

FINANCIAL SECTOR CONVERGENCE IN EUROPE

By

Andy Mullineux and Victor Murinde

Birmingham Business School, University of Birmingham

Correspondence to:

Professor Andy Mullineux
Department of Accounting and Finance
Birmingham Business School
University of Birmingham
Birmingham
B15 2TT

Tel: 0121-414-6642
Fax: 0121-414-6238

Email: A.W.Mullineux@bham.ac.uk

FINANCIAL SECTOR CONVERGENCE IN EUROPE

Summary

This paper attempts to assess the current stage of development of the banking, equity and bonds markets in 11 Central and Eastern European Countries (CEECs), which aim eventually to accede to EU membership. It does so by first reviewing the post 1990 financial sector restructuring process and then taking a "snapshot" of the financial structure in the CEECs after a decade of reform. A model for assessing financial sector convergence is then estimated and tested on a panel of groups of these countries for the period 1990-2000 in order to assess: convergence amongst the 11 CEECs and subsets of them, thereby identifying candidates for earlier and later accession; convergence of the leading accession candidate CEECs on a "late entrant" subset of EU states (Greece, Portugal and Spain); and convergence of the accession CEECs on a core EU ("Euroland") group.

1. Introduction

Any attempt to assess the convergence of the financial sectors of 'accession countries' on the EU financial sector faces an immediate fundamental difficulty. This is because the ultimate shape of the EU financial sector is itself unknown. The single market in financial services is far from complete since numerous tax and regulatory impediments remain. Further, the full impact of the introduction of the euro in January 1999 has yet to be seen and will of course be greater when (eventually) the UK, and hence "The City" is integrated into a single European financial space. The initial impact of the euro was to induce more rapid growth of the corporate bond markets. Other drivers of change include pension privatisation. The progressive replacement of "pay as you go" pension schemes with funded schemes will accelerate the development of capital markets in Europe by creating a long-term demand for capital market instruments (bonds and equities).

Thus, in assessing convergence, we face a moving target when answering the question 'convergence on what?'. Financial sector restructuring in the EU member states is progressing at varying paces from historical structures that vary considerably. It is indeed possible that some of the accession countries will prove to be the "tortoises" that arrive at the ultimate structure ahead of some, perhaps even all, of the current member state "hares"; whose progress is in fits and starts and often focus the opposition of vested interest groups. The "tortoises" meanwhile have grown accustomed to a long and arduous, but continuously progressive, reform process over the last decade or so. They may turn out to be the marathon runners.

Before we go on to assess convergence in the equity (stock), bond and banking markets amongst EU member states and between EU member states and a set of

accession countries, it is sensible to dwell a bit more on the financial reform process underway in the global context, for Europe is not an insular island. This will help us to get a picture of the sort of ultimate structure upon which EU member states, and thus the accession states as well, will converge.

What will the ultimate structure look like? Assuming that recent events have not marked a reversal of globalisation, then convergence in the EU, and indeed globally, appears to be on a hybrid “Continental European”/Anglo-Saxon model. In the emerging hybrid model, capital (bonds, equities, derivatives etc) markets and institutional, investors and investment funds are increasingly important. Hence “direct finance” is progressively replacing “indirect or intermediated” finance for larger firms. Alongside a number of smallish specialist “financial boutiques”, financial conglomerates, or superstores are emerging with a “Continental European” (i.e. universal banking, bank assurance or finance) character. These mega ‘banks’ engage in retail, commercial and investment banking and insurance. They provide intermediated finance, particularly to households and small and medium sized enterprises (SMEs), and also engage in capital markets and insurance related activities e.g. corporate finance, broking, underwriting, fund management, payments, custody and settlement etc.

It should also be noted that the development of domestic stock markets, like national currencies and airlines, has become a national status symbol. Most accession countries, and many member countries, have found it difficult to develop domestic capital markets (see Section 3). Firms in most accession countries, like those in most member states, will increasingly have the opportunity to tap the emerging EU-wide capital markets. Hence exploitation of direct financing opportunities by the larger firms in accession countries is likely to accelerate as the accession date approaches.

The process could be accelerated further by the linking of their domestic exchanges, to the emerging euro-exchanges, as has already occurred in a number of cases within the EU.

The remainder of this paper is structured as follows. In Section 2, we take stock of progress with financial sector reform made by the transition economies. Before assessing progress with convergence, we discuss in Section 3 the financial sectors of the CEEC accession countries. Section 4 presents the methodology, including the approach to modelling convergence and the dataset. The estimation and testing results are presented in Section 5. Section 6 concludes.

2. Financial Sector Restructuring in Transition Economies

It is widely agreed that the restructuring of the financial system is an integral element of the ongoing economic transformation in CEECs (Mullineux, 1998; Walter, 1998). This is particularly important because, as Doukas, Murinde and Wihlborg (1998) have observed, one distinct feature which all transition economies had in common during the central planning era was that a market oriented financial system was almost completely absent. Apart from some informal financing activities, the financial sector comprised a “monobank system” (state bank, savings banks, specialized banks, etc.) which played a limited role compared to a traditional banking system (Buch, 1996). Although the savings banks accepted deposits from households and the state banks had accounting and credit disbursement roles, the final decisions on the distribution of credit rested with the central planning agencies, which allocated credit to selected enterprises in order to attain output targets. Bank managers had no incentive to undertake credit risk analysis because the credit lines were underwritten by the state; moreover, the managers were not

constrained by capital budgeting criteria (e.g. using financial ratios to analyse the efficiency of investment).

