alpha_i + \beta_i f_{k,t}^j \) is the trend of the deviation \( D_t = R_t - R_{UE}^t \) for the country \( j \) in the period \( t \); \( I_k \) is the set of ratios related to the \( k \)th factor; \( JF_k \) is the set of countries with observed data in some of the ratios \( R \), related to the \( k \)th factor.

Furthermore, and to avoid identifiability problems in the estimation of the parameters, we will take \( \beta_{i,k} = 1 \) for all \( k = 1, ..., K \).

The factor scores \( \{f_{k,t}^j; t = 1, ..., T; j \in JF_k\} \) reflect the common trends of the deviations \( \{D_i; i \in I_k\} \) for each country and period in relation to the financial ratios related to the \( k \)th factor. The trends for these deviations are estimated on this basis for each country and period using the expressions \( \{\alpha_i + \beta_i f_{k,t}^j; t = 1, ..., T; j \in JF_k; i \in I_k\} \).

As mentioned above, given the small sample size available by series (seven data points for the larger series) and the different observation periods for each country and ratio, we use a Bayesian approach to estimate the parameters of the model, allowing us to make exact inferences using MCMC methods (see Gallizo et al. 2009 for details).

**Results**

Figure 1 shows the evolution of the average values of the ratios analyzed for the European Union countries. The analysis shows that returns fell (ratios R1 to R3), the cost of debt increased (ratios R4 and R5), and productivity declined (ratios R6 to R9) in EU firms in 2001 and 2002, with recovery following in 2003. These dips were basically a consequence of the economic slowdown caused by the decline in sales of European industrial concerns, which involved a deceleration in exports and rising prices for goods and services (European Commission 2005a). Likewise, a clear upward trend is apparent in the level of indebtedness among firms in the European Union (ratio 10), in line with falling interest rates in the period analyzed.

An exploratory analysis of the ratios revealed three factors related to return versus the cost of debt (ratios R1 to R5), productivity (ratios R6 to R9), and indebtedness (ratios R10 and R12) of the firms, which together explain around 75 percent of the total variation (Gallizzo et al. 2008). For this reason, we take \( K = 3 \) and, to avoid identifiability problems, take the factor loadings ratios R1, R6, and R10 equal to 1. Table 4 shows the estimated values of the parameters \( \alpha_i, \beta_i \), and \( \sigma_{f,k}^j \), the ratios related with each factor and the expected sign of the factor loadings \( \beta_i \), which coincide with the sign of the estimated coefficients. Figures 2, 3, and 4 show the point estimations and the 95 percent Bayesian credibility intervals corresponding to the factorial scores \( \{f_{k,t}^j; j \in JF_k; t = 1, ..., T\} \) of each country for each year and factor; Figures 5, 6, and 7 show the estimated trend of the financial ratios deviations related to each factor and country, together with the 95 percent Bayesian credibility intervals calculated using the procedure described in Gallizo et al. (2009).

**Returns Versus Cost of Debt**

As may be observed (see Table 4), the first factor has positive factor loadings \( \beta_i \) with ratios for returns (R1, R2, and R3) and negative factor loadings \( \beta_i \) with ratios measuring the cost
Figure 1. Dynamic evolution of the average financial ratios of the European Union firms

Note: $t = 1$ corresponds to year 1998, $t = 2$ to year 1999, and so on.
Table 4. Posterior estimation of $\alpha_i$, $\beta_i$, and $\sigma_{d,i}$

