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**FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: EMPIRICAL
EVIDENCE FROM THE CEE AND CIS COUNTRIES**

By

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Financial Development and Economic Growth: Empirical Evidence from the CEE and CIS Countries

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Abstract:

We empirically estimate the role played by financial development in economic growth in the former Communist countries of Central and Eastern Europe and the Commonwealth of Independent States, since 1990, after the fall of Communism. We employ system GMM, panel data covering the period 1990-2008, and various proxies for financial depth and financial efficiency. We show that credit to the private sector had a positive effect on growth in these countries; however, high levels of inflation can render the positive effect of private credit insignificant. High interest rate spreads and reduced banking competition hampered economic growth.

JEL Classification: O16, P27, P34

Keywords: transition economies, CEE, CIS, financial sector development, economic growth, panel data

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I. Introduction

The relationship between economic development and long-run economic growth has been studied since the nineteenth century, although not always with economists agreeing on the matter. After the 1990's, following the trailblazing work of King and Levine (1993), a growing body of empirical research investigated the financial development-economic growth nexus. While the empirical results consistently indicate the development of an efficient and effective financial system as a key factor determining economic growth, the effect may be contingent on particular economic, political, social, cultural and geographical circumstances.

The former Communist countries of Central and Eastern Europe (CEE) and the Commonwealth of Independent States (CIS) represent a unique case study of the relationship between financial development and economic growth, especially because at the end of the 1990's their financial systems did not perform many of their traditional market economy functions. In the twenty years that have passed since the transition began, much progress has been achieved, however the process of creating and reforming the financial systems based on capitalist principles still continues. Thus, understanding the effects of financial development on economic growth in the CEE and CIS transition countries warrants an in-depth investigation. However, little research exists on this topic. Only one other paper specifically addresses the growth-financial development in CEE and CIS, using a quantitative approach and panel data (Koivu, 2002).

The present paper is an attempt to partially fill this gap. We investigate whether the relationship between financial deepening and efficiency and economic growth which has been found in other studies also holds in the CEE and CIS countries. We also identify those aspects of financial development which have the most significant effect on the growth of these countries.

We use panel data on the CEE and CIS countries over the period 1990-2008 to estimate GMM models for financial development-economic growth relationship. Specifically, using proxies for both financial deepening and improvements in financial efficiency, we find that credit to the private sector is a positive factor in promoting economic growth. This finding is robust; however the relationship disappears during periods of hyperinflation. Moreover, high interest rates and high bank concentration hamper the growth of a country. The results are consistent with the general findings on the financial development growth relationship, but nonetheless surprising in the context of these specific countries, given the specific problems encounter during the process of financial development (discussed in section 2.2). Our findings contradict Koivu (2002) (summarized in Section 2) who suggested that the financial development-economic growth relationship did not hold for the CEE and CIS countries for the period analyzed.

The rest of this paper is organized as follows. In Section 2 (Background) we present a selective literature review of the main theoretical and empirical findings regarding the financial development-economic growth relationship, including papers concerned with various aspects of financial development during transition. We also offer an overview of the financial development process in the CEE and CIS countries. In Section 3 (Data and Methods) we introduce the dataset used for the quantitative analysis, the problems associated with estimating growth equations, as well as the main econometric method used-system GMM. Section 4 (Results) describes the results of the analysis of the relationship between financial depth and financial efficiency and economic growth, followed by several robustness checks. The main findings are reiterated in Section 5 (Conclusions) where we also suggest several topics for future investigation.

II. Background

Selective literature review

Among the earliest economists to study the relationship between financial development and economic growth was Schumpeter (1912). He argued that banks facilitate financial intermediation and promote economic growth by selecting those entrepreneurs with the most innovative and productive projects. Several decades later Robinson (1952) (p. 62) suggested, however, that financial development in fact only follows growth: ‘where enterprise leads, finance follows’. Later, Gurley and Shaw (1955) showed, without resorting to modern statistical tools, that the development of the financial system has positive implications for the real economy while Lewis (1955) argued that the relationship between financial development and economic growth runs in both directions. Goldsmith (1969) empirically documented a statistical, positive relationship between financial development and economic growth, although without establishing its causality. Indeed, as Levine (2003) pointed out, economists often had diverging positions regarding this relationship, from ignoring its existence altogether (Meier and Seers, 1984), to arguing that the role of finance has been exaggerated in the growth literature (Lucas, 1988), to stating that the contribution of financial markets to financial growth is so obvious it does not even warrant discussion (Miller, 1998).

Levine (2004) summarized the role of financial systems as: 1) producing information ex-ante about possible investments and allocating capital; 2) monitoring investments and exerting corporate governance after providing financing; 3) facilitating the trading, diversification, and management of risk; 4) mobilizing and pooling savings and 5) easing the exchange of goods and services. The main channels through which theory suggests that financial development can stimulate growth are the capital accumulation channel, the total factor productivity channel, and financing human capital accumulation. LaPorta, Lopez-de-Silanes et

al. (1997) argue that financial development and its effects on growth are dependent on a country's legal and institutional structure.

Even though the theory analyzing the causal relationship between financial development and growth originated much earlier, most empirical work has been developed since 1990's, following King and Levine (1993). The seminal King and Levine (1993) paper is a cross-country study of 77 countries, analyzing the effect of financial sector development on the average rate of real per capita GDP growth, the average rate of growth in the capital stock per person, and on total productivity growth. Although the issue of causality is not considered, the findings suggest that an increase of 4 percent in financial sector size would lead to 1 percent higher economic growth. To overcome some of the econometric problems associated with cross-country growth analysis (reverse causation, missing variables bias) Levine, Loayza et al. (2000) and Beck, Levine et al. (2000) were the first to use the system GMM for panel-data in the analysis of the financial development-economic growth nexus. The results were very similar to results obtained earlier in pure cross-country analysis.

