DEVELOPMENT AND EFFICIENCY OF BANKING AND ECONOMIC GROWTH IN CENTRAL AND EASTERN EUROPE[1]

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Abstract

In an endogenous growth framework, well developed and efficient financial system can promote economic growth. A number of empirical studies confirmed this hypothesis. Since the financial systems of transition countries are dominated by banks, in this paper we analyze the importance of banking industry for economic growth using methods of panel data analysis for 15 Central and Eastern European countries in the period from 1992 to 2006.

Using variables that measure both quantitative and qualitative aspects of financial intermediation, our findings support the view that the effectiveness of banking industry is more important than its size per se for the economic growth in the Central and Eastern European countries.

Key-words: *banking, financial intermediation, endogenous growth, panel, Central and Eastern Europe*

JEL Classification: E44, G21

1. Introduction

In the last two decades there has been a huge increase of literature in the growth theory on the relationship between financial intermediation and economic growth (for the survey see Levine (1997), Thiel, (2001), Ang (2008)). According to the new growth models financial intermediaries lower financial market imperfections (transaction costs and information asymmetry) and affect economic growth through four channels: changing the marginal productivity of capital, proportion of saving funnelled to investment, saving rate and rate of technological innovation. A numerous empirical studies evidence that financial intermediation plays a growth-supporting role, while some have contradict results. The findings on the contribution of financial development to economic growth in transition countries are ambiguous (for the survey see Fink et al. (2008)).

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The aim of this work is to examine empirically if the banking industry as dominated part of financial systems in transition countries plays a growth-supporting role while controlling for other influences on economic growth and endogeneity. In order to accomplish the task we use endogenous growth model and apply a panel estimation techniques. Our sample consists of 15 Central and Eastern European countries in the period from 1992 to 2006.

The paper is organized as follows. In section 2 the data are described. Section 3 presents methodology. In section 4 the estimation results are presented. The paper finishes with some concluding remarks and policy recommendations outlined in section 5.

2. **Data**

In our research of banking development and efficiency and growth nexus we estimate economic growth regressions in a unbalanced panel (cross-country, time-series) data set consisting of 15 Central and Eastern European countries (Belarus, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Slovakia, Slovenia and Ukraine) over the period 1992-2006. Table 1 presents descriptive statistics for all variables used in the regressions. See Appendix for the sources of all the variables used in the research.

Economic growth is measured by growth rate of GDP per capita. In choice of proxies of banking variables we follow Koivu (2002). The level of banking development is measured by bank credit to private sector in relation to GDP (private credit). We expect positive relationship between the first banking variable and economic growth. The second variable is interest margin measured by spread between bank's lending and borrowing rate. It measures efficiency of the banking industry. We use the banking variables both current and one period lagged as in Koivu (1999) and Fink et al. (2008).

Table 1

Descriptive statistics

Variable	Mean	Median	Maximum	Minimum	Std. Dev.
Economic growth	0.044	0.049	0.122	-0.229	0.046
Private credit	0.255	0.242	0.784	0.003	0.152
Interest margins	0.117	0.067	2.690	-0.003	0.234
Log initial GDP per capita	8.135	8.258	9.864	5.991	0.793
Investment	0.005	0.007	0.094	-0.087	0.027
Education	0.924	0.930	1.090	0.720	0.075
Openness	0.520	0.521	0.854	0.223	0.141
Inflation	0.365	0.084	9.535	-0.009	1.227
Government	0.416	0.416	0.650	0.294	0.073

The first control variable is the initial level of economic development, measured by the log initial level of GDP per capita. It is introduced in the model to

capture the convergence effect or the tendency of economic growth rate to converge across countries. Thus, the expected sign of the parameter of the initial level of economic development variable is negative. The second control variable is investment. We follow the common practice of using gross capital formation as a proxy for investment. The expected sign of the coefficient is positive. The positive sign is expected for the coefficient of education variable, too. Education accounts for human capital. As a measure of education variable we use secondary enrollment. The next variable used in our research as determinant of economic growth is openness. As a measure of openness, we use export of goods and services in relation to GDP. We expect that export is positively related to economic growth. The inflation rate is used to account for monetary discipline. It is expressed by GDP deflator (annual percentage). We expect its negative correlation with economic growth. The last variable used to control for other influences on economic growth is government expenditure in relation to GDP accounts for government burden. The expected coefficient has a negative sign.

3. **Methodology**

We form the following econometric model:

$$y_{it} = \alpha + \beta X_{it} + u_{it} \tag{1}$$

where the subscripts i and t represent country and time, respectively. α is the intercept term. y is the dependent variable, that is, the growth rate of GDP per capita. X is the vector of observations on the explanatory variables that include private credit and interest margin as well as other variables that are shown empirically to be determinant of economic growth (log initial level of economic development, education, openness, inflation and government expenditure). β is the vector of coefficients to be estimated on the explanatory variables. The error term is $u_{it} \sim N.I.D.(0, \sigma 2)$.

