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Tuuli Koivu

Do efficient banking sectors accelerate economic growth in transition countries?

Bank of Finland  
Institute for Economies in Transition, BOFIT

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All opinions expressed are those of the author and do not necessarily reflect the views of the Bank of Finland.

Tuuli Koivu \*

## Do efficient banking sectors accelerate economic growth in transition countries?

### Abstract

The relationship between financial sector and economic growth in transition countries has been largely ignored in the earlier empirical literature. In this paper, we analyse the finance-growth nexus using a fixed-effects panel model and unbalanced panel data from 25 transition countries during the period 1993-2000. We measure the qualitative development in the banking sectors using the margin between lending and deposit interest rates. Our second variable for the level of financial sector development is the amount of bank credit allocated to the private sector as a share of GDP. According to our results, the interest rate margin is significantly and negatively related to economic growth. This outcome is in line with theoretical models and has important policy implications. On the other hand, a rise in the amount of credit does not seem to accelerate economic growth. The main reasons behind this result could be the numerous banking crises the transition countries have experienced and the soft budget constraints that are still prevalent in many transition countries. Due to these specific characteristics the growth in credit has not always been sustainable and in some cases it may have led to a decline in growth rates.

Keywords: financial sector, transition economies, economic growth, panel data

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Tuuli Koivu

## Do efficient banking sectors accelerate economic growth in transition countries?

### Tiivistelmä

Rahoitussektorin merkitystä siirtymätalousmaiden talouskasvun taustatekijänä on tutkittu vähän. Rahoitussektoria näissä maissa hallitsevat yleisesti pankit; pääomamarkkinat ovat lähes merkityksettömiä. Tässä tutkimuksessa pyritään 25 siirtymätalousmaata kattavalla paneeliaineistolla selvittämään, vaikuttaako pankkisektorin kehitys talouskasvuun. Pankkisektorin laadullista kehitystä mitataan korkomarginaalilla eli anto- ja ottolainauskoron erotuksella. Sektorin koosta kertoo yksityiselle sektorille myönnettyjen lainojen määrä suhteessa maan bruttokansantuotteeseen. Tulosten mukaan korkomarginaalin pieneneminen nopeuttaa talouskasvua. Toisaalta yksityiselle sektorille myönnettyjen luottojen määrän kasvulla ei näytä olevan vaikutusta talouskasvuun. Syynä tähän voivat olla sekä siirtymätalousmaiden läpikäymät pankkikriisit että tiukkojen budjettirajoitteiden puute useissa siirtymätalousmaissa. Näiden erityispiirteiden vuoksi luottojen kasvu ei aina ole ollut keskeisellä pohjalla, ja se on saattanut jopa johtaa talouskasvun hidastumiseen.

Asiasanat: siirtymätaloudet, talouskasvu, rahoitussektori, paneeliaineisto

# 1 Introduction

The numerous empirical studies on determinants of growth in transition economies (e.g. De Melo et al. 1996, Havrylyshyn 2001, Havrylyshyn et al. 1998, 2000, Berg et al. 1999) reflect efforts to explain the sizeable variations in growth performance seen in these countries. The relationship between financial markets and economic growth, however, has largely been ignored. To our knowledge, the only study that empirically tests the relation between financial markets and economic growth in transition countries is Drakos's (2002) paper on the effects of banking sector's structure on economic performance. No studies specifically assess the roles of the size and efficiency of domestic financial markets on economic growth in transition countries. This paper is a modest attempt to rectify this gap in the literature.

Over the past decade, considerable interest focused on the link between the financial sector and economic growth. Endogenous growth theory emerged in the late 1980s and paved the way for new theories exploring the link. In addition, improved empirical methods added considerable value to subsequent studies.

Most empirical studies usually conclude development of the financial sector accelerates economic growth (e.g. Levine 1997, Thiel 2001, Wachtel 2001). A few, however, contradict this finding. In transition countries, the link between financial sector development and economic growth in transition economies seems to be ambiguous at best (e.g. Krkoska 2001, Berglöf & Roland 1995, Berglöf & Bolton 2002). They note most investment in transition countries has been financed from cash flows and foreign direct investment has substituted for domestic financing. Even in central Europe, where financial sectors tend to be better developed than in CIS countries, the banks have sometimes concentrated on granting loans to the public sector. The level of loans granted to the private sector is still considerably lower than the EU average. For these reasons, one might infer that emerging domestic financial sectors have only modestly affected economic growth in transition countries.