While other studies, generally find a positive effect of financial development on economic growth, these results are often subject to qualifications. For example, a cross-sectional study Rousseau and Wachtel (2002) indicated that the effect is significantly positive only when inflation falls below 5-6percent, with the largest effect taking place during periods of disinflation. A study by Rioja and Valev (2004a) suggested the effects of financial development may be non-linear or dependent on certain thresholds. Significant and positive effects are observed for the countries situated in the middle and high range of financial development but the result does not hold unambiguously for the countries in the low range. Furthermore, finance might affect growth differently in industrial compared to developing countries. Rousseau and

Wachtel (2005) found differences in the effects of financial development on growth, which depended not only on the level of development of the country, but also, on the level of financial development. They found evidence that while the relationship holds for middle income countries, it is not significant for low and high income countries. Furthermore, the relationship is positive and significant for countries with financial system in the middle range of development. Rousseau and Wachtel (2007) in a panel study for 84 countries over the period 1905-1995, found that the relationship between financial deepening and growth holds, with the exception of financial crisis periods.

Despite a sustained interest in the financial development-economic growth nexus and a large body of empirical studies that examine it, very little empirical research specifically addresses the problem in the context of the CEE and CIS transition economies. One such study by Koivu (2002) investigated the effects of larger and more efficient financial systems on the growth in 25 transition countries, during the period 1993-2000, using a fixed-effects panel setting. She concluded that the margin between lending and deposit interest rates negatively and significantly affected growth, whereas the size of the financial sector did not. Fink, Haiss et al. (2006) presented some evidence that total financial intermediation contributed to growth in nine EU accession countries for the period 1996-2000, with domestic credit representing a significant factor in promoting growth, and private credit and stock market capitalization - not. Mehl, Vespro et al. (2006) found that financial deepening had no significant effects on the growth of the South-Eastern European countries for the period 1993-2003. Moreover, they even ascertain a significant negative effect of financial intermediation and monetization on growth and a positive

and sometimes significant effect of foreign bank penetration ratio. Additionally, in most specifications higher creditor right protection exerted a positive impact on growth.¹

Financial development in the CEE/CIS countries

Since the 1990's, the CEE and CIS countries have been making substantial progress in the creation and reform of their financial markets and institutions. Under the Communist regimes, the banking systems were limited to passively allocating funds to firms, according to a central plan. Interest rates paid on savings were set administratively, there was no credit evaluation of the recipient or risk management, and banks could not use the threat of bankruptcy and liquidation. Although, the inherited structures of these countries shared many similarities, differences could also be observed. For example, in Hungary, Poland and the former Yugoslavia, enterprises had been given some degree of independence in their decisions, and there were even some private firms. Monetary holdings and trade credit were also allowed. The situation was vastly different in countries such as Bulgaria, Romania and the Soviet Union (Coricelli G. Caprio, Honohan, P., Stiglitz, J., 2001).

Today, banking still dominates the financial sector in transition countries. During the first years after the fall of the Communist regimes, state-owned banks were freed from the influence of the Central Bank and a large share of their non-performing loans was written off (Liebscher, 2007). Later, these banks were restructured and privatized, commercial banks were created, and new foreign-owned banks started to emerge. High levels of foreign bank ownership, pioneered by the Austrian banks, are a striking feature of many Eastern European banking systems. Foreign bank ownership accelerated dramatically after 1998 and continued even after

¹ For more literature review on the financial development-economic growth nexus, see for example Cojocaru, L. (2011). *Financial Development, Growth, Inequality and Poverty: Evidence from the Former Communist Countries. Economics*. Newark, University of Delaware.

2000, although at a slower pace. In many of these countries, between 60percent and 90percent of the banks are foreign-owned (mainly Austrian, followed by Belgian, German and Italian).

Evidence indicates that foreign ownership was, by and large, associated with greater stability and efficiency. Foreign ownership brought technological and managerial improvements, economies of scale, arm's length relationships between the financial sector and industry. It also reduced the concentration of economic power in banking markets.

The liberalization of the banking system encountered a series of problems and difficulties. Ineffective bankruptcy or contracting laws, the lack of enforcement mechanisms and adequate collateral guidelines created an environment where there were soft budget constraints for former state-owned firms, followed by moral hazard behavior on the managers' part.

Although bank privatization (and foreign ownership) can harden budget constraints, sometimes soft budget constraints can persist even after the reform of the financial sector (De Haas, 2001).

The enterprise sector where the banks did most of their lending was dominated by large firms, often under ineffective state ownership. This situation created distortions in the allocation of financial resources. Without international diversification and insufficient domestic diversification the financial systems of these countries were very exposed to systemic shocks. As a results, most transition economies in Europe experienced major bank insolvencies in the 1990's. Moreover, during transition, lack of confidence in the sustainability of macroeconomic stability, often lead to reduced financial intermediation and capital flight. The governmental institutions of these countries were weak and vulnerable to pressures from various interest groups, which in turn hampered banking sector restructuring. The lack of adequate deposit insurance laws and auditing and accounting standards for firms and the insufficient or low skilled human capital in the banking sector created additional problems.

By 2000, many transition countries, especially the EU members had carried out significant reforms of their legal structures and institutions. Some countries have levels of credit to the private sector comparable to those of some West European countries, although others are still lagging behind. Table 1 below summarizes some of the financial development indicators in the CEE and CIS countries: GDP per capita, domestic credit to the private sector as percentage of GDP and market capitalization of listed companies in these countries. These are compared to similar measures for three Western European countries, the United States, and Japan. There are important disparities among the countries studied, in terms of their GDP per capita. For example, in 2008, in Slovenia it was \$26,779 per capita, whereas in the Kirgiz Republic it was less than \$900 per capita. Furthermore, in 2008, private credit in Latvia was 90percent of GDP, while in Armenia it was only 17percent of GDP. This compares with private credit in the UK of over 213percent of GDP. Market capitalization shows even more dramatic differences. Armenia's market capitalization in 2008 was only 1.5percent of GDP while in the Russian Federation market capitalization was more than 82percent (almost equal to the market capitalization in the US).