As noted by Bahra, Green and Murinde (1997), at the genesis of the transition period, there was no blueprint for developing a banking sector. However, most transition economies started by creating a two-tier banking system, comprising on the one hand a central bank to oversee monetary policy and bank supervision, and on the other hand some commercial banks to perform some form of financial intermediation. Thereafter, the process of privatisation of all or some of the existing banks and new entry was used to encourage further the development of the commercial banking system.

However, as private banks started to operate on the basis of market criteria and as privatisation of firms increased, there was a marked increase in credit defaults. Clearly, the inherited bad loans problem affected almost every transition economy, but in some cases the accumulation of bad loans by the banking sector became an epidemic (Buch, 1996). It is important to note, therefore, that although the banking systems of these transition economies shared a broadly common central planning heritage, they have had different experiences of bank development during the transition process, and also inherited different levels of bad loans from the previous period of directed lending (Buch, 1996). The procedures for dealing with the inherited bad loans also varied considerably across the transition economies (Buch, 1996; Mullineux, 1998). Consequently, the banks grew at very different rates throughout the 1980s such that by 1993 there were marked differences in the level of bank development in each of the transition economies. Since January 1993, when the EU launched the European single market, the transition economies have more purposefully defined their reforms, especially with the banking sector, in order to prepare for subsequent entry to the EU as members. It seems likely that, due to

information asymmetry, banks will remain the main source of finance for small and medium sized enterprises (SMEs) for the foreseeable future (even in the US).

Apart from banks, another important component of the process of building the financial system in the European transition economies has been the setting up of stock markets and the revitalisation of existing ones. These emerging stock markets have underpinned the trend towards privatisation of public enterprises and large numbers of private floatations. The main markets are based in Croatia, Czech Republic, Hungary, Poland, Russia and Slovakia.

In general, therefore, the strategy for financial sector reform in transition economies has been to first establish a well functioning banking sector and then, subsequently, to develop capital markets. The latter has begun to develop as a result of the execution of privatisation programmes and the issuance of government securities (treasury bills and bonds). The restructuring of the banking sector does, however, require the development of wholesale money markets, including an interbank market. These markets facilitate increased efficiency in the allocation of capital by banks, which is the prime goal of the reform process. This is because banks with insufficient profitable lending opportunities and a surplus of (retail) deposits should be able to lend to banks in the opposite position. It is also evident that a rapid transfer of know-how (to practitioners and supervisors) concerning lending techniques and risk control, via asset and liability management, in commercial banking is required if a more efficient allocation of capital is to be achieved.

As the capital markets develop further, as a result of privatisation, other institutions, such as the investment funds created in connection with voucher-based mass privatisation programmes in Poland and the Czech Republic, will begin to share this role. As major shareholders, the investment funds will have the potential to

influence management behaviour and should be given the incentive to do so. In the “West”, and particularly in countries where the capital markets are most developed, particularly the UK and the US, institutional shareholders, such as insurance companies and pensions funds, are playing an increasingly important role in corporate governance. In more bank-oriented countries, such as Germany and Japan, the banks are major shareholders and wield influence as both debt and equity holders, though in recent years banks in these countries have begun to reduce their equity stakeholding in corporates.

3. The Financial Sectors of CEEC Accession Countries

3.1 The Banking Sector

Appendix table 1 presents bank performance data for the sample CEECs, namely Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia, during the period 1995-2000. The country data are for commercial banks only, as a total for each of the six years. It is shown that by 1995 the ratio of loans to total assets was high (greater than 40 percent) in Bulgaria, Czech Republic, Estonia, Lithuania, Romania, Slovakia and Slovenia. By 2000, the ratio was higher than 40 percent only in Estonia, Hungary, Poland, Slovakia and Slovenia. Estonia characterises a classic story of too many banks being licensed, leading to a tightening of licensing requirements and a rapid thinning of the number of banks following two banking crises and accompanying failures and mergers. Overall, the ratio of loans to total assets as well as the ratio of other earning assets to total assets gradually improved during the period 1995 to 2000, reflecting the positive impact of the reform process.

The bank asset data for the EU member countries (except France and UK) are also reported in the same table, for comparison with the data for the CEECs. It is shown that the ratio of loans to total assets as well as the ratio of other earning assets to total assets was generally greater than 40 percent during the period 1995 to 2000. It is further shown that the pattern of both ratios in Austria, Denmark, Finland, Germany, Ireland, Italy, the Netherlands, Portugal, Spain and Sweden, among the EU sample, is similar to the pattern in Croatia, Estonia, Lithuania, Slovakia and Slovenia. In this context, it appears that the commercial banks in this small subgroup of five CEEC countries display a similar behavioural pattern as do the banks in most of the EU countries.

3.2 The Stock Markets

The main stock markets in the CEECs are presented in Appendix table 1.¹ The Croatian stock market became operational in 1994 with 29 listed companies on the Zagreb Stock Exchange, a market capitalisation of US\$513.9 million and trading volume of US\$251.8 million. Partly benefiting from the privatisation and economic restructuring programme, the number of listed companies had grown to 61 and market capitalisation had increased to US\$580.8 million by the end of 1995. Launched one year earlier than the Croatian market, the Czech stock market did not become fully operational until 1995. By the end of 1995, the number of listed companies on the Prague Stock Exchange stood at 1635, while market capitalisation was US\$15664 million and trading volume was US\$3630 million. Unlike the Croatian and Czech markets, Hungary is not a typical emerging market because some companies have existed for well over 100 years. The origins of the Budapest Stock Exchange (BSE)