This paper uses empirical data to examine whether relatively larger, more efficient banking sectors accelerated economic growth in transition economies. We concentrate on banking sectors as they typically have dominated financial intermediation in transition countries. We emphasise the importance of both the qualitative and the quantitative aspects of the banking sector and measure the qualitative development in the sector with the margin between lending and deposit interest rates. To our knowledge, this variable has not been used previously to measure the efficiency of the banking sector. As in many earlier studies, our second variable for the level of financial sector development is the amount of bank credit allocated to the private sector as a share of GDP. We analyse the finance-growth nexus using a fixed-effects panel model and unbalanced panel data from 25 transition countries during 1993-2000.

Our findings support the view that the presence of an efficient banking sector accelerated economic growth in transition economies. Moreover, the interest rate margin is significantly and negatively related to economic growth – a finding that parallels theories suggesting greater efficiency in the banking sector accelerates economic growth. Indeed, as banking sector reforms and the interest rate margin are negatively correlated, it has significant policy implications.<sup>1</sup> Countries with evolved banking sectors have smaller interest margins and higher economic growth than countries struggling with banking sector reform.

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<sup>1</sup> The correlation rate between the banking reform index of EBRD and interest rate margin is  $-0.57$ .

The relationship between the amount of credit to the private sector (the second variable) and economic growth is less clear. Our results are hardly robust and causality seems to run mostly from economic growth to credit growth. This outcome contradicts the general literature, but is in line with financial market development in transition countries. A couple of characteristics of transition economies should be noted. First, banking crises rocked the financial sectors of many countries during the first decade of transition. Thus, large amount of credit could have led to significant drops in GDP growth. Second, our findings probably reflect the soft budget constraints still prevalent in many transition countries. Their existence may have encouraged private sector actors to make counterproductive investments. Against such a background, it is clear that a large banking sector is in itself not necessarily something that promotes high economic growth and on the other hand, we can argue that the size of the financial sector is not a good variable to measure the development of effectiveness in the sector in transition countries.

This paper starts with a short, general overview of banking sector development in transition countries in section 2 and then discusses earlier theoretical and empirical research work in section 3. Section 4 presents the data used in this study. Section 5 summarises the empirical results, and section 6 provides overall conclusions.

## 2 The banking sectors in transition countries

In this section, we present a short overview of banking sector development in transition countries. These banking systems typically evolved from the Soviet model, whereby a single bank was responsible for both monetary policy and commercial banking. In most central and eastern European countries (CEECs) and the Baltics, the monobank structure was abolished in the late 1980s. CIS countries introduced a more competitive system in the early 1990s. With the elimination of monobank systems, most countries experienced a rapid expansion of the banking sector with the entry of a large number of new banks and corresponding declines in state ownership in the sector. Foreign banks entered the field in many CEECs and the Baltics in the second half of the 1990s.

Rapid increases in stocks of non-performing loans led to banking crises in many transition countries during the 1990s. In fact, transition made banking sectors vulnerable in several respects. Many crises arose out of insolvencies in state-owned or formerly state-owned banks caused by bad loans inherited from the Soviet era. Moreover, transition cut enterprise profitability in certain sectors, reduced the ability of companies to service their loans. Employees in the banking sector also lacked an understanding of profit-oriented approaches to business. The operating environment for banks deteriorated in conjunction with severe output contractions in the early part of transition. Finally, regulatory frameworks and supervisory structures for the banking system in most transition countries were inadequate (EBRD 1998, Tang et al. 2000).

CEECs generally paid a higher price for their banking crises than the CIS countries, but they also ended up with sounder and more efficient banking systems. In CEECs, the average amount of credit allocated to the private sector has risen to about 25% of GDP in recent years. In CIS countries, the figure was only about 10% of GDP in 2000. The faster progress in the banking sectors in CEECs has led to a smaller amount of non-performing loans and the share of state owned assets is currently lower in CEECs than in CIS countries.

Although banking sectors are still underdeveloped in most transition economies, they are nevertheless the most important channel for domestic financing. Capital markets in these countries are small, volatile and illiquid. Indeed, the stock markets in some transition countries even face a danger of sliding into irrelevance as so many companies have been delisted in recent years. Thus, enterprises in transition countries have often financed capital investments out of their own cash flows or from lenders abroad. The level of domestic financing in many transition economies remains inadequate (Berglöf and Bolton 2002).

## 3 Earlier literature

### 3.1 Theoretical background

Both theoretical and empirical evidence suggest a strong financial sector promotes economic growth. Seven decades ago, Schumpeter (1934) stressed the role of the banking sector as a financier of productive investments and thus as an accelerator of economic growth. Most of the theoretical models relevant to our discussion, however, followed the emergence of endogenous growth theory. Pagano (1993) suggests three ways in which the development of financial sector might affect economic growth under the basic endogenous growth model. First, it can increase the productivity of investments. Second, an efficient financial sector reduces transaction costs and thus increases the share of savings channelled into productive investments. Third, financial sector development can either promote or decline savings.