| Ratio | Factor                     | Expected sign of beta | $\alpha_i$  | $\beta_i$  | $\sigma_{d,i}$ |
|-------|---------------------------|-----------------------|-------------|-------------|----------------|
|       |                           |                       | Q2.5        | Median      | Q97.5         | Q2.5        | Median      | Q97.5         |
| R1    | Return versus cost of debt| +                     | -0.0113     | -0.0082     | -0.0051       | 1.0000      | 1.0000      | 1.0000       | 0.0090       | 0.0118       | 0.0154       |
| R2    | Return versus cost of debt| +                     | -0.0261     | -0.0217     | -0.0172       | 0.7606      | 0.8707      | 0.9874       | 0.0081       | 0.0105       | 0.0132       |
| R3    | Return versus cost of debt| +                     | -0.0456     | -0.0376     | -0.0295       | 1.7647      | 1.9740      | 2.1787       | 0.0055       | 0.0113       | 0.0184       |
| R4    | Return versus cost of debt| -                     | 0.0823      | 0.2351      | 0.3878        | -13.5545    | -9.3898     | -5.3495      | 0.0067       | 0.0541       | 0.2848       |
| R5    | Return versus cost of debt| -                     | 0.3976      | 0.4986      | 0.6010        | -5.4700     | -2.5718     | -0.2979      | 0.4381       | 0.5308       | 0.6697       |
| R6    | Productivity              | +                     | -0.6107     | -0.5188     | -0.4058       | 1.0000      | 1.0000      | 1.0000       | 0.2920       | 0.3664       | 0.4686       |
| R7    | Productivity              | -                     | 0.0341      | 0.0519      | 0.0807        | -0.2222     | -0.1620     | -0.1093      | 0.0369       | 0.0543       | 0.0715       |
| R8    | Productivity              | -                     | -0.2451     | -0.1790     | -0.0961       | -0.6327     | -0.4250     | -0.2029      | 0.1813       | 0.2309       | 0.3134       |
| R9    | Productivity              | -                     | -0.0082     | 0.0113      | 0.1807        | -1.3295     | -1.0821     | -0.8221      | 0.0070       | 0.0478       | 0.2907       |
| R10   | Indebtedness              | +                     | -0.2962     | -0.2807     | -0.2583       | 1.0000      | 1.0000      | 1.0000       | 0.0123       | 0.0544       | 0.1314       |
| R11   | Indebtedness              | +                     | -0.3583     | -0.2962     | -0.2346       | 0.0057      | 0.1214      | 0.4929       | 0.1842       | 0.2261       | 0.2873       |
| R12   | Indebtedness              | +                     | -0.2353     | -0.1679     | -0.1004       | 0.0053      | 0.1245      | 0.5157       | 0.2032       | 0.2469       | 0.3061       |
Figure 2. Point estimations (continuous line) and Bayesian 95 percent credibility intervals (dotted lines) of the evolution of the scores of the return versus cost of debt factor for each country.
Figure 3. Point estimations (continuous line) and Bayesian 95 percent credibility intervals (dotted lines) of the evolution of the scores of the productivity factor for each country.
Figure 4. Point estimations (continuous line) and Bayesian 95 percent credibility intervals (dashed lines) of the evolution of the scores of the indebtedness factor for each country.
Figure 5. Estimated trend (continuous line) and 95 percent credibility Bayes intervals limits (dotted lines) of the evolution of financial ratios related to the return versus cost of debt factor with respect to the EU-15 firms (the zero value dashed line shows the position of the average ratio of the EU-15)
Figure 6. Estimated trend (continuous line) and 95 percent credibility Bayes intervals limits (dotted lines) of the evolution of the financial ratios related to the productivity factor with respect to the EU-15 firms (the zero value dashed line shows the position of the average ratio of the EU-15)
Figure 7. Estimated trend (continuous line) and 95 percent credibility Bayes intervals limits (dotted lines) of the evolution of the financial ratios related to the indebtedness factor with respect to the EU-15 firms (the zero value dashed line shows the position of the average ratio of the EU-15).
of debt (R4 and R5). Essentially, it contrasts the evolution of these two groups of ratios, capturing their divergent behavior. It thus reflects the inverse relation between the returns generated by enterprises and the cost of borrowing in terms of financial charges, explaining how rising returns are accompanied by a reduction in firms' financial expenses.

The estimated values of the factor scores (Figure 2) and the trends for ratios R1 to R5 (Figure 5) show that the crisis in the business cycle that firms in the EU-15 underwent between 2001 and 2002 was not felt in the candidate countries, where firms enjoyed positive growth in returns (see Figure 5), as they had done since the transition and expansion of national economies (European Commission 2004). Furthermore, the ratios of CEEC firms had, to some extent, closed the gap with the values found in the EU countries by the end of the period. Clearly, the downward trend in interest rates in international markets in the first years of the twenty-first century resulted in a reduction in financial costs, from which the CEEC countries also benefited. Hence, returns improved toward the levels of their European partners.

The only exceptions to this general movement are Estonia and Poland. For Estonia, the return versus cost of debt factor scores positively at the end of the period (see Figure 2) due to the higher returns generated by its enterprises (see Figure 5). In this regard, Estonia’s strong economic situation from 2001 to 2004 period should not be forgotten. The economic framework within which its enterprises have developed was extremely favorable, combining price stability (2 percent in 2004) with considerable growth (3 percent in 2004) and a low level of public debt (5.3 percent in 2004), allowing returns to grow faster than the average for the countries’ European partners.