Insert Table 1 here

Given the wide variation in the financial development of the CEE and CIS countries and the specific problems associated with the reform of their financial sectors, it is important to examine if the financial development-economic growth relationship holds in transition. Moreover, it is necessary to determine which components of the financial system play the most important role for the growth of these countries. A priori, in these economies lacking in capital to finance projects and education, the capital deepening aspect of financial development would be expected to be the most relevant, with financial modernization starting to play a more important role as capital becomes more abundant. However, the limited empirical research that has been

carried out to this point suggests that the relationship might not hold, at least not for the first part of the transition period.

III. Data and Methods

Methods. The equation to be estimated incorporates measures of financial development (FD) into a standard model of economic growth, in which growth (g) is a function of income at the beginning of the period (y), country characteristics (X), an unobserved country effect (η_i) and time effects (γ_t) :

$$(1) \quad g_{i,t} = \gamma_t + \alpha y_{i,t-1} + \beta X_{i,t} + \lambda FD_{i,t} + \eta_i + v_{i,t}, \text{ for } i=1, \dots, N \text{ and } t=2, \dots, T.$$

In (1), g is the log difference in per capita GDP over a five-year period, $y_{i,t-1}$ is the logarithm of per capita GDP at the beginning of that period, and country characteristics are averaged over the period. The focus of the analysis is on λ , which measures the impact of financial sector development on economic growth.

The effects of financial development on growth are estimated using system Generalized Method of Moments (system GMM), a panel estimation dynamic technique. This type of estimation follows Beck, Levine et al. (2000).

The estimation of growth equation has known statistical difficulties : the data-generating process may be dynamic, current realizations of the dependent variable may be influenced by past ones, potential fixed individual effects, endogenous regressors, measurement errors, omitted variables, not readily available external instruments, a small number of time periods.

One econometric method that deals with these problems is the First-Differenced Generalized Method of Moments Estimator (difference GMM) developed by Arrelano and Bond (1991). The model is based on the idea that taking the first difference removes the time-invariant country fixed effects. Assuming that the transient errors are serially uncorrelated and that the initial conditions are predetermined, the model instruments the right-hand-side variables with lags. This method controls for time-invariant omitted variables bias, as well as provides

consistent estimates, even in the presence of endogeneity and measurement errors. However, it has been found to have poor finite-sample properties. Furthermore, problems related to weak instruments might arise when the time series are persistent and the time dimension is small. Growth series indeed have these properties, since often output is averaged over periods of five years and relatively persistent. In this case, the difference GMM estimator has been found to behave poorly in terms of bias and precision (large downward bias) (Arrelano and Bover, 1995 and Blundell and Bond, 1998).

The system Generalized Method of Moments estimator introduced by Arrelano and Bover (1995) and further developed by Blundell and Bond (1998) produces consistent estimators even under these conditions and has been shown to have superior finite sample properties.² It makes the additional assumption that the log difference of per capita GDP is not correlated with the country's individual effects. This assumption does not imply no role of country-specific effects in output determination, but rather no correlation between output growth and country-specific effects in the absence of conditioning variables. This allows the use of lagged first-differences of the series as instruments for equations in levels. Thus, system GMM combines the set of equations in first differences with suitable lagged levels as instruments, and with an additional set of equations in levels with suitably lagged first-differences as instruments. Including the regression in levels reduces the biases associated with small samples, since it does not eliminate cross-country variation and does not intensify the strength of measurement error. Moreover, the regressions in levels have stronger correlation with their instruments than the variables in differences.

² Blundell, R. and S. Bond (1998). "Initial conditions and moment restrictions in dynamic panel data models." *Journal of Econometrics*(87): 115-143. use Monte Carlo simulations and show that in the case of finite samples, system GMM offers dramatic reduction of bias and improved precision over difference GMM estimation. These findings are also shown to hold in models with lagged dependent variables and additional right-hand-side variables, as typically encountered in estimations of growth models.

For all models reported in this paper, we use two tests of model specification. First, we use the Hansen test of over-identifying restrictions, which tests the overall validity of the instruments. Second, we examine the assumption of no serial correlation in the error terms. Robust two-step standard errors are computed, using the methodology suggested by Windmeijer (2005) to correct for small sample biases.

Data Our broadest dataset includes the following CIS and CEE countries over the period 1990-2008: Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Macedonia FYR, Moldova, Montenegro, Poland, Romania, Russian Federation, Serbia, Slovak Republic, Slovenia, Tajikistan, Turkmenistan, and Ukraine. All data are taken from WorldBank (2009) except for bank concentration, which was extracted from Beck, Demirguc-Kunt et al. (2000)

Economic growth is measured by the annual *growth of real gross domestic product per capita* based on constant local currency. Because financial development is a complex concept, we use multiple alternative measures in order to understand which aspects are most conducive to growth. We use measures of the size of financial intermediation and of the efficiency of the financial sector. Size is measured by the following three variables. *Domestic credit to the private sector (private credit)*, one of the main proxies for financial development used in recent empirical studies, refers to financial resources provided to the private sector through loans, purchases of non-equity securities, trade credits and other accounts receivable that establish a claim for repayment. Because this measure isolates credit issued to the public sector and excludes credit issued to the government or governmental agencies, it is especially relevant for the countries studied. *Liquid liabilities (M3)* is used as an alternative, broader measure of the size of the financial sector. M3 is the sum of currency and deposits in the Central Bank plus transferable deposits and electronic currency plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements plus travelers' checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market

funds held by residents. A third measure of the size of the financial sector is the logarithm of *domestic credit provided by the banking sector*. This measure includes all credit to various sectors, including the public sector and bills, bonds, and securities, loans and advances.

Although, a deeper financial sector is expected to positively affect growth, given the often ineffective investments by the governments, it is private credit that is expected to have the most significant role in stimulating growth.