Greenwood and Jovanovic (1990), Levine (1991), Bencivenga and Smith (1991) and Saint-Paul (1992) have all constructed theoretical models wherein efficient financial markets improve the quality of investments and enhance economic growth. In the Greenwood and Jovanovic model (1990), the primary task of financial intermediaries is to channel funds to the most profitable investments they can identify by using information that they have gathered and analysed. The higher rate of return earned on capital promotes economic growth, which, in turn, provides the means to implement costly financial structures.

An efficient financial sector also improves the liquidity of investments. In the models of Levine (1991) and Bencivenga and Smith (1991), financial markets improve firm efficiency by eliminating the premature liquidation of firm capital. During liquidity shocks, investors can sell their shares to another agent. Financial markets may also promote growth by increasing the proportion of resources allocated to firms. Through the diversification of productivity risk, even risk-averse investors can invest in firms.

Under Saint-Paul's (1992) model, productivity growth is achieved through a broader division of labour and specialisation of enterprises. Specialisation, however, carries risk. Financial intermediaries support specialisation by permitting investors to hedge with a diversified portfolio. Specialisation in the absence of a properly functioning financial sector, however, may be too risky individual investor. If it is, financing for efficiency improving projects dries up.

Blackburn and Hung (1996) identify a two-way causal relationship between growth and financial development. In their model, the lack of a financial sector means that every investor must individually monitor projects, so that the costs of monitoring are excessive. With a well-developed financial sector, monitoring tasks are delegated to intermediaries. Transaction costs are reduced and more savings can be allotted to investments that produce new technology. Ultimately, this promotes economic growth. Blackburn and Hung also

show how a country might become trapped in a vicious cycle of sluggish economic growth and weak financial development. This situation occurs when the initial level of technical development in the country is very low and the expected flow of new technology remains low. Monitoring costs remain so high that financial intermediation is never organised. As a result, transaction costs remain high and economic growth remains low. Harrison et al (1999) construct a model in which causality runs both ways between economic growth and financial sector development. Basically, they argue, economic growth increases banking activity and profits, which promotes the entry of more banks. The greater availability of banking services reduces the non-physical and physical distance between banks and client, which, in turn, lowers transaction costs.

Endogenous growth theory argues that a higher savings rate leads to higher economic growth. Generally speaking, development of financial sector affects the savings rate in three ways. First, financial markets can reduce idiosyncratic risks and thus lower the level of precautionary saving by households and slow down growth (Tsuru, 2000). Second, a reduction in rate-of-return risks by portfolio diversification has ambiguous effects on saving (Tsuru, 2000). Third, lowering liquidity constraints in the financial sector may lower the savings rate. For example, Jappelli and Pagano (1994) develop a model in which the younger generation borrows extensively when no liquidity constraints accompany the liberalisation of consumer credit and mortgage markets.

## 3.2 Empirical studies

A number of studies empirically analyse the relationship between financial sector development and economic growth (Levine 1997, Thiel 2001, Wachtel 2001). Goldsmith's work (1969) provides the earliest evidence that development of financing accelerates economic growth. However, the measure (deposits to GDP) used for financial sector development was highly simplified and the direction of causality was never assessed. King and Levine (1993) study cross-country data for 80 countries. They measured financial sector development with four indicators: the amount of liquid liabilities divided by GDP, the importance of commercial banks in relation to central bank when allocating credit, the ratio of credit allocated to private enterprises to total domestic credit, and credit to private sector divided by GDP. After controlling for other factors affecting economic growth, King and Levine find a strong positive relation between each of the financial development indicators and economic growth. Using cross-country analysis, Levine and Zervos (1996, 1998) research the role of stock markets and the banking sector. They conclude that stock market liquidity and bank development robustly correlate with economic growth.

Rajan and Zingales (1998) strongly criticise some of the variables used for measuring financial sector development and conclusions about causality in these studies. They argue that growth of the financial sector and economic growth can be driven by a common variable such as the savings rate and that the amount of credit and size of the stock market may predict economic growth as forward-looking financial markets anticipate growth. Rajan and Zingales note enterprises reliant on external financing develop faster in countries with well-developed financial sectors. Their study supports the hypothesis that causality runs from financial development to economic growth.