¹ Data were not available for some frontier markets such as Armenia, Azerbaijan, Kazakhstan, Uzbekistan, Ukraine and Macedonia. These are also excluded from this study.

actually go back to 1864 when its predecessor was founded, only to be discarded by the post-war communist regime; see Meszaros (1993) on the evolution of the BSE. After over 50 years of inactivity, the BSE was reopened in 1990 as part of the legal and economic reform programme which aimed to guide Hungary towards a market economy. Although first established in 1817, the Warsaw Stock Exchange (WSE) is regarded as an emerging market, opening in its new guise in April 1991 after a 52-year hiatus. During the 1991-2000 period, the trading system was formalised and continuously upgraded. The Slovakian stock market became operational in 1994, with 18 companies listed on the Bratislava Stock Exchange and market capitalisation of US\$1,093 million. The “take-off” of the market was in 1996 when the number of listed companies increased to 816, market capitalisation grew to US\$2182 million and trading value reached US\$2321 million (with turnover ratio of 134.0 per cent).

In general, the development of stock markets in the CEECs was initially largely driven by the enterprise privatisation process. The markets have been subsequently boosted, especially in Poland, by the privatisation of pensions, which has created pension funds and hence institutional investors. The mass privatisation programmes in the first half of the 1990’s in the Czech Republic and Slovenia kick started the process in those countries. In contrast, in Poland and Hungary a more cautious approach was adopted after the necessary regulatory framework had been established ahead of privatisations following financial restructuring agreements between banks and enterprises in Poland, and direct sales in Hungary. As a result the stockmarkets in Hungary and Poland have tended to perform better. Poland’s market has the highest absolute capitalisation, although Hungary has the highest capitalisation, relative to GDP (29.5%), but even the Hungarian market remains small as a percentage of GDP compared to Germany (63%) and the USA (153%).

In Appendix table 2, we report the IFCG price index correlations for Central and Eastern European emerging stock markets versus the UK market, during the formative years of these markets i.e. December 1993 – December 2000. The Czech market shows high positive correlation with the entire sample emerging stock markets, except Slovakia, but low positive correlation with the UK market. The Polish market demonstrates similar correlation patterns as the Czech market. The Hungarian market shows high positive correlation with the UK market as well as the entire sample emerging stock markets, except Slovakia. Clearly, the Slovakian market is unique, showing low positive correlation with the entire sample emerging markets and negative correlation with the UK market.

3.3 The Bond Markets

In general, in the CEECs, the issuance of debt securities has been dominated by government instruments. Appendix table 3 reports data on the market capitalisation of corporate bonds in the CEECs and EU countries. It is clearly shown that Slovenia is the only CEEC in which non-government debt securities are reported. The bond market in Poland is only reported for 2000. In general, it is fair to say that the commercial paper and corporate bond markets remain underdeveloped, even in the EU member countries. For example, missing data are reported in Appendix table 3 for the bond markets in Athens, Helsinki, Ireland, Valencia and Stockholm. Overall, among the EU bond markets, as well as in Slovenia and Poland, companies are the largest group of investors in bond market securities, accounting for 39% in October 2000 followed by banks and insurance companies (10%).

Due to the non-existence of the bond market in most CEECs, and the rudimentary nature of the market in countries where bonds are traded (i.e. Slovenia

and Poland), it is not possible to investigate the problem of convergence with respect to the bond market.

4. Econometric Methodology

4.1 Modelling output convergence for banks

In the literature on economic growth, convergence has been mainly modelled using time series, cross-section and panel data techniques. Strictly, there is no universally agreed definition of the term convergence. However, Baumol, Nelson and Wolff (1994) identify seven concepts of convergence; these use Barro-type tests, as in Barro and Sala-i-Martin (1995), or cointegration analysis to test whether convergence has occurred or not. These studies have isolated two predominant concepts of convergence in the growth literature (Quah, 1993). One concept, referred to as beta convergence, implies regression to the mean and applies if a poor country tends to grow faster than a rich one, such that the poor country tends to catch up with the rich one in terms of the dynamics over time involving the level of per capita income (Barro and Sala-i-Martin, 1995). The other concept, known as rho convergence, concerns cross-sectional dispersion and applies if the dispersion, measured as a change in the standard deviation of a given variable (e.g. GDP), declines over time. The relationship between beta convergence and rho convergence is that the former tends to generate convergence of the type implied by the latter *i.e.* if poor countries grow faster than rich ones, there is reduced dispersion of incomes overall (see Bernard and Durlauf, 1996). The regression tests take the following form:

$$x_{i,t+1} = a + b_y (y_{i,t} - y^*_i) + e_{i,t+1} \quad b_y < 0, \quad (1)$$

where $x_{i,t+1} = y_{i,t+1} - y_{i,t}$ and $y_{i,t}$ is the logarithm of per capita GDP of country i at time t ; y^*_i is the steady-state level of country i , and by construction $e_{i,t+1}$ is the error

term that is uncorrelated across i and with regressors. The parameter restriction, $b_y < 0$, is the main implication tested in the convergence literature; it suggests that a country positioned further below the steady state level tends to grow faster.