The efficiency of the financial system is proxied by the following two measures. *Net interest margin* is equal to the difference between the interest income generated by banks or other financial institutions and the amount paid in interest to the lenders, relative to assets. *A priori*, it is not obvious what the relationship between interest margins and growth is. Lower net interest margins could mean more competition in the banking sector, better contract enforcement, efficiency in the legal system and a lack of corruption (Demirguc-Kunt and Huizinga, 1998). However, relatively large margins may insure a higher degree of stability for the financial system, adding to the profitability and capital of banks and better protecting them against crises. Other measures of financial sector efficiency related to net interest margin are the *interest rate spread* and *bank overhead costs* as a share of its total assets. Interest rate spread is the interest rate charged by banks on loans to prime customers minus the interest rate paid by commercial or similar banks for demand, time, or savings deposits. Overhead costs are banks' operating costs relative to their total earning assets, such as costs for salaries, motor vehicles, fixed assets (excluding depreciation).

Bank concentration is defined as the assets of three largest banks as a share of assets of all commercial banks and is a measure closely related to the efficiency of the financial sector. A highly concentrated commercial banking sector might result in lack of competitive pressure to attract savings and channel them efficiently to investors. On the other hand, a highly fragmented market might be evidence of undercapitalized banks.

The following variables are used as controls. *Initial GDP per capita*, measured at the beginning of each period, controls for the convergence effect. The standard prediction of the

neoclassical models is that a country will grow faster the farther away it is from its steady state. *Secondary school enrollment*³ is a measure of human capital and is expected to enter the regressions with a positive sign. *Inflation*, measured by the GDP deflator is used as a proxy for macroeconomic stability and is expected to have a negative effect on economic growth. Time dummies are included in many of the specifications to control for common time trends in economic growth, such as common productivity changes.

Appendix Table 1 shows detailed summary statistics by country for the main variables. The countries in the sample show dramatic differences in term of economic growth, financial development and macroeconomic stability, as well as important variation over time.

To aggregate away business cycle effects and to better proxy long-run economic growth, in the estimation of equation (1), the data are averaged across five-year time periods (1990-1993, 1994-1998, 1999-2003, 2004-2008), in conformity with much of the empirical literature. Some empirical papers suggest averaging the data over longer periods of times, such as 10 years. That is not feasible in this application since we have a total time span of only 19 years.

IV. Results

The first part of the analysis is focused on the effects of financial deepening on economic growth. We use system GMM and fixed effects and three indicators for financial depth. The results are shown in Table 2. Our baseline model, shown in Column (1), includes private credit, as a proxy for the size of financial intermediation. Column (2) presents results from a model excluding the schooling variable, since its coefficient is not significant in Model 1 and missing schooling data reduces sample size. The coefficient of private credit/GDP is positive and statistically significant in both *Model 1* and *Model 2*, indicating that the exogenous component of financial development positively influences economic growth. Both GMM

³ This is measured as the proportion of the population of the official age for secondary education according to national regulation who are actually enrolled in secondary schools.

specifications pass the standard specification tests (Hansen test and Arellano-Bond test for AR(2)). The results indicate that despite problems inherited and often inherent to transition countries, the development of a strong financial sector has the potential to stimulate the economic growth of these countries.

Insert Table 2 here

The results are verified using Fixed Effects Least Squares with first-order autoregressive disturbances (*Model 3* and *Model 4*). The Hansen test favors this method of estimation over random effects. Due to the large number of countries and short time span, as well as the relatively large differences among countries that might dominate the equation, the estimates may be inconsistent. Private credit is highly significant and positively related to growth, both with and without the school enrollment variable and its coefficients are close to the ones obtained by system GMM estimation.

The estimated impact of private credit is quantitatively quite large. For example, using the coefficient obtained in Model 1 (the smallest value), if Romania's credit to the private sector in 2008 were 108percent GDP (France's private credit) instead of 38.5percent, its economic growth would have been 3.26percent higher for that year.⁴

Initial GDP and inflation have negative coefficients, statistically significant in most models. Secondary school enrollment has a positive effect, but is not statistically significant. Secondary school enrollment is a very imprecise measure of investment in human capital that does not account for differences in the quality of schooling. Its insignificance here is not altogether surprising if one takes into account that secondary school is mandatory in many of these countries and the quality varies hugely from one region to another, and from country to country. Inflation is statistically insignificant in the first specification, but its sign always matches the expectations

⁴ $\ln(108) - \ln(38.5) = 1.03$, $1.03 * 3.16 = 3.26$, where 3.16 is the coefficient on Private Credit from Model 1

Two alternative measures for the size of the financial sector are shown in Models (5) and (6). Liquid Liabilities as a percentage of GDP does not distinguish among the financial sectors (Central Bank, deposit money banks or other financial intermediaries) or whether the claims are on the public or private sector. Although its coefficient is positive (*Model 5*), it is not statistically significant at conventional levels. Domestic Credit by the banking sector refers to credit to all sectors, including the government, and it also has a positive sign, but is not statistically significant at conventional levels (*Model 6*). These results suggest that, in fact, it is the credit extended to the private sector that plays a critical role in promoting economic growth. For transition economies, this result is not surprising given the soft budget constraints and the persistence of state-owned enterprises, especially during the first years after 1990.

The findings of this section suggest that a larger financial system is indeed conducive to growth in the CIS and CEE countries, but also that the most important driver of this relationship is the credit to the private sector. Although a financial sector where the importance of Central Banks is smaller compared to that of money banks might be better at stimulating economic growth, the evidence found here is not conclusive. The finding is somewhat surprising, given the extent to which in the pre- and early-transition years, state policies distorted the allocative role of the banking sector. It contradicts the findings of Koivu (2002), mentioned in the literature review section, who found that the size of credit did not significantly affect economic growth and that its lagged value had a negative impact. Koivu (2002) however, uses annual data, different controls and a different econometric method, and analyzes only the early transition period. Rioja and Valev (2004b) found that that countries with low level of financial development experience little growth increase from marginal increases in financial development. Although the sample considered here offers a mix in terms of levels of financial development, the results tend to disagree with the findings of Rioja and Valev (2004b). The CEE and CIS countries tend to have a relatively large share of small and medium firms, thus the results may indirectly offer some support to studies that find that industries whose organization is based more on small firms have higher benefits from better financial intermediation, through the lowering of

transaction costs and informational barriers that hinder small firms the most (Beck, Demirguc-Kunt et al., 2005).