In the literature, studies using cross-sectional data tend to find a causal relationship from financial sector development to economic growth. Cross-country regressions, however, are criticised for ignoring large differences between countries (Arestis & Demetriades 1997, Neusser & Kugler 1998), as well as the reliability of results due to the instability of

long time series used (Quah 1993). Some economists have expressed scepticism about the ability of cross-country regressions to explain the direction of causality. For example, Rousseau and Wachtel (2000) argue that often components, even pre-determined, measuring financial sector development, remain correlated with the contemporaneous measures. Thus, when banks anticipate higher economic growth, they may allocate more credit. In addition, GDP growth rates tend to be correlated serially. For these reasons, Rousseau and Wachtel argue, cross-country analyses fail to unambiguously determine the direction of causality.

In recent years, several studies have used time-series framework. These studies reach mixed conclusions about the role of financial sector development in economic growth. Half of the countries in the study of Demetriades and Hussein (1996) exhibit two-way causality between economic growth and financial sector, while for the rest the relation ran from economic growth to financial development. Also Arestis and Demetriades (1997) determine that the long-run causality between financial sector and economic growth may vary across countries. Shan, Morris and Sun (2001) identify similar evidence when using causality procedure. Rousseau and Wachtel (1998) researched data from five current OECD members during rapid industrialisation (1871-1929). They find strong evidence for one-way causality from finance to growth. Conversely, Neusser and Kugler (1998) study OECD countries during 1960-1993 and cannot find strong evidence that development in the financial sector affects economic growth. Levine, Loayza and Beck (2000) show using dynamic panel analysis that banks exert a strong causal impact on economic growth. Also Leahy et al. (2001) identify a positive and generally significant relationship between financial development and the level of investment. When added to result that investment contributes directly to economic activity and growth (Bassanini et al. 2001), the authors see financial development as having a role in the growth process. Drakos's study (2002) about the relation between the financial sector and economic development in 21 transition economies shows that imperfect competition in banking sectors tends to lower economic growth and deepen business cycles.

Rousseau and Wachtel (2002) examine the effect of inflation on the finance-growth nexus. They argue information about investment projects becomes more uncertain in an inflationary environment, which complicates financial intermediation. High inflation may also repress financial intermediation by eroding the usefulness of money assets. Their empirical research shows that when inflation exceeds the 15-25% range, financial deepening no longer adds to economic growth. Their results are relevant for transition countries, where inflation rates were often extremely high in the beginning of the transition process.

As mentioned, the findings of numerous cross-country studies that financial development accelerates economic growth are somewhat contradicted by time-series models. Not only the method, but also the composition of data seems to have affected the results. Papers that use large bodies of data from both rich and poor countries normally find a causal relationship running from financial market development to economic growth. Studies of smaller groups of relatively homogenous countries often show quite opposite results. These differing results may be explained by the fact that most studies use the size of the financial sector as a measure of development in the sector. Size, however, does not necessarily capture the effect of financial sector efficiency on economic growth. Thus, the positive growth-finance nexus is only found when the size of the financial sector correlates with the efficiency of the sector. For data covering both high and low-income countries, it is typical that high-income countries have larger and more efficient financial sectors than low- or middle-income countries. In this case, the size of the financial sector correlates with efficiency and levels of income. If one studies countries with similar income levels, the size of the sector itself tells nothing about differences in qualitative levels between countries. The

efficiency of the sector is thus ignored and only size is measured. These studies do not find causality running from the financial sector to economic growth and the size of the financial sector does not seem to affect economic growth. Here, we attempt to avoid this problem using variables that measure both qualitative and quantitative financial sector development.

## 4 Data

We analyse the link between efficiency and size of the banking sector and economic growth using panel data for 25 transition countries during the period 1993-2000 (see Appendix 2 for data sources). The short period of time is unfortunate, but goes with the territory in economies in transition. The lack of information on equity and debt markets means they cannot be analysed here. However, they have yet to become significant channels for financing in transition countries. Thus, the overall picture of the relation between financial sector and economic growth in transition countries should not be seriously disturbed.

We measure economic development in terms of annual real GDP growth. As noted, development of the financial sector is difficult to measure, but we attempt to get beyond earlier studies that only measure development with a variable for size of the financial sector. Size does not necessarily reflect efficiency, so mere growth of the financial sector may not necessarily indicate development.