Inspired by the above literature, this paper models convergence in the context of the structure of financial systems in the CEECs. In order to tie down the output of banks in the CEECs and EU, the paper also draws on the literature on the microeconomics of the banking firm, which focuses on testing for the existence of economies of scale and economies of scope in the banking industry, based on output from a production function of a banking firm (see Murinde, 1992). In contrast to the neo-classical growth model and endogenous growth models used in the growth literature, the early studies of the banking firm started with a standard log linear Cobb-Douglas production function of the following form:

$$q = \gamma_0 + \alpha k + \eta m \quad (2)$$

where q is an output measure (e.g. bank loans to NFCs), k and m are factor inputs into the bank production process (such as bank capital, bank liabilities including deposits, and personnel). However, this entailed a strong assumption regarding the shape of the cost function *i.e.* returns to scale are assumed to be increasing everywhere ($\eta < 1$), constant everywhere ($\eta = 1$) or decreasing everywhere ($\eta > 1$), thus a u-shaped curve is not possible. To circumvent these limitations, a multiproduct translog production function is used:

$$q = \gamma_0 + \sum_i \alpha_i k_i + 0.5 \sum_i \sum_j \eta_{ij} m_j k_i \quad (3)$$

where $\eta_{ij} = \eta_{ji}$ for all i, j . A key output of the banking firm comprises loans to the company sector.

The modelling procedure used for testing for convergence, based on equation (3), was initially based on cross-section tests of unconditional and conditional convergence. The cross-section unconditional convergence tests were constructed as follows:

$$g_{i,T} = \alpha + \beta q_{i,0} + \varepsilon_{i,T} \quad (4)$$

where $g = q_t - q_{t-1}$, and T is a fixed horizon. Conditional convergence tests are constructed by modifying equation (6) to include control variables:

$$g_{i,T} = \alpha + \beta q_{i,0} + \pi w_{i,T} + \varepsilon_{i,T} \quad (5)$$

where $w_{i,T}$ denotes a vector of control variables.

Given that our database consists of unbalanced short-panel data, we explored the possibility of using the dynamic panel data programme by Arellano and Bond (1988). We started by assuming that we have observations on $i = 1, \dots, N$ countries for each of $t = 1, \dots, T$ years, with $g_{i,T}$ as the dependent variable and the independent variables are denoted by $w_{i,T}$, the fixed effects model assumes that there are common slopes, but that each cross section unit has its own intercept, which may or may not be correlated with the independent variables:

$$g_{i,T} = \alpha_i + \beta q_{i,0} + \pi w_{i,T} + \varepsilon_{i,T} \quad (6)$$

Then we introduced dynamic behaviour by incorporating both time series and cross section variations in the model. In addition, recent studies indicate that the standard procedure for the estimation of the dynamic panel data regression model involves casting the equation in first-differences and then using instrumental variables (see Arellano and Bond, 1991; Arellano and Bover, 1995). However, Ahn and Schmidt (1997), among others, have shown that instrumental variable estimators may not be able to exploit some additional moment conditions. We therefore applied the GMM

estimator proposed by Hansen (1982) to a dynamic fixed effects model for panel data in order to exploit the additional moment conditions as suggested by Ahn and Schmidt. This also enables us to compute the GMM asymptotic standard deviations for the parameters in the convergence model (see, for example, Andersen and Sørensen, 1997).⁵

The GMM estimator is applied to a dynamic fixed effects model for panel data with respect to the growth of output of banks:

$$BFG_t = \alpha + \beta_1 BFG_{t-1} + \beta_2 BFG_{t-2} + \beta_3 BFY_t + \varepsilon_{i,T} \quad (7)$$

where *BFG* is the growth rate of bank loans, as a measure of bank output; *BFY* is the initial level of bank loans (at 1995).

The literature on the dichotomy between bank oriented financial systems and capital market oriented financial systems (e.g. Doukas, Murinde and Wihlborg, 1998) implies the need for considering equity as an additional element to bank debt in the capital structure of companies. However, we do not extend the above convergence tests for the banking systems to focus on the role of equity markets *i.e.* the provision of equity finance in the capital structure of companies, in line with modern corporate finance theory. This is because of the difficulties of measuring the output for stock markets in general, and specifically with respect to the CEEC. Instead, we examine the correlation pattern of the main indices for CEEC and EU markets over the period 1995-2000.

In addition to bank debt and equity finance, bond issues are an important element of the capital structure of NFCs. Moreover, one would expect that bond issues are likely to become more important in “Euroland” if, for instance, the EU financial system were to converge on the US model. However, as is clearly shown in Appendix Table 2, data on CEEC bonds are not available, and the data for the EU are also incomplete. We could therefore not undertake a direct statistical analysis of the corporate bond markets in the sample countries.

4.2 The data

The data on the banking sector are taken from the International Financial Statistics Database (IFS) published monthly by the International Monetary Fund and cover the period 1993-1997 for 11 transition economies in Central and Eastern Europe, namely: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia and Slovakia.² Bank output is defined in terms of bank loans to the private sector (households and firms), observed in terms of claims on the private sector by domestic money banks (line 12d of IFS). We ignore bank loans to government sector, observed in terms of claims on general government by domestic money banks (line 12a of IFS); we also exclude bank loans to public enterprises, observed in terms of claims on non-financial public enterprises by domestic money banks (line 12c of IFS). These two types of loans have fiscal implications while our aim is to capture the private sector (rather than government sector) banking activities, which is represented by claims on the private sector by domestic money banks (line 12d of IFS).

A model for assessing financial sector convergence is then estimated and tested on a panel of groups of these countries for the period 1990-2000 in order to assess: convergence amongst the 11 CEECs and subsets of them, thereby identifying candidates for earlier and later accession; convergence of the leading accession candidate CEECs on a “late entrant” subset of EU states (Greece, Portugal and Spain) and convergence of the “advanced CEECs” on a core EU (“Euroland”) group. Specifically, we constitute four groups from the sample, Groups A, A1, A2, C and D; A1 and A2 are subsets of A.