For Polish firms, returns and borrowing costs were respectively lower and higher than in EU-15 firms, but by 2004, levels similar to those found in the EU-15 had been achieved. Meanwhile, the evolution of the return versus cost of debt was positive throughout the period analyzed. These developments are related to the higher levels of trade payables found on the balance sheets of Polish concerns, which freed them from total dependence on borrowings to finance the operating cycle. This cost-free debt lowered financial expenses in relation to profits to levels similar to those found in the European Union at the end of the period analyzed.

**Productivity**

The second factor is directly related to the ratio R6 and inversely related with ratios R7, R8, and R9 (see the signs of the $\beta_i$ coefficients in Table 4). This factor basically measures the level of productivity in the enterprises of the country in question, contrasting sales with the costs incurred to obtain them (consumption of goods and services, and personnel expenses). This factor therefore compares productivity gains in the use of materials and services in manufacturing and sales processes, which are usually accompanied by falls in personnel expenses as a percentage of sales.

The evolution of the productivity factor remained practically constant throughout the period in the majority of the countries analyzed (see Figure 3), with Poland after 1999 and Latvia outperforming the EU-15 mainly due to lower personnel costs (see Figure 6, ratio R8). Productivity in Estonia and Lithuania was lower than in the EU-15 because of lower ratios for value added (R6) and higher ratios for consumption of goods and services (R7; see Figure 6). In general, real differences in labor productivity between the countries have remained stable over time. This is due to structural conditions in the local markets, which feature high levels of unemployment and low wages, as well as more rigid labor legisla-
tion, which prevents flexible responses by firms in their efforts to adapt costs to levels of production. Furthermore, there was a small spike in 2002, due to the fall in productivity in EU-15 firms, as mentioned above (see Figure 1, ratios R6, R8, and R9).

The Czech Republic, Slovakia, and Slovenia represent exceptions to the general pattern. Productivity declined in the Czech Republic in the period 2002–4, with a downward trend in the value-added ratio (see ratio R6 in Figure 6) and an increasing trend in personnel costs and higher consumption of goods and services (ratios R7 to R9; see Figure 6). In Slovenia, meanwhile, an upward trend is observable over the period 1998–2002, followed by a downward trend beginning in 2003. Finally, Slovakia exhibits an upward trend, with higher productivity than in the EU-15 throughout the period analyzed.

In this light, the growth in real wages seen in all CEEC countries in the latter years of the study does not threaten the development of enterprise in the majority of the countries analyzed because it has been offset by an equivalent increase in value added; consequently, labor productivity remains grossly constant. These developments exemplify the adaptability of government policy-making. Employment rose in Slovakia from 2003 onward, due to reforms making wage settlements more flexible and reducing the social charges payable by firms. Furthermore, convergence in labor productivity has been supported by a swift transition toward the knowledge-based society and the expansion of information technologies (European Commission 2005b).

In the Czech Republic, however, productivity declined in the last three years of the study as a result of increases in purchases and personnel costs ratios. The government found itself obliged to implement urgent measures to reform labor legislation and the education system to create more flexible contracts and improve employee training, as well as measures to support special direct investments (SDI), including incentives for investment in fixed assets, all of which, it is hoped, will have a medium-term effect on corporate results (European Commission 2005a).

As a consequence of the above, there has been no clear convergence of the new member states with the EU-15 in terms of productivity (see Figure 3). Rather, the relative positions of each country have stayed more or less the same, with the exceptions of the Czech Republic, Slovakia, and Slovenia, which tended to diverge from the EU-15 in the years immediately after 2002 for the reasons outlined above. Only Lithuania exhibits an evolution similar to that of the European Union, where the trajectory is a continuation of the trend in prior years.

**Indebtedness**

The third factor is positively related to the indebtedness ratios R10, R11, and R12 (see the positive signs of the $\beta$ coefficients in Table 4) and measures the level of indebtedness, which is of particular interest for identifying stable differences in the internal country patterns that determine firms’ capital structures. The evolution of this factor remains a grossly constant trend in the majority of countries over the period 1998–2002, with a downward trend thereafter (see Figure 4), due mainly to the sharp increase in the gearing ratio (R10) in EU-15 firms (see Figure 1). Furthermore, the level of the indebtedness ratios tends to be lower than the average values of EU-15 firms for all of the countries analyzed (see Figure 7), reflecting the high levels of debt that EU-15 firms maintained in the period considered. This lower level in indebtedness in the CEECs is due mainly to foreign direct investment and the small size of their financial systems. The only exception to this pattern is Slovenia, where a clear upward trend in indebtedness may be observed.
(see R10 in Figure 7), partly because interest rates fell more quickly in this country than in the other members of its peer group.