We look at both qualitative and quantitative development of the financial sector. To measure the qualitative effectiveness of the sector, we use the interest rate margin (INT). INT measures the difference between deposit and lending rates in the banking market. The margin is likely a good estimator for efficiency in the banking sector as it describes transaction costs within the sector. If the margin declines due to a decrease in transaction costs, the share of savings going to investments increases. As growth is positively linked to investment, a decrease in transaction costs should accelerate economic growth. This variable is closely linked to the theoretical models of Blackburn and Hung (1996) and Harrison et al. (1999). The interest rate margin may also reflect an improvement in the quality of borrowers in the economy. However, as those improvements are often linked to favourable economic development, we attempt to eliminate the problem with control variables for economic growth in the regression. We use interest rate margins from the Transition Reports published by the EBRD.<sup>2</sup>

Our second variable, CREDIT, has been used in earlier studies. CREDIT measures the size of the banking sector by dividing the banks' claims on the private sector by the GDP. The data come from the IMF's International Financial Statistics. Despite the drawbacks of this variable discussed above, CREDIT still appears a superior option to the pure ratio of broad money to GDP used in some studies, because it excludes credits by development banks and loans to the government and public enterprises. CREDIT also enables us to compare the results with previous studies.

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<sup>2</sup> Deposit and lending rates are unavailable for identical periods for each country. The overall size of the margin, however, should not be affected significantly by lending/deposit periods. Moreover, the differences in margins between and within countries are large, so a small error in the margins should not disturb the results. The IMF has reported lending and deposit rates, but this information is not available for all transition countries. Using the IMF data where possible, the results correspond to the EBRD data.

To control for other factors that influence economic growth, we use a number of control variables. The reform index (RI) consists of five indices published by the EBRD. These indices measure large-scale and small-scale privatisation, price liberalisation, forex and trade liberalisation, as well as competition policy. For each country, we have taken a simple average of these indices for each year. The bigger the index is for a country, the more advanced it is in regard to the reforms in the five areas. Due to the nature of the reforms, their effects on the economy can be seen with a lag of one or two years. We use a one-year-lagged reform index in this study. Inflation (INF) is measured by using the end-of-period consumer price index. A number of studies have found significant effects of inflation and reforms on economic growth in transition countries (De Melo et al. 1996, Havrylyshyn et al. 1998, Berg et al. 1999, Grogan & Moers, 2001).

In addition to macroeconomic variables and variables representing structural reforms, the initial conditions at the beginning of transition also determine later economic development (De Melo et al. 1996, Havrylyshyn et al. 1998, 2000). Here, however, we leave out initial conditions as control variables. In a fixed-effects model, the initial conditions should be contained in the individual dummies. Moreover, our research period starts from 1993, when the effects of initial conditions were already waning. Table 1 provides a summary statistics of the variables.

Table 1. Summary statistics 1992-2000

Variable	Period	Mean	Median	Max	Min	Std.Dev.	Obs
INT, %	1992-2000	35.88	11.2	1898.4	-15	150.98	179
INT*, %	1992-2000	15.75	10.4	77.9	-0.3	14.07	160
CREDIT, % of GDP	1992-2000	17.16	12.17	65.59	0	14.11	175
RI	1992-1999	2.68	2.87	3.8	1	0.71	200
INF, %	1992-2000	485.5	21.7	10896	-7.6	1505.2	224
Real GDP growth, %	1993-2000	0.29	2.7	17.6	-31.2	7.91	200

Notes: INT = Difference between lending and deposit interest rates as percentage points. CREDIT = Ratio of bank credit to private sector to GDP. RI = Reform index. INF = Annual consumer price index as percentages. GDP growth = Real GDP growth rate.

\*) 19 outliers have been removed from the data (Bulgaria 1996, banking crises; Croatia and FYR Macedonia 1992, profound instability in the area; Azerbaijan 1992-1994; Russia 1995-1996; Tajikistan, all observations; Turkmenistan 1992-1995; and Ukraine 1992, probable disturbances in the data).

## 5 Estimation results

To analyse the finance-growth nexus, we use a fixed-effects panel model. This choice is reasonable as our data consists of almost the entire population of transition economies. Wachtel (2001) criticises the use of a country fixed-effects model to determine causality between financial sector development and economic growth. In his view, fixed effects dominate the equation since the differences in the level of financial sector are larger between countries than over time. However, in transition economies, this is not the case normally. Banking sectors developed quickly and the level of financial development changes substantially over time. We thus estimate the following regression:

$$GROWTH_{i,t} = \beta_{0,i} + \beta_1 FINANCE + \beta_2 [CONDITIONINGSET] + u_{i,t}$$

where the dependent variable, GROWTH, equals real GDP growth,  $\beta_{0,i}$  is the individual dummy for each country (constant in time), FINANCE equals either INT or CREDIT and CONDITIONINGSET represents a vector of conditioning information that controls for other factors associated with economic growth. The error term is  $u_{i,t}$ .