Growth in only the size of the financial sector does not necessarily imply financial development; therefore, it is necessary to also capture some of the improvements in the efficiency of its functioning. Table 3 presents the results of regressions using several such measures. The Interest rate spread reflects the costs of intermediation that banks incur and their mark-up levels, relating to their efficiency and competitiveness. Saunders and Schumacher (2000) point out that although the ex-Communist countries have made progress, their interest rate spreads were still relatively large when compared to Western European countries. Bonin, Hasan et al. (2008) suggest that much of the decrease in interest rate spreads observed since the beginning of transition may be due to a reduction in the risk in the macroeconomic environment, rather than an increase in banking competitiveness.

Insert Table 3 here

The results of ***Model 1*** show a statistically significant and large, negative impact of the interest rate spread on economic growth. This implies that economies whose financial systems offer lower interest rate spreads experience relatively faster economic growth. The result is verified in the next specification (***Model 2***) by including both interest rate spread and credit to the private sector. While the interest rate spread retains its statistical significance and has almost the same value as previously, credit to the private sector is insignificant and its coefficient is much smaller than previously. The results of these models, combined with the results of Table 2 ***Model 1*** and ***Model 2***, suggest that while the size of the financial system is important for growth, it does not tell the entire story. The efficiency of the financial system, as measured here by the interest rate spread, is crucial for economic growth and perhaps even more so than the sheer size of financial intermediation, although clearly the two measures are not completely independent.

In the next column, we show results using the interest-rate margin in place of the interest rate spread. While the margin is related to the spread, it takes into account the fact that the amount of earning assets and borrowed funds might be different; for example, banks may

need to keep a certain amount of assets in non-interest bearing assets due to reserve requirements. Claeyns and Vander Venet (2008) argue that the relatively high interest-rate margins observed in the CEE countries could be explained by a low degree of efficiency and market competition and that the institutional reforms that took place in these countries initially increased the interest margins before competition started to drive them down. As *Model 3* indicates, this variable does not seem to have a statistically significant effect on economic growth. This insignificance could be due either to the measurement errors that interest-rate margin may be subject to, or, as pointed out by Levine (2003), to differences in activity and risk premium, rather than efficiency and competition, that could be reflected by the interest rate margins. The overhead costs tell a more accurate story about the efficiency of the banking system (*Model 4*). However, while the estimated impact of overhead costs is negative, indicating a negative effect of poor efficiency on economic growth, its statistical significance is quite low.

Economic theory suggests that departures from perfect competition create market inefficiency, and thus, higher concentration in the capital markets would harm firms' access to credit, negatively impacting economic growth. On the other hand, Beck, Demirguc-Kunt et al. (2006) find empirical evidence that favors concentration-stability theories: higher bank concentration reduces the likelihood that a country will suffer a systemic banking crisis. Although their experiences were not identical, the CEE and CIS countries inherited high concentration ratios that persisted long into the transition process. *Model 5* indicates that high bank concentration has a large, negative and statistically significant effect on growth. Moreover, the effect of high bank concentration is retained even in the presence of private credit, which, in turn, is insignificant with concentration included (see *Model 6*). The finding is consistent with Cetorelli and Gambera (2001) who find a negative effect of concentration on growth in a cross-country study, although the effect was found to be heterogeneous across different industries. This result enforces the finding of Table 3 *Model 1* and *Model 2*, suggesting that the sheer increase in the size of the financial sector does not necessarily ensure higher economic growth. An uncompetitive financial system may undermine the positive effects of the financial

deepening, especially in transition countries, where oftentimes many of the largest banks are still, or until recently were, state-owned.

The findings in this section suggest that the quality and efficiency of the financial sector are important factors in promoting economic growth in the CIS and CEE countries, and perhaps even more so than the size of financial intermediation. High interest rate spreads negatively affect the economic growth in the transition countries, and this effect can even negate the positive effect of private credit. This negative effect seems to be at least partly due to the high concentration in the banking markets of the transition countries.

Robustness checks

The main results are verified in Table 4 by including additional controls for the openness of the economy, the size of government, and the level of inflation (*Model 1-Model 4*) and by using a different method for computing the averages (*Model 5-Model 7*). The degree of openness of the economy is defined as the sum of imports and exports as a percent of GDP. Government expenditures are measured as a percent of GDP. We focus on specifications using private credit, the interest rate spread and concentration as measures of financial development, since these variables were more consistently significant in the previous tables.

Insert Table 4 here

In *Model 1*, we add openness and government expenditure to our baseline specification for the impact of private credit. The extent of openness has a negative effect on growth that is statistically significant at the 10percent level. The size of government has a very small (negative) and statistically insignificant effect. Inclusion of these variables does not qualitatively alter the results concerning the size of the financial sector and the size of the coefficient of private credit is nearly the same as in the baseline model. In column (2), we replace the previous measure of inflation with a variable indicating only inflation that exceeds an average of 40percent for a 5-year period (hyperinflation). Not only has hyperinflation a negative, statistically significant effect on growth, but it renders private credit insignificant. This result

suggests that the deepening of the financial sector can spur economic growth, but periods of grave macroeconomic instability may negate this effect. High rates of inflation discourage financial intermediation and the confidence in the financial system itself as investors may prefer real assets to financial assets during such periods.

We also verify the (negative) effects of high interest rate spreads and high bank concentration by adding the degree of openness and government expenditure as controls (*Model 3-Model 4*). The variable ‘concentration’ becomes statistically insignificant (p-value 0.13) after adding the two additional controls (*Model 4*), although the sign of its coefficient remains negative.