At the first stage three approaches are taken when estimating the equations of form represented in (1). They include estimation of simple pooled regression (model with neither fixed nor random effects), fixed and random effects models. Some researchers in the finance-growth nexus empirical literature use the fixed effects model (Koivu, 2002), while some criticize it (Wachtel, 2001). We test the presence of fixed or random effects. First, the parameters of cross-section fixed effects model are estimated by using ordinary least squares (OLS) estimator. To test the significance of cross-sectional effects F-test is applied. Then we apply feasible-generalised least squares (F-GLS) method to estimate parameters of cross-section random effects models. The choice between fixed and random effects models is based on the Hausman test. If, according to Hausman test, the cross-sectional fixed effect model is preferable, then we apply F-test in order to test significance of period-fixed effects. In order to estimate the regressions with heteroscedasticity robust standard errors we use White's modified standard error estimates in all the specifications.

The equations estimated using above mentioned methods ignore the effects in other direction. Since there is a possibility of reverse causality between financial development and growth, in the next stage we extend analysis to the estimation by

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using instrumental variables that accounts for some endogeneity in the explanatory variables. We apply two-stage least squares (2SLS) estimator. As instruments we use one-period lagged regressors.

4. Empirical results

The findings of the analysis are presented in the following tables. First, the results of F-test and Hausman test are shown in the Tables 2 and 3, respectively.

Table 2

F-test results

Redundant Fixed Effects Tests							
Equation with private credit				Equation with interest margin			
Effects Test	Statistic	d.f.	Prob.	Effects Test	Statistic	d.f.	Prob.
Test cross-section fixed effects				Test cross-section fixed effects			
Cross-section F	2.685343	(14.158)	0.0015	Cross-section F	3.469394	(14.144)	0.0001
Cross-section Chi-square	38.634477	14	0.0004	Cross-section Chi-square	48.539269	14	0.0000
				Test period fixed effects			
				Period F	1.413968	(12.146)	0.1656
				Period Chi-square	18.360798	12	0.1052

Table 3

Hausman test results

Correlated Random Effects - Hausman Test							
Equation with private credit				Equation with interest margin			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.	Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Test cross-section random effects				Test cross-section random effects			
Cross-section random	10.665972	8	0.2214	Cross-section random	32.65494	8	0.0001

The preferred model for both proxies of banking variables is identified. Regarding the specification with private credit as proxy of banking development, according to F-test there are significant cross-section fixed effects, while according to Hausman test, random effects model is preferred. In another combination of variables with interest margin used as proxy of banking system efficiency, the favoured model is the fixed effects model. Testing of period-fixed effects shows insignificance of period effects.

The results obtained by the analysis which is made according to random effects model in the specification with private credit, and according to fixed effects model in specification with interest margin are shown in (3) and (4) respectively in Table 4. Beside these results, the table present results of the OLS estimation of the simple pooled regression ((1) and (2)).

According to the results, private credit in current value enters positively in growth equation in the both specifications, but only in the second one it is significant. The lagged values have negative sign, but without significance. On the other hand, coefficients of interest margin variable, both in current and lagged values, in all the specifications have expected negative sign and they are significant at 1 percent level. Regarding the control variables, investment appears to be the

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most important determinant of economic growth. The others significant factors are inflation and government. Coefficients of the education and export variables have expected signs, while significance varies among specifications.

Table 4

Bank development and economic growth: OLS/ F-GLS and 2SLS

Independent variables	Dependent variable: GDP growth					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.012845	0.266011	-0.024585	-0.02936	0.110281	0.128374
	(0.03213)	(0.039502)	(0.053381)	(0.041068)	(0.100684)	(0.0667)
Private credit	0.063207		0.070222***		0.505386	
	(0.042191)		(0.038044)		(0.367399)	
Private credit$_{-1}$	-0.035619		-0.032798		-0.466598	
	(0.053325)		(0.046319)		(0.366931)	
Interest margin		-0.035798***		-0.040554***		-0.065657*
		(0.013138)		(0.013685)		(0.0415)
Interest margin$_{-1}$		-0.023577***		-0.021483***		0.028192
		(0.00858)		(0.012189)		(0.06154)
Log initial GDP per capita	0.003421	-0.026171	0.005653	0.008496	-0.009422	-0.006314*
	(0.004725)	(0.005443)	(0.006474)	(0.005641)	(0.010185)	(0.003976)
Investment	0.880548***	0.42394***	0.86392***	0.469506***	1.044227**	0.129819
	(0.083906)	(0.16735)	(0.079699)	(0.185463)	(0.489028)	(0.536024)
Education	0.061678***	0.050312	0.063645	0.041177***	-0.003534	0.016862
	(0.036815)	(0.023513)	(0.046721)	(0.024416)	(0.094107)	(0.055269)
Openness	0.023997	0.033337***	0.034777	0.08306***	0.030533	0.056349***
	(0.016931)	(0.014252)	(0.026387)	(0.023422)	(0.020865)	(0.016791)
Inflation	-0.007131***	-0.009942***	-0.006708***	-0.010697***	-0.026493	-0.024847*
	(0.002533)	(0.000642)	(0.001011)	(0.000661)	(0.005166)	(0.015682)
Government	-0.125033***	-0.153175***	-0.162603***	-0.160588***	-0.044946	-0.147356***
	(0.039854)	(0.027047)	(0.047952)	(0.06648)	(0.096814)	(0.039475)
R^2	0.60803	0.592308	0.620315	0.695139	0.203921	0.52646
F	33.35108***	28.69348***	35.12592***	14.92482***	20.97027***	13.87794***
Observations	181	167	181	167	152	139