Table 2. Link between the financial sector and growth: fixed-effects panel regressions

Regressors	(1)	(2)	(3)	(4)	(5)
				restricted sample	
RI <sub>1</sub>	1.751 (2.161)	2.248 (2.252)	-3.602* (1.917)	-2.134 (1.345)	6.091*** (2.138)
INF	-0.001*** (0.000)	-0.001 (0.000)	-0.009*** (0.002)	-0.006*** (0.001)	-0.000 (0.000)
INF <sub>1</sub>	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	-0.001 (0.000)
INT	-0.070*** (0.011)	-0.075*** (0.017)		-0.231*** (0.036)	
INT <sub>1</sub>	-0.046*** (0.016)	-0.006*** (0.002)		-0.050 (0.038)	
LogINT			-7.694*** (1.199)		
LogINT <sub>1</sub>			-3.564*** (0.968)		
CREDIT	4.404 (8.851)				0.241 (12.16)
CREDIT <sub>1</sub>	-9.353 (6.925)				-17.951*** (6.202)
Number of countries	22	25	25	24	22
Number of Observations	136	162	138	143	153
R <sup>2</sup>	0.68	0.65	0.68	0.68	0.51
WALD 1	235.9***	102.2***	1049***	8763***	22.85***
AR(1)	0.893	1.623	-0.652	-0.252	0.507

Standard deviations in parentheses. \* indicates significance at the 10 percent level, \*\* at 5 percent level and \*\*\* at 1 percent level.

Results from the panel estimations are presented in Table 2. Note that a shrinking interest rate margin (measure of efficiency of the financial sector) promotes economic growth. In contrast to many earlier studies, the amount of credit does not seem to accelerate economic growth. Among the control variables, the reform index seems to have the expected positive sign only in three out of five regressions and the coefficient is significant only in two cases. This result is contradicted most earlier results of growth in transition countries but might be due to our data set. As we do not have financial sector data on many CIS countries in the first half of 1990s, we lose many observations and the results for the reform

index are different than in earlier papers. As expected, inflation affects GDP growth negatively. In all, but one regression, inflation is significantly related to the growth.

In the first regression, we have both variables for the financial sector with their current and lagged values. As expected, both the current and the lagged interest rate margins are negatively and significantly associated with growth. The results do not change significantly when the credit variable is dropped in the second regression. We also test the significance of interest rate margin by including the logarithm of INT (regression 3) and leaving out several outliers (regression 4). In both cases, the margin is negatively linked with economic growth. These results are in line with theories presented in Blackburn and Hung (1996) and Harrison et al (1999), i.e. an efficient banking sector decreases transaction costs and the margin between lending and deposit rates. The share of savings allocated to the investments increases and, according to the endogenous growth theory, leads to higher economic growth.

These results have economic implications. If, for example, Romania's interest margin had averaged 6.1 percentage points as in Hungary rather than 20.6 percentage points during the period 1992-2000, Romania's annual GDP growth rate would have been 1.0 percentage point higher.

The amount of credit allocated to the private sector is insignificantly associated with economic growth. In stark contrast to earlier studies, the lagged value of CREDIT has a negative coefficient.

In fact, our results are quite in line with our earlier thoughts about using the size of the financial sector as a measure of financial development. In transition countries, the size of the financial sector does not tell about the quality of the sector. For example, soft budget constraints are prevalent in many transition countries and lending to enterprises applying soft budget constraints may have resulted in counterproductive investments and financial losses. According to Mitchell (2001), banks may even make the situation worse by keeping such loans on their balance sheets. As a result, growth in credit has not been profitable. Another phenomenon linked to the negative coefficient may be a number of banking crises that transition countries experienced in the 1990s. Unsustainable credit growth precipitated banking crises that hurt transition economies (Tang et al. 2000). Thus, the size of the sector does not correlate with the qualitative development of the financial sector in transition countries.

We checked the robustness of our results with additional control variables in the regressions. The growth rate in OECD countries has positive and significant impact on growth in transition countries. Including the OECD growth rate into the model does not affect the coefficient or significance of INT and CREDIT. None of the other control variables - government expenditure as a percentage of GDP, share of exports as a percentage of GDP, gross domestic investments as a percentage of GDP - have any significant effect on INT or CREDIT.

We know it has been considerably harder for CIS countries to achieve economic growth than CEECs or the Baltics. Thus we ask, does the level of financial sector influence economic growth differently between these two groups of countries? To find out, we divide the countries into two groups. The first group (CEEC) includes all central and eastern European countries and the three Baltic countries. In second group (CIS), we include all CIS countries. The results of least squares dummy variable (LSDV) estimations are presented in Table 3. For both groups, the interest rate margin has the expected negative sign and is statistically significant.