Finally, in order to increase the number of observations, we used shorter time periods- three years each- for computing period averages. We also exclude year 2008, since it represented the beginning of the financial crisis and because with short periods, one year could have a larger impact. In order to maximize the sample size, we also excluded the schooling variable, which was consistently insignificant in the previous models. The results are shown in Table 4, where, for simplicity, we show only the key variables. Each model also included time dummies for five of the six periods (unreported) and schooling was excluded, since it did not have statistical significance and it was reducing the sample size considerably. Again the findings confirm that private credit positively influences economic growth (although three years can hardly be considered the long-run), with a coefficient slightly smaller, but not very different from the ones in the previous results. Only the interest rate spread and bank concentration lose their statistical significance in this setting. The signs of their coefficients still conform to the expectations. The lack of significance seems to suggest that the negative role of high interest rate spreads and bank concentration is predominantly felt in the long-run, whereas, more credit to the private sector plays a positive role for the economy both in the medium and the long-run.

Conclusions

This paper empirically investigated the outcomes of financial sector development in the former Communist countries from CEE and the CIS on their economic growth over the transition years from 1980 through 2008. In order to overcome the possible endogeneity of some of the regressors, we use system GMM, following an approach previously used by Beck, Levine et al. (2000). In order to capture the most important aspects of financial development we used several alternative measures to proxy both financial depth and financial efficiency.

The main conclusion that emerges is that credit to the private sector plays a positive and economically large role in spurring economic growth. Moreover, this result is robust, with the exception of periods of grave macroeconomic instability proxied by hyperinflation. Additional indicators of depth such as liquid liabilities and domestic credit also have positive coefficients, however they are not statistically significant at conventional levels. High interest rate spreads negatively affect economic growth and the statistical significance of the coefficient is maintained even when private credit is included in the regression. We find no evidence that net interest rate margins affect growth, and that overhead costs do. However, high bank concentration (a possible underlying cause of the large interest rate spreads) seems to lower economic growth. Our findings contradict one of the few previous papers with a similar scope. Koivu (2002), using an earlier sample and a different econometric technique, found that private credit did not contribute to the growth of the former communist countries.

One of the main weaknesses of our paper relates to the small time frame available. Future research is needed not only to verify if the relationship between financial development and economic growth, changes in magnitude over time but also to take advantage of a longer time span. Moreover, especially in the light of the 2008 crisis, the consequences of financial crises on the economy command in depth economic research. Lastly, recent economic advancements suggest that financial development can affect the distribution of income in a country and possibly decrease poverty – a topic of much importance for the CEE and CIS countries.

Table 1 Financial development and macroeconomic indicators in CEE, CIS and selected developed countries, 2008

	<i>Domestic credit to private sector (% of GDP)</i>	<i>Market capitalization of listed companies (% of GDP)</i>	<i>GDP per capita (current US\$)</i>
<u>CIS Countries</u>			
Armenia	17.4	1.5	3,873
Belarus	28.8	--	6,229
Bulgaria	74.5	17.8	6,546
Estonia	98.7	8.5	17,223
Georgia	33.3	2.6	2,931
Kazakhstan	50.1	23.5	8,436
Kyrgyz Republic	--	2.1	837
Latvia	90.2	4.8	14,909
Lithuania	62.7	7.7	14,096
Moldova	36.5	--	1,665
Russian Federation	42.0	82.2	11,339
Ukraine	73.7	13.5	3,899
<u>CEE Countries</u>			
Croatia	64.9	38.6	15,636
Czech Republic	52.5	22.6	20,760
Hungary	69.6	12.0	15,409
Macedonia, FYR	43.8	8.7	4,673
Poland	49.9	17.1	13,823
Romania	38.5	10.0	9,300
Serbia	38.4	24.3	6,811
Slovak Republic	44.7	5.4	17,565
Slovenia	85.6	21.6	26,779
<u>Developed Countries</u>			
France	107.9	52.3	45,981
Germany	107.8	30.3	44,471
United Kingdom	213.4	70.0	43,088
United States	190.5	82.6	46,717
Japan	163.5	65.6	38,443
<i>CIS & CEE Avg</i>	<i>54.8</i>	<i>17.1</i>	<i>10,607</i>
<i>Dev. Country Avg.</i>	<i>156.6</i>	<i>60.2</i>	<i>43,740</i>

Source: *Source: WorldBank (2009)*

Table 2 Financial depth and economic growth, CEE and CIS countries, 1990-2008

	<u>System GMM</u>		<u>Fixed Effects</u>		<u>System GMM</u>	
	(1)	(2)	(3)	(4)	(5)	(6)
Private Credit	3.16** (2.17)	4.33* (1.85)	4.43*** (4.58)	4.66*** (3.60)		
Liquid Liabilities					5.09 (1.32)	
Domestic Credit						3.72 (1.57)
Initial GDP	-5.61*** (2.94)	-4.88** (2.14)	-9.71*** (3.45)	-10.37*** (2.92)	-5.61* (1.86)	-5.14* (1.90)
School Enrollment	1.14 (0.61)		7.03 (0.94)		-0.48 (0.18)	0.56 (0.26)
Inflation	-0.65 (1.17)	-1.04* (1.87)	-2.16*** (4.75)	-2.27*** (5.02)	-0.93 (1.47)	-1.24** (2.21)
Period 2	7.99*** (5.05)	8.72*** (3.58)			8.49*** (4.13)	7.51*** (5.11)
Period 3	10.16*** (4.41)	10.42*** (4.11)			10.66*** (3.69)	10.00*** (4.29)
Period 4	11.33*** (6.41)	10.42*** (3.22)			11.76*** (5.59)	11.35*** (5.61)
Const.			-2.92 (0.10)	26.56*** (3.43)		
# obs.	77	86	54	61	78	78
# countries	23	25	22	24	23	23
Hansen Test (p-val)	0.53	0.77			0.34	0.52
R-sq			0.72	0.25		

Dependent variable (log)GDP per capita growth.