² This is a group of transition economies, whose homogeneity derives from a broadly common heritage and some similarities in the transition process. However, the group includes clear candidates for joining the EU in the very short term as well as those whose prospects are long term.

Sample A comprises the entire group of 11 CEECs; the model for assessing convergence of bank output is estimated and tested on a panel of these countries for the period 1995-2000. Sub-sample A1 includes the leading accession countries, namely Czech Republic, Estonia, Hungary and Poland. Sub-sample A2 includes the remaining 7 countries, namely Bulgaria, Croatia, Latvia, Lithuania, Romania, Slovenia and Slovakia. The idea is to assess bank output convergence amongst the 11 CEECs and the two subsets of them in order to identify candidates for earlier and later accession.

Sample B comprises the leading accession candidate CEECs (Czech Republic, Estonia, Hungary and Poland) and the “late entrant” subset of EU states (Greece, Portugal and Spain). The idea is to assess bank output convergence of the leading accession candidate CEECs on a “late entrant” subset of EU states.

Sample C comprises the leading accession candidate CEECs (namely Czech Republic, Estonia, Hungary and Poland) and the core EU (“Euroland”) group. The idea is to test bank output convergence in the leading accession CEECs” on bank output in a core EU (we choose France, Germany and UK).

We test for convergence of bank output and stock market output on these 11 countries as a group. We do not test for bond market output due to the relative underdevelopment of the market in company bonds in these economies.

A panel for the above transition and EU countries is estimated using GMM procedure, allowing for dynamics and a dummy for Eastern Europe.

5. Estimation and Testing Results

5.1 Estimation and Testing Results for Transition Economies Only

The estimation and testing results for the convergence hypothesis with respect to bank output, defined as bank loans to the private sector, are reported in Table 1.

[Table 1 about here]

The results for banking systems in the homogenous group of European transition economies, depicted in Group A, do not confirm that convergence has occurred among the group. The coefficient for the convergence term, the initial level of bank loans to the private sector (at 1995) or the variable g_0 , bears the expected negative sign but it is not statistically significant. It would thus appear that over time (during 1995-2000) and across the homogenous group of 11 transition economies, there is no robust evidence that the banking systems have shifted towards convergence, if bank output is defined in terms of bank loan activities to the private sector. The dynamics in the specification are validated by statistically significant estimates for the second lag but not the first lag; this finding suggests that the first period is merely transitory.

[Table 2 about here]

The correlation of the main stock market indices for the 11 transition economies and the EU countries is reported in Table 2. With respect to Group A countries, we do not find high correlations of the market for the period 1995 – 2000, except among the markets in Poland, Hungary, Lithuania and Latvia. Clearly, we cannot infer stock market convergence from simple correlation coefficients; however, what we may learn is the fact that these markets are highly correlated (greater than 50% in pairs) and are located in the same region. Further research is required to explore the extent to these markets move together.

5.2 *Evidence for the Leading Accession Transition Economies*

With respect to the leading accession countries in Group A1, namely Czech Republic, Estonia, Hungary and Poland, we find strong evidence for convergence among the banking systems of these countries. The coefficient of the initial level of bank output (variable g_0) bears the expected negative sign and is statistically significant. Moreover, the dynamics appear to play an important role in the shift of the banking systems towards convergence: the first and second lags of the growth rate of loans bear statistically significant estimates. Overall, therefore, the evidence suggests that over time (during 1995-2000) and across the 4 countries the banking systems have attained convergence in terms of the rate of growth of bank output, defined as bank loans to the private sector, relative to the initial level of loans (at 1995).

The correlation of the indices of the main stock markets in Group A1 countries show that the markets in Czech Republic, Estonia, Hungary and Poland are highly correlated for the period 1995-2000, although the ratio of 0.33 between Czech and Estonia is low. In general, the leading accession group of countries are highly correlated with the ICFG Eastern Europe index. Further research is required to explore the extent to these markets move together.

5.3 Evidence for the Non-Accession Transition Economies

For Group A2 countries, namely Bulgaria, Croatia, Latvia, Lithuania, Romania, Slovenia and Slovakia, the results do not show that convergence has occurred among the group. The convergence term, the initial level of bank loans to the private sector (at 1995), does not bear the expected negative sign and it is not statistically significant. These results suggest that over time (during 1995-2000) and across the subset of 7 transition economies, the banking systems have hardly shifted towards convergence, if bank output is defined in terms of bank loan activities to the private sector. The

dynamics in the specification are validated by statistically significant estimates for the first lag but not the second lag. Thus, the banking systems in Bulgaria, Croatia, Latvia, Lithuania, Romania, Slovenia and Slovakia, as a group, do not exhibit evidence of convergence.

Regarding the stock markets in this group of countries, we find that the correlation of the indices of the main stock markets are not highly correlated for the period 1995-2000.

5.4 Evidence for the Leading Accession Transition Economies and Late Entrant EU States

With respect to Group B, which combines the leading accession candidate CEECs (Czech Republic, Estonia, Hungary and Poland) and the “late entrant” subset of EU states (Greece, Portugal and Spain), the results show strong evidence for convergence among the banking systems of these countries. The coefficient of the initial level of bank output (variable g_0) bears the expected negative sign and is statistically significant. Moreover, the dynamics appear to play an important role in the shift of the banking systems towards convergence: the first and second lags of the growth rate of loans are statistically significant estimates. Overall, therefore, the evidence suggests that over time (during 1995-2000) and across the 7 countries the banking systems have attained convergence in terms of the rate of growth of bank output, defined as bank loans to the private sector, relative to the initial level of loans (at 1995).