Table 3. Fixed-effects panel regressions for CEEC and CIS

Regressors	(1) CEEC and Baltics	(2) CEEC and Baltics	(3) CIS	(4) CIS
RI <sub>1</sub>	-0.404 (1.867)	2.304 (2.324)	4.885 (4.723)	4.120 (3.158)
INF	-0.026*** (0.008)	-0.021*** (0.005)	-0.000 (0.000)	-0.006* (0.003)
INF <sub>1</sub>	-0.005** (0.002)	0.001 (0.002)	-0.002*** (0.001)	-0.000 (0.001)
INT	-0.042*** (0.008)		-0.082*** (0.024)	
INT <sub>1</sub>	0.012** (0.005)		-0.023* (0.013)	
CREDIT		-13.31 (9.957)		109.2*** (16.52)
CREDIT <sub>1</sub>		-5.826 (7.651)		-42.704*** (15.61)
N	13	13	12	9
Number of observations	99	87	63	58
R <sup>2</sup>	0.57	0.49	0.73	0.62
WALD 1	3587***	228.4***	215.2***	581.4***
AR(1)	1.680*	-0.543	0.9353	-0.179

Standard deviations in parentheses. \* indicates significance at the 10 percent level, \*\* at 5 percent level and \*\*\* at 1 percent level.

The results differ more between the groups when looking at the link between amount of credit and GDP growth. For CEE countries, both the current and lagged values of CREDIT are negatively linked to growth but the coefficients are not statistically significant. For CIS countries, the current level of credit is positive and significantly linked to the growth. On the other hand, the lagged value of CREDIT is negatively linked to growth and this result is also significant. These results confirm our earlier thoughts on banking crises and soft budget constraints in transition countries. Soft budget constraints have been more prevalent in the CIS, and to some extent explain the counter-productivity of bank credit in these countries. On the other hand, costs of banking crises were more severe in CEE countries. However, the reasons for differences in growth rates of the two groups are not found in these results.

Table 4. OLS causality tests between financial sector and economic growth

Regressors	(1)	(2)	(3)	(4)
	Y	Dependent Y	variables INT	CREDIT
C	2.908*** (0.360)	1.852** (0.759)	19.435*** (4.406)	0.020** (0.009)
Y			-1.587 (1.127)	0.000 (0.001)
Y <sub>-1</sub>	0.518*** -0.065	0.503*** (0.092)	0.226 (0.703)	0.002** (0.001)
INT	-0.052*** (0.009)			
INT <sub>-1</sub>	-0.010 (0.008)		0.006 (0.059)	
CREDIT		5.153 (10.28)		
CREDIT <sub>-1</sub>		-5.547 (9.747)		0.866*** (0.060)
Number of countries	25	22	25	22
Number of Observations	150	145	150	145
R <sup>2</sup>	0.5	0.34	0.12	0.87
WALD 1	175.6**	46.26**	9.33*	294.5**
AR(1)	-0.986	-1.163	0.378	1.451

Standard deviations in parentheses. \* indicates significance at the 10 percent level, \*\* at 5 percent level and \*\*\* at 1 percent level.

Next, we examine the direction of causality between the financial sector and economic development using a modified Granger causality test. We test for the causality between interest rate spread and economic growth with the following equations:

$$Y_t = c_i + \alpha \sum_{i=0}^1 Y_{t-i}^{i,j} + \beta \sum_{i=0}^1 INT_{t-i}^{i,j}$$

$$INT_t = c_i + \alpha \sum_{i=0}^1 INT_{t-i}^{i,j} + \beta \sum_{i=0}^1 Y_{t-i}^{i,j}$$

To test for causality between credit allocated to the private sector and economic growth, we apply the following equations:

$$Y_t = c_i + \alpha \sum_{i=0}^1 Y_{t-i}^{i,j} + \beta \sum_{i=0}^1 CREDIT_{t-i}^{i,j}$$

$$CREDIT_t = c_i + \alpha \sum_{i=0}^1 CREDIT_{t-i}^{i,j} + \beta \sum_{i=0}^1 Y_{t-i}^{i,j}$$

The results of estimations are presented in Table 4. Note that causality runs from financial sector development to GDP growth when we measure the financial development by the interest rate margin. This fits fine with the theoretical model of Blackburn and Hung (1998) presented earlier. The two-way-model of Harrison et al. (1999) is not strongly supported because higher GDP growth is linked only insignificantly to a decrease in the interest rate margins.