As a result, there is no observable convergence with the EU-15, but rather the reverse: The trend is increasingly divergent in the last years of the period (see Figure 7). There are several reasons for this. The evolution of the financial structure of firms in the new EU member states is conditioned by foreign investment, but is also closely linked to the characteristics of local banking systems, influencing the distribution of financial resources during the period of the study. Foreign investment has made strategic restructuring possible and boosted production capacity, generating growth in both sales and earnings that could not have been achieved if firms were able to rely only on domestic capital (Kocenda and Svejnar 2003). Furthermore, the debt markets are still only embryonic. This means that collective investment barely exists, and the financial system is based mainly on state-owned banks, preventing faster development. Nevertheless, foreign capital has taken positions in recent years, which points to new opportunities for expansion and business growth. All of the above explains the divergence found in the indebtedness factor between the CEECs and the EU-15 group, where the financial system is stable and well developed to fund enterprise growth.

**Goodness of Fit of the Model**

Gallizo et al. (2009, p. 23, figures 8–10) graphically analyze the goodness of fit of the model to the observed data. In these figures, the observed dynamic evolution of the financial ratios is compared to their predicted values $E[d_j^t | \text{Data}]$ and the 95 percent Bayesian forecasting intervals one step ahead, using the procedure described in Gallizo et al. (2009). The goodness of fit of the model is adequate for the majority of countries and ratios analyzed with an empirical coverage of the above intervals equal to 96.91 percent (the coverage of the 99 percent intervals was equal to 99.14 percent). More general models allowing the assumption that the factor scores follow an AR(1) procedure were estimated, but they do not significantly improve the results obtained.

**Conclusions**

The enlargement of the European Union in May 2004, embracing eight new CEECs as well as Malta and Cyprus, brought a significant contingent of firms into competition in the single European market under similar conditions to the enterprises of the existing member states. This paper has sought to discover whether the new partners have succeeded in making a harmonious transition, expressed in terms of the structure of their financial statements, over the period of the study, which begins with the consolidation of the privatization process affecting state-owned enterprises (1998) and continues through to the moment at which the CEECs actually joined the European Union (2004). We also investigate whether European aid and the economic policies followed by the respective governments have helped to generate convergence in the main financial measures.

To this end, we perform a dynamic factor analysis of financial ratios related to firms’ returns, cost of debt, productivity, and indebtedness to capture the patterns of simultaneous evolution over the period considered. Analyzing the evolution of these ratios, we observe the presence of convergence in returns and cost of debt, with a clear trend toward an increase in profitability and a reduction in financial expenses after 2002. No convergence is found for the ratios related to the productivity and indebtedness factors.
The evolution of the productivity factor remained practically constant throughout the period in the majority of the countries analyzed. In general, real differences in labor productivity between the countries have been maintained over time. This is due to structural conditions in the local markets, which feature high levels of unemployment and low wages, as well as more rigid legislation, which prevents flexible responses by firms in their efforts to adapt costs to levels of production.

No convergence is observed for the indebtedness factor over the period considered. However, the beginnings of a possible process of divergence may be observed at the end of the period due to the arrival of foreign capital, encouraged by the outlook for the CEECs upon joining the European Union and by the limited development of the banking industry and financial sector legislation. Foreign investment is, moreover, highly likely to continue, whereas the new member states remain stable and continue growing. Nevertheless, any change in circumstances could reduce the inflow of foreign investment, with the result that business expansion would have to be funded out of local lending, which would affect corporate results and lead to a narrowing of the gap in the financial variables considered in this study.

Although no convergence between the economic and financial structures of companies in the CEECs and those in the EU-15 is observable in the ratios analyzed taken as a whole, changes in employment and productivity structures could point to increased participation by CEEC firms in the wider European economy, despite differences in convergence—and, therefore, to the possibility of future convergence in the countries’ main financial indicators.

Note

1. In the case of ratios R4 to R9 and R11 to R14, we transform logarithmically in order to increase their normality degree.

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