5.5 Evidence for the Leading Accession Transition Economies and Core EU States

The results for banking systems in Group C, which comprises the leading accession candidate CEECs (namely Czech Republic, Estonia, Hungary and Poland) and the

core EU (France, Germany and UK), do not confirm that convergence has occurred among the group. The coefficient for the convergence term, the initial level of bank loans to the private sector (at 1995) or the variable g_0 , bears the expected negative sign but it is not statistically significant. It would thus appear that over time (during 1995-2000) and across the homogenous group of 7 transition and core EU, there is no robust evidence that the banking systems have shifted towards convergence, if bank output is defined in terms of bank loan activities to the private sector. The dynamics in the specification are validated by statistically significant estimates for the first lag only.

We find that that the indices of the main stock markets in the leading accession countries and the core EU countries (here represented by UK), are not highly correlated at all, for the period 1995-2000; instead the ratios are low at about 20%. This seems to suggest that the markets in the two groups are miles apart. Further research is required to explore the extent to these markets move together.

6. Summary and Conclusion

Following the participation of the EU member countries in the single market launched in January 1993, and the recent restructuring of banking systems in Central and Eastern Europe, the transition economies may expect convergence of their banking systems as a group as well as convergence of the banking systems of some progressive transition economies on the EU banking system. This paper proposes and implements novel applications of econometric tests for convergence (hitherto popularised in the growth literature) to determine whether there has been a shift towards convergence of the banking systems first for a homogenous group of Central and Eastern Europe transition economies, and secondly for subsets of a group of leading accession transition economies and late entrant EU states, as well as a group of leading accession countries and some core EU states. Models are specified for the growth rate of bank loans, and are

estimated and tested using data from the International Financial Statistics for the period 1995-2000. We also analyse the correlations of the stock market indices in these countries. For lack of data, we do not present evidence on the markets for corporate bonds.

We find strong evidence for convergence among the banking systems of the leading accession countries in Group A1, namely Czech Republic, Estonia, Hungary and Poland. This finding is supported by the correlation of the indices of the main stock markets in the Group for the period 1995-2000. We also find convergence for Group B, which combines the leading accession candidate CEECs (Czech Republic, Estonia, Hungary and Poland) and the “late entrant” subset of EU states (Greece, Portugal and Spain).

However, we do not find firm evidence to suggest that there is convergence among the banking systems in the full sample of 11 transition economies. Similarly, we cannot confirm that convergence exists among the non-accession group, namely Bulgaria, Croatia, Latvia, Lithuania, Romania, Slovenia and Slovakia. This finding is consistent with the signals from the correlation of the indices of the main stock markets in this group of countries. In addition, we do not find convergence among banking systems in Group C, which comprises the leading accession candidate CEECs (namely Czech Republic, Estonia, Hungary and Poland) and the core EU (France, Germany and UK).

References

- Arellano, M., and Bover, O. (1995), "Another look at the instrumental variables estimation of error-component models". *Journal of Econometrics*, 68, pp. 29-51.
- Arrelano, M., and Bond, S. (1988), "Dynamic Panel Data Estimation Using DPD: A Guide for Users". IFS Working Paper 88/15. Institute of Fiscal Studies, London.
- Arrelano, M., and Bond, S. (1991), "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations". *Review of Economic Studies*, 68, pp. 277-97.
- Bahra, P., Green, C. J. and Murinde, V. (1997), "Coping with financial reforms in transition economies: what have we learned?", in: Kowalski, T. (Ed.) *Financial Reform in Emerging Market Economies*, Poznan, University of Poznan Press.
- Barro, R. J. and Sala-i-Martin, X.X. (1995), *Economic Growth*, New York, McGraw Hill.
- Baumol, W. J., Nelson and Wolff, E. N. (1994), "Introduction: The convergence of productivity, its significance and its varied connotations", in: Baumol, W. J., Nelson and Wolff, E. N. (eds.), *Convergence of Productivity*, Oxford University Press.
- Bernard, A. B. and Durlauf, S. N. (1996), "Interpreting tests of the convergence hypothesis", *Journal of Econometrics*, 71, pp. 161-173.
- Buch, C.M. (1996), *Creating Efficient Banking Systems: Theory and Evidence from Eastern Europe*, J.C.B Mohr (Paul Siebeck), Tubingen.
- Doukas, J., Murinde, V. and Wihlborg, C. (1998), *Financial Sector Reform and Privatisation in Transition Economies*, North-Holland, Amsterdam.
- Mullineux, A. W. (1992), "Introduction", in Mullineux, A. W. (ed.) *European Banking*, Basil Blackwell, Oxford, pp. 1-11.
- Mullineux, A. W. (1998), "Banking sector restructuring in transition economies", in: Doukas, J., Murinde, V. and Wihlborg, C. (1998), *Financial Sector Reform and Privatisation in Transition Economies*, North-Holland, Amsterdam, Ch. 2, pp. 21-33.

- Murinde, V. (1992), "Microeconomic policy in the banking industry: the implications of policy regime change involving financial restructuring", in: D.P. Doessel (Ed.), *Micro-economic policy and Reform for International Competitiveness*, The Economic Society of Australia (Queensland), Inc: Brisbane, pp. 465-476.
- Quah, D. (1993), "Empirical cross-section dynamics in economic growth", *European Economic Review*, 37, pp. 426-343.
- Sala-i-Martin, X.X. (1996), "Regional cohesion: Evidence and theories of regional growth and convergence", *European Economic Review* 40 (1996), pp. 1325-1352.
- Walter, I. (1998), "Design of financial systems and economic transformation", in: Doukas, J., Murinde, V. and Wihlborg, C. (Eds.), *Financial Sector Reform and Privatisation in Transition Economies*, North-Holland, Amsterdam, Chapter 6, pp. 123 - 151.