The causality between the amount of credit and economic growth seems to be much more unclear. Although the amount of credit is positively linked to growth, the result is not significant. On the other hand, probably due to the reasons we have presented earlier, higher economic growth (when lagged one period) appears to have increased the amount of credit in transition countries.

## 6 Conclusions

This paper examined the link between the banking sector and real GDP growth in transition economies. We used a fixed-effects panel model and data from 25 transition countries for the period 1993-2000. We used two variables to measure the level of financial sector development. As the size of the financial sector in itself is not necessarily a valid measure for financial sector development, we selected the interest rate margin, which is closely linked to the theoretical models.

As expected, the interest rate margin is negatively and significantly associated with economic growth. This result is consistent with theoretical models that find banking sector efficiency important for economic growth. The outcome is the same for both CEEC and CIS countries. This has important policy implications: the interest rate margin tends to shrink as reform in the financial sector advances.

Our second variable, the amount of bank credit allocated to the private sector, apparently does not speed up economic growth in transition countries. Its lagged value is even negatively related to economic growth and the causality between the growth of credit and real GDP growth is unclear. This result contradicts many earlier results and probably reflects the characteristics typical to transition economies, where the growth of domestic credit was often unsustainable.

The results suggest two reasons that financial sector efficiency should not be measured by sector size in the case transition economies. First, the soft budget constraints prevalent in many transition countries and credit to enterprises applying soft budget constraints may lead to considerable losses in the economy when investments turn out to be counterproductive. Second, the negative link between the lagged amount of credit and growth may reflect banking crises that many transition economies experienced during the research period. The increase in credit imposed considerable costs in the wake of the crises in many banking sectors. Thus, the amount of credit is probably not a valid measure of financial sector development in transition countries.

Apparently, when the financial sector or the business environment is not ready for growth in the amount of finance, growth in the amount of finance may be unsustainable and do nothing to accelerate economic growth. In the worst case, such growth in the amount of available finance may precipitate financial crises and harm economic development.

On the other hand, our results are in line with the theoretical models that indicate qualitative financial sector development accelerates economic growth. Nevertheless, it would be valuable to test empirically the channels through which financial development

affects economic growth. Under the theoretical models we presented, these channels might be growth in investments, productivity improvement or an increase in the savings rate. It would also be useful to clarify the relationship between FDI and domestic debt. According to Krkoska (2001), FDI in transition countries supplements inadequate domestic resources in financing ownership change and capital formation. One might ask if this is an efficient means of finance or whether an efficient domestic financial market might be more conducive to economic growth.

Another useful extension of this study would be to include the equity markets into the model. Although the equity and debt markets in transition economies are far from developed and their role in financing limited, it would be interesting to clarify their role in economic development. The number of countries might also be increased. As mentioned above, the interest rate margin has not been used as a variable for financial development, so it might be interesting to see results for a larger group of countries. By doing so, we would supplement earlier papers that have largely ignored the ways in which qualitative development of financial sector influences economic growth. From there, policy recommendations could be extended beyond transition countries.

## Appendix 1 List of the countries

Albania	Georgia	Romania
Armenia	Hungary	Russia
Azerbaijan	Kazakhstan	Slovak Rep
Belarus	Kyrgyzstan	Slovenia
Bulgaria	Latvia	Tajikistan <sup>1</sup>
Croatia	Lithuania	Turkmenistan <sup>1</sup>
Czech Rep.	Moldova	Ukraine
Estonia	Poland	Uzbekistan <sup>1</sup>
FYR Macedonia		

- 1) Due to a lack of data, Tajikistan, Turkmenistan and Uzbekistan are not included in models using the amount of credit.

## Appendix 2 Variables and sources

<b>Variable</b>	<b>Definition</b>	<b>Source</b>
Growth rate of GDP	Real GDP	EBRD Transition reports
Interest rate margin, INT	Margin between deposit and lending rate	EBRD Transition reports
Credit to private sector, CREDIT	Credit to private sector from deposit banks as a share of GDP (line 22d/GDP)	IFS
Reform index, RI	Arithmetic average of EBRD transition indices (Index of price liberalisation, Index of forex and trade liberalisation, Indices of small-scale and large-scale privatisation, Index of competition policy)	EBRD Transition reports
Inflation, INF	Consumer price index	EBRD Transition reports
Investments	Gross domestic investment as a share of GDP	IFS
Exports	Exports as a share of GDP	IFS
Government Expenditure	Government expenditure as a share of GDP	EBRD Transition reports
Growth rate of GDP in OECD countries	Real GDP	IFS

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