Standard errors in parentheses. ***, **, * denote statistical significance at the 1, 5, 10 percent level.

Regression results from 2SLS estimator are presented in (5) and (6) in Table 4. Private credit in current value has a positive sign, while in the lagged value it has a negative one, without significance in both cases. Interest margin enters economic growth equation in the expected sign with significance for current value, but not for

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the lagged one. Regarding the control variables, the coefficients on all the variables have expected sign, except for the education variable in the first specification, but it is not significant.

Thus, the overall results suggest that effectiveness of banking industry in funnelling financial resources from surplus to deficit units is an important determinant of growth. An efficient and competitive banking system lowers the costs of channelling saving into investment and promotes economic growth. On the other hand, the relationship between private credit and economic growth seems not to be completely clear. But, domination of insignificantly coefficients (coefficients with positive or negative sign with no significance in all the specifications, but one) leads us to conclude that the size of the banking sector is not as important for the economic growth as its effectiveness. The results are in line with those of Koivu (2002).

Besides of the specific characteristics of transition process, soft budget constraints, high share of non-performing loans in the banks' balance sheets, banking crises in 1990s, bank financing of enterprise working capital while the investments are financed by internal earnings and through foreign direct investment, which are among the main explanations of the empirical results of the weak relationship between financial development and economic growth in transition countries in 1990s, we add one more that is related to the more recent period. In many transition countries credit to private sector has been growing at high rates in the last years. The credit growth has been driven by macroeconomic stabilization, economic growth, reforms in the banking systems and capital inflows (Duenwald et al. (2005), Backe and Zumer (2005)). But the banks have increasingly focused on households in their lending activities. From 2000 to 2006 the household credit as proportion of GDP in the countries in our sample rose in average 3.8 times, while the credit to enterprises in relation to GDP rose 1.5 times (EBRD, 2006, 2008). Important reason is lower risk in comparison to bank lending to enterprises. Part of the credit to households is used for financing acquisitions of imported goods since there are no such goods in the local markets. However, by increasing consumption of imported goods, the rapid growth in household credit may cause macroeconomic imbalance in term of the current account deficits (Coricelli, et al., 2005). On the other hand, the banks have a limited impact on reducing financing constraints of enterprises in transition economies. But the problem also lies on the enterprise side because of the lack of enterprise reform and good investment projects (Kraft, 2006). Thus, the structure of credit to private sector could be important in explanation of the impact of the banking sector's size on economic growth in transition countries.

5. **Conclusion**

The results of empirical analysis of the role of banking industry in economic growth of Central and Eastern European countries suggest that the size of the industry, measured in terms of bank credit to private sector, is not as important as it is its efficiency together with competitive and adequate regulated bank environment. The important reason of insignificance of private credit size could be

the changes in the structure of bank credits, since banks in transition economies are increasingly focused on household lending and have limited impact on lowering enterprise financing constraints.

These study findings could be suggestive for as well as for banks' policy makers and for those on the macroeconomic level. In countries with less reformed banking system, there is a need for the improvements especially in banks' risk management practice. Banks should better use their unique position among financial intermediaries regarding the function of providing mechanism of payment which enables them to collect important information on users of their services. They should make progress in forming their own credit registers, which are an important aspect of evaluating credit risk and reducing information asymmetry which should have implications on lowering the financing constraints of enterprises. The banks efforts should be helped by institutional reforms, too. Beside those that provide competitive bank market structure and adequate banking regulation, the important improvements are needed in the field of forming public creditor register, the valuation of collateral and the creditor rights protection. In these countries as well as in those with more reformed banking sector there is a need for stronger efforts in reforms of the real sector in order to enterprises become able to offer promisingly investment projects to be financed from the banks' sources.

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APPENDIX

Sources of the data on variables used in the regression analysis

Variable	Sources
Gross domestic product	World development indicators (WDI) database, World Bank
Private credit	Financial structure database, World bank, Transition Report, EBRD
Interest margin	Transition Report, EBRD
Investment	World development indicators (WDI) database, World Bank
Education	EdStats, World Bank
Export	International Financial Statistics, IMF, line 90c World development indicators (WDI) database, World bank
Inflation	World development indicators (WDI) database, World Bank
Government	Transition Report, EBRD