Table 1: GMM estimation results for convergence of bank output

	Sample A	Sub-sample A1	Sub-sample A1	Sample B	Sample C
CONST	-0.268** (-4.143)	-0.116** (-5.317)	-0.125** (-3.126)	-0.033** (-7.327)	-0.391** (-3.900)
g(-1)	0.115** (7.169)	0.225** (3.062)	0.183** (5.003)	0.119** (8.004)	0.518** (3.015)
g(-2)	0.025** (3.319)	0.219 (0.865)	0.200 (0.674)	0.014** (2.372)	(0.195) (1.106)
g ₀	-0.013 (-1.047)	-0.127** (-4.816)	0.110 (1.031)	-0.126** (-4.159)	-0.018 (-1.129)
dummy (CEEC)				0.105 (0.329)	0.019** (3.362)
Wald test	49.03	10.316	2.922	2.922	10.407
Sargan test	0.816	0.951	0.345	0.345	0.006
Number of countries:	11	4	7	7	7
No. of observation:	66	24	42	42	42
Sample:	1995-2000	1995-2000	1995-2000	1995-2000	1995-2000

Notes:

- * Sample A comprises the entire group of 11 CEECs; the model for assessing convergence of bank output is estimated and tested on a panel of these countries for the period 1995-2000. Subsample A1 includes the leading accession countries, namely Czech Republic, Estonia, Hungary and Poland. Subsample A2 includes the remaining 7 countries, namely Bulgaria, Croatia, Latvia, Lithuania, Romania, Slovenia and Slovakia. The idea is to assess bank output convergence amongst the 11 CEECs and the two subsets of them in order to identify candidates for earlier and later accession.
- * Sample B comprises the leading accession candidate CEECs (Czech Republic, Estonia, Hungary and Poland) and the “late entrant” subset of EU states (Greece, Portugal and Spain). The idea is to assess bank output convergence of the leading accession candidate CEECs on a “late entrant” subset of EU states.
- * Sample C comprises the leading accession candidate CEECs (namely Czech Republic, Estonia, Hungary and Poland) and the core EU (“Euroland”) group. The idea is to test bank output convergence in the leading accession CEECs on bank output in a core EU (we choose France, Germany and UK).
- * the dependent variable is the growth rate of loans (see definition of g below)
- * ** significant at 10%, * significant at 5%
- * values in parentheses are t-statistics
- * g is bank output, defined as bank loans to the private sector (households and firms), observed in terms of claims on the private sector by domestic money banks (line 12d of IFS); g₀ is the initial level of bank output; g(-1) and g(-2) denote one-period and two-period lags, respectively.

Table 2: IFCG Price Index Correlations for CEEC Emerging Markets and EU Markets, January 1995 – December 2000

	Bulgaria	Croatia	Czech Republic	Estonia	Hungary	Latvia	Lithuania	Poland	Romania	Slovakia	Slovenia	UK FTSE100	IFCG E.Europe
Bulgaria	1.00												
Croatia	.42	1.00											
Czech Republic	.45	.43	1.00										
Estonia	.34	.37	.33	1.00									
Hungary	.50	.42	.50	.53	1.00								
Latvia	.48	.49	.38	.35	.45	1.00							
Lithuania	.50	.52	.49	.51	.46	.52	1.00						
Poland	.51	.50	.57	.50	.53	.50	.49	1.00					
Romania	.50	.50	.50	.50	.70	.72	.72	.43	1.00				
Slovakia	.28	.23	.13	.20	.04	.31	.29	.21	.24	1.00			
Slovenia	.41	.40	.39	.41	.38	.44	.49	.52	.50	.55	1.00		
UK FTSE100	.22	.24	.21	.20	.40	.21	.19	.26	.20	-.03	.11	1.00	
IFCG E.Europe	.70	.71	.73	.72	.82	.70	.75	.63	.50	.26	.35	.47	1.00

Source: Calculated by authors from the database of the International Federation of stock Exchanges and IFC, Emerging Markets Database.

Appendix Table 1: Bank performance ratios in eleven European transition countries and the EU

COUNTRY/ BANK ASSETS	2000	1999	1998	1997	1996	1995
CEEC						
Bulgaria						
loans/total assets	0.23	0.23	0.20	0.22	0.37	0.50
other earning assets/total assets	0.66	0.62	0.65	0.65	0.50	0.37
Croatia						
loans/total assets	0.42	0.46	0.50	0.47	0.39	0.40
other earning assets/total assets	0.49	0.45	0.41	0.44	0.52	0.52
Czech Republic						
loans/total assets	0.29	0.41	0.49	0.50	0.50	0.50
other earning assets/total assets	0.61	0.46	0.39	0.37	0.37	0.40
Estonia						
loans/total assets	0.58	0.56	0.58	0.52	0.50	0.45
other earning assets/total assets	0.29	0.31	0.27	0.34	0.34	0.36
Hungary						
loans/total assets	0.45	0.38	0.36	0.34	0.31	0.34
other earning assets/total assets	0.40	0.43	0.48	0.53	0.54	0.46
Latvia						
loans/total assets	0.41	0.45	0.45	0.29	0.23	0.25
other earning assets/total assets	0.47	0.39	0.36	0.55	0.59	0.53
Lithuania						
loans/total assets	0.42	0.47	0.43	0.40	0.44	0.56
other earning assets/total assets	0.35	0.27	0.31	0.37	0.29	0.16
Poland						
loans/total assets	0.46	0.49	0.47	0.42	0.38	0.29
other earning assets/total assets	0.43	0.40	0.39	0.42	0.48	0.54
Romania						
loans/total assets	0.34	0.32	0.35	0.38	0.53	0.54
other earning assets/total assets	0.48	0.49	0.44	0.39	0.35	0.35
Slovakia						
loans/total assets	0.50	0.48	0.45	0.45	0.48	0.46
other earning assets/total assets	0.42	0.42	0.46	0.46	0.43	0.46
Slovenia						
loans/total assets	0.52	0.51	0.48	0.45	0.43	0.45
other earning assets/total assets	0.40	0.41	0.45	0.46	0.47	0.46