Note: System GMM: Arrelano-Bond robust, two-step estimation. T-statistics in parentheses

* denotes statistical significance at the 10% level, ** at 5%, *** at 1%

Table 3 Financial efficiency and economic growth, CEE and CIS countries, 1990-2008

	<u>System GMM</u>					
	(1)	(2)	(3)	(4)	(5)	(6)
Private Credit		0.42 (0.29)				0.31 (0.31)
Spread	-2.30** (2.48)	-2.04* (2.00)				
Net Interest Margin			0.28 (0.11)			
Overhead Costs				-3.36 (0.89)		
Concentration					-2.7** (2.17)	-2.60* (1.87)
Initial GDP	-4.16** (2.11)	-4.17* (1.92)	-3.69 (1.64)	-4.09** (2.57)	-3.09*** (2.85)	-3.24** (2.30)
Inflation	-0.70 (1.18)	-.41 (0.61)	-1.30** (2.08)	-0.52 (0.63)	-1.39*** (2.85)	-1.32*** (3.48)
School Enrollment	3.53* (1.70)	2.86 (1.14)	2.64 (1.24)	-0.21 (0.07)	2.07* (1.91)	1.91* (1.79)
Period 2	7.49*** (3.38)	8.15*** (2.95)	8.30*** (4.41)	9.26*** (4.42)	6.64*** (3.47)	6.56*** (3.42)
Period 3	9.40*** (3.37)	10.00*** (3.20)	8.76*** (4.77)	10.88*** (4.02)	7.85*** (3.94)	8.27*** (5.04)
Period 4	10.72*** (3.98)	11.48*** (4.17)	11.23*** (5.59)	12.40*** (5.21)	9.633*** (4.59)	9.66*** (5.32)
# obs.	71	70	70	71	73	70
# countries	22	22	23	23	23	22
Hansen Test (p-val)	0.23	0.38	0.08	0.66	0.20	0.43

Dependent variable (log)GDP per capita growth.

Note: System GMM: Arrelano-Bond robust, two-step estimation. T-statistics in parentheses

* denotes statistical significance at the 10% level, ** at 5%, *** at 1%

Table 4 Robustness checks. Financial depth, financial efficiency and economic growth, CEE and CIS countries, 1990-2008

	<i>System GMM</i>						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Private Credit	3.22**	1.55			2.24**		
	(2.39)	(1.20)			(2.34)		
Spread			-2.22**			-0.55	
			(2.48)			(0.92)	
Concentration				-2.60			-1.87
				(1.56)			(0.88)
Initial GDP	-5.15***	-2.78*	-4.24**	-3.07**	-0.45*	-0.14	-0.15
	(3.25)	(1.72)	(4.24)	(2.20)	(1.70)	(1.46)	(1.03)
School Enrollment	1.78	0.99	4.07*	2.25			
	(1.01)	(1.06)	(2.01)	(1.29)			
Inflation	-0.80		-0.78	-1.43*	-2.05***	-1.03**	-1.23***
	(1.30)		(1.30)	(2.06)	(8.83)	(2.32)	(2.98)
Hyperinflation		-1.03***					
		(2.88)					
Openness	-2.23*	-1.03	-1.78	-0.01			
	(1.80)	(0.97)	(-1.05)	(0.01)			
Government expenditure	-0.10	-0.08	-0.03	-0.05			
	(0.67)	(0.71)	(0.15)	(0.18)			
Period 2	7.94***	6.07***	8.00***	7.20***			
	(4.83)	(3.67)	(3.56)	(3.03)			
Period 3	10.04***	7.87***	9.54***	8.08**			
	(3.81)	(3.53)	(3.45)	(2.63)			
Period 4	11.15***	8.95***	11.08***	9.79**			
	(4.98)	(4.33)	(4.00)	(2.70)			
# obs.	77	78	71	70	126	110	108
# countries	23	23	22	22	25	23	22
Hansen Test (p-val)	0.56	0.89	0.28	0.19	0.26	0.61	0.30

Dependent variable (log)GDP per capita growth.

Note: System GMM: Arrelano-Bond robust, two-step estimation. T-statistics in parentheses

* denotes statistical significance at the 10% level, ** at 5%, *** at 1%

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APPENDIX

Table A1: Descriptive statistics of the main financial variables

	Variable	#obs	Mean	StDev	Min.	Max.
Armenia	Growth	4	2.27	14.56	-19.43	11.50
	Inflation	4	387.59	449.63	1.94	863.30
	Credit	4	12.65	8.00	7.48	24.41
	Bank Concentration	3	0.80	0.15	0.63	0.93
	Spread	3	19.25	12.47	11.66	33.64
Belarus	Growth	4	2.53	7.13	-6.28	10.33
	Inflation	4	363.51	345.29	17.15	743.73
	Credit	3	13.70	6.14	9.45	20.74
	Bank Concentration	3	0.84	0.11	0.75	0.96
	Spread	4	15.95	16.33	1.55	38.37
Bosnia & Herzegovina	Growth	2	5.04	1.47	4.00	6.08
	Inflation	3	4.93	4.15	0.81	9.10
	Credit	3	47.66	11.83	35.44	59.06
	Bank Concentration	3	0.61	0.16	0.49	0.79
	Spread	3	12.65	8.46	4.81	21.62
Bulgaria	Growth	4	1.52	5.73	-5.49	6.91
	Inflation	4	87.11	113.06	4.65	245.71
	Credit	4	45.03	24.73	17.35	74.71
	Bank Concentration	4	0.75	0.25	0.44	1.00
	Spread	4	34.22	43.22	5.97	97.69
Croatia	Growth	4	0.23	8.82	-12.89	6.14
	Inflation	4	189.84	353.87	3.92	720.31
	Credit	4	43.25	12.24	29.47	58.01
	Bank Concentration	4	0.62	0.03	0.61	0.66
	Spread	4	203.37	385.62	8.36	781.79
Czech Republic	Growth	4	1.48	3.80	-3.94	4.90
	Inflation	4	9.90	9.64	2.10	22.47
	Credit	4	56.65	17.08	41.60	73.21
	Bank Concentration	4	0.73	0.14	0.60	0.92
	Spread	4	5.38	1.23	4.32	7.04
Estonia	Growth	4	1.29	7.82	-9.41	7.96
	Inflation	4	83.01	133.08	4.63	281.17
	Credit	4	44.56	26.02	23.45	82.14
	Bank Concentration	4	0.92	0.07	0.83	0.98
	Spread	3	5.31	3.26	2.68	8.96
Georgia	Growth	4	-1.62	16.83	-26.76	8.82
	Inflation	4	1369.28	1982.81	5.83	4210.26
	Credit	3	11.41	8.55	5.04	21.13
	Bank Concentration	3	0.76	0.07	0.72	0.84
	Spread	3	21.88	8.83	13.42	31.04
Hungary	Growth	4	1.58	4.22	-4.66	4.68
	Inflation	4	14.62	10.05	4.10	26.04
	Credit	4	37.77	13.77	23.93	56.70
	Bank Concentration	4	0.70	0.13	0.61	0.89
	Spread	4	4.54	2.60	2.06	6.82
Kazakhstan	Growth	4	1.40	8.36	-8.46	9.25