Appendix Table 1 (concluded)

EU						
Austria						
loans/total assets	0.50	0.54	0.53	0.51	0.44	0.43
other earning assets/total assets	0.46	0.43	0.44	0.46	0.53	0.54
Belgium						
loans/total assets	0.44	0.40	0.38	0.34	0.33	0.34
other earning assets/total assets	0.48	0.53	0.56	0.61	0.62	0.61
Denmark						
loans/total assets	0.55	0.51	0.48	0.49	0.48	0.48
other earning assets/total assets	0.36	0.40	0.41	0.41	0.45	0.46
Finland						
loans/total assets	0.51	0.49	0.51	0.44	0.46	0.46
other earning assets/total assets	0.41	0.39	0.39	0.49	0.47	0.45
Germany						
loans/total assets	0.49	0.47	0.52	0.58	0.59	0.60
other earning assets/total assets	0.43	0.43	0.41	0.38	0.37	0.36
Greece						
loans/total assets	0.42	0.40	0.38	0.35	0.35	0.34
other earning assets/total assets	0.50	0.53	0.55	0.58	0.58	0.59
Ireland						
loans/total assets	0.55	0.53	0.53	0.58	0.54	0.54
other earning assets/total assets	0.35	0.38	0.37	0.36	0.39	0.38
Italy						
loans/total assets	0.57	0.54	0.52	0.50	0.50	0.50
other earning assets/total assets	0.33	0.35	0.38	0.40	0.41	0.40
Luxemburg						
loans/total assets	0.23	0.22	0.20	0.21	0.19	0.20
other earning assets/total assets	0.70	0.73	0.75	0.75	0.77	0.77
The Netherlands						
loans/total assets	0.60	0.60	0.57	0.58	0.59	0.59
other earning assets/total assets	0.34	0.35	0.38	0.37	0.37	0.37
Portugal						
loans/total assets	0.59	0.52	0.47	0.40	0.37	0.36
other earning assets/total assets	0.30	0.37	0.44	0.50	0.53	0.54
Spain						
loans/total assets	0.51	0.49	0.48	0.45	0.43	0.42
other earning assets/total assets	0.39	0.41	0.42	0.47	0.49	0.50
Sweden						
loans/total assets	0.53	0.53	0.51	0.54	0.49	0.50
other earning assets/total assets	0.36	0.37	0.39	0.36	0.39	0.36

Source: Calculated by authors from BankScope.

Appendix Table 2: Corporate bond markets in transition and EU member countries (Market capitalisation, millions of USD)

COUNTRY (EXCHANGE/MARKET)	2000	1999	1998	1997	1996	1995
Transition countries						
BULGARIA	-	-	-	-	-	-
CROATIA	-	-	-	-	-	-
CZECH REP	-	-	-	-	-	-
ESTONIA	-	-	-	-	-	-
HUNGARY	-	-	-	-	-	-
LATVIA	-	-	-	-	-	-
LITHUANIA	-	-	-	-	-	-
POLAND	21.78	0.00	0.00	0.00	0.00	0.00
ROMANIA	-	-	-	-	-	-
SLOVAKIA	-	-	-	-	-	-
SLOVENIA	272.87	185.67	193.02	145.29	74.60	-
EU member countries						
Athens	-	-	255.85	958.10	1799.93	587.47
Copenhagen	168007.27	167643.98	205514.97	171320.50	177148.81	173619.63
Deutsche Börse	-	1286813.67	1449028.30	1044238.36	1116872.43	1085077.06
(Euronext) Amsterdam	82867.34	167021.15	166891.02	150102.60	132725.95	102032.31
(Euronext) Brussels	3018.05	3298.69	3574.22	3377.62	3776.20	1780.27
(Euronext) Paris	201695.62	201744.01	159824.32	150596.74	172321.83	169740.93
Helsinki	-	-	8137.55	7817.15	8569.42	8653.75
Irish	-	-	-	-	-	-
Italy	57844.54	59194.85	51744.07	50083.09	39076.86	38476.47
Lisbon	9711.01	9730.18	9954.27	6904.77	6396.24	6205.68
London	487771.14	422991.38	336702.71	248599.87	277388.19	226217.51
Luxembourg	49259.26	36174.86	32952.25	11150.44	-	-
Barcelona	3336.78	4733.89	6616.97	7659.35	10127.63	10647.37
Bilbao	3097.99	5649.31	5915.32	7599.06	9915.64	13455.80
Madrid	3810.11	5572.81	7222.42	8708.81	11840.70	15953.73
Valencia	5327.39	6078.08	-	-	-	-
Stockholm	-	-	-	108638.12	111928.88	120710.99
Vienna	-	25841.44	34399.13	34445.98	40846.14	45985.44

Source: Calculated by authors from the database of the International Federation of Stock Exchanges (available at www.fibv.com).