	Inflation	4	330.22	435.11	11.68	937.34
	Credit	4	29.65	19.74	10.31	49.30
	Bank Concentration	3	0.70	0.06	0.66	0.77
	Spread	0				
Kyrgyz Republic	Growth	4	-0.98	6.08	-8.97	4.20
	Inflation	4	128.32	203.48	8.51	431.82
	Credit	3	7.37	2.90	4.41	10.20
	Bank Concentration	2	0.86	0.04	0.83	0.89
	Spread	3	22.65	3.01	19.36	25.25
Latvia	Growth	4	1.71	10.29	-13.61	7.94
	Inflation	4	81.82	141.08	3.49	293.24
	Credit	4	33.56	29.63	11.91	77.06
	Bank Concentration	4	0.59	0.13	0.48	0.78
	Spread	4	19.28	22.06	4.33	51.57
Lithuania	Growth	4	0.59	10.07	-14.28	7.59
	Inflation	4	132.23	240.38	-0.16	492.28
	Credit	4	24.01	16.42	14.06	48.55
	Bank Concentration	4	0.82	0.08	0.75	0.93
	Spread	4	5.18	2.71	2.35	8.25
Macedonia, FYR	Growth	4	-0.36	4.98	-7.30	4.48
	Inflation	4	161.62	294.32	3.65	602.55
	Credit	4	34.37	17.54	18.54	59.34
	Bank Concentration	4	0.86	0.11	0.76	1.00
	Spread	3	10.91	6.66	5.72	18.42
Moldova	Growth	4	-1.79	9.76	-12.33	7.42
	Inflation	4	148.71	228.87	11.28	489.71
	Credit	4	14.50	10.62	5.57	29.14
	Bank Concentration	3	0.78	0.23	0.53	1.00
	Spread	3	7.74	2.56	5.01	10.08
Montenegro	Growth	3	3.76	3.69	0.25	7.60
	Inflation	2	9.94	0.83	9.35	10.53
	Credit	2	27.44	25.13	9.67	45.21
	Bank Concentration	0				
	Spread	1	5.21	.	5.21	5.21
Poland	Growth	4	3.55	2.93	-0.49	5.99
	Inflation	4	18.10	18.35	3.04	41.44
	Credit	4	26.15	7.21	19.65	35.95
	Bank Concentration	4	0.61	0.08	0.53	0.70
	Spread	4	39.58	68.55	3.71	142.38
Romania	Growth	4	1.62	5.73	-6.06	7.37
	Inflation	4	72.84	64.78	12.59	159.00
	Credit	3	15.73	9.90	9.56	27.15
	Bank Concentration	3	0.74	0.13	0.66	0.89
	Spread	3	15.35	4.88	9.72	18.40
Russian Federation	Growth	4	0.54	8.00	-7.94	7.69
	Inflation	4	196.20	292.31	16.73	630.70
	Credit	4	18.00	10.04	11.23	32.67
	Bank Concentration	4	0.48	0.28	0.19	0.85
	Spread	3	36.40	44.50	6.41	87.53
Serbia	Growth	4	-1.52	12.19	-19.15	7.07

	Inflation	3	31.27	19.95	11.54	51.43
	Credit	3	28.16	2.31	25.62	30.15
	Bank Concentration	0				
	Spread	3	29.48	20.72	10.88	51.81
Slovak Republic	Growth	4	2.24	6.45	-7.04	7.30
	Inflation	4	9.31	7.91	3.04	20.88
	Credit	4	45.74	7.60	38.24	56.14
	Bank Concentration	4	0.83	0.10	0.76	0.98
	Spread	4	5.32	0.86	4.38	6.39
Slovenia	Growth	4	2.26	3.71	-3.29	4.52
	Inflation	4	34.69	52.73	3.02	113.39
	Credit	4	39.42	19.11	26.23	67.00
	Bank Concentration	4	0.68	0.12	0.59	0.85
	Spread	4	20.82	30.55	3.80	66.57
Tajikistan	Growth	4	-2.86	11.33	-15.05	7.06
	Inflation	4	186.99	213.47	20.51	471.73
	Credit	3	16.01	3.56	12.91	19.90
	Bank Concentration	1	1.00	.	1.00	1.00
	Spread	3	24.80	18.65	13.45	46.33
Turkmenistan	Growth	4	2.71	12.73	-8.86	16.09
	Inflation	4	414.50	497.15	13.60	1043.57
	Credit	3	4.31	4.07	1.72	9.01
	Bank Concentration	0				
	Spread	0				
Ukraine	Growth	4	-1.27	9.58	-9.85	7.13
	Inflation	4	407.79	610.09	14.76	1302.00
	Credit	4	16.83	20.76	2.03	46.73
	Bank Concentration	4	0.69	0.27	0.39	1.00
	Spread	4	26.57	14.81	7.63	40.69
Uzbekistan	Growth	0.85	5.11	-5.28	6.68	
	Inflation	4	223.23	226.67	20.50	471.43
	Credit	0				
	Bank Concentration	3	0.92	0.09	0.82	1.00
	Spread	0				