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Importance of Financial Sectors for Growth in Accession Countries

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ABSTRACT

We use a production function approach in investigating the relationship between financial development and economic growth in 9 EU accession and new EU member countries during their transition period. Along with real capital stock growth, labor participation and educational attainment, we use aggregate measures of financial development as well as measures for single segments of financial sectors. To our knowledge in context of transition countries, bond markets are taken explicitly into account for the first time. This approach enables us to identify the segments of financial markets that contribute most to economic development of the EU accession countries. We find that the overall financial sector development, as well as two single segments - domestic credit and bond markets - stimulate economic growth in our sample. On the other hand, private credit and stock market capitalization are found to have no significant influence on growth. As for the other growth determinants, real capital stock growth turned out to be an important factor contributing to economic development, while labor participation and educational attainment did not play a significant role. We conclude that the impact of access to financial markets and bank loans on growth is different for private and public sectors. Development of financial market segments with stronger links to the public sector has stimulated economic growth.

JEL classification: C-23, G-10, G-21, H-74, O-11, O-16, O-52

Keywords: finance-growth; EU-accession countries; production function; credit, bond, stock markets; private/public finance

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1. INTRODUCTION

Over the last decade the role of financial sector development in economic growth has become a major topic in empirical research. Most cross-section oriented studies (for example Rousseau and Wachtel 2003, Levine, Loayza and Beck 2000, Singh, Singh and Weisse 2000, Demirgüç-Kunt and Levine 1999) base their analyses on broad samples of industrial and developing countries. Most of them come to the conclusion that there is a positive interrelation between financial development and economic growth. But as Ahmed (1998) argues with respect to bank development: “[...] there are reasons to expect that [...] the effect of bank development on growth may not be the same in magnitude in developing countries and industrial economies [...]. Thus due to country aggregation we cannot answer interesting questions such as: how do the effects of banking development in a country such as the United States differ from those in Zimbabwe, say?” A recent study by Rousseau and Wachtel (2005) also shows that the analysis of a possibly different impact of finance on growth in different countries and different periods becomes increasingly important. They find that the nexus between finance and growth seems to be significant for middle income countries (between 3,000 and 12,000 USD per capita), but not for low income and high income countries. In addition, if countries are grouped according to the relative development of their financial sectors they find evidence for positive and significant effect on growth only for the group of countries in the middle range (countries with M3 to GDP ratios between 45 and 60%). Rousseau and Wachtel (2005) conclude that: “[...] the correlations between finance and growth found in cross-country data may well reflect differences in country characteristics rather than any dynamic cause-effect relationship from finance to growth.” They call for more studies on individual countries’ experiences and the relationship between finance and growth.

Picking up this thought, our paper addresses two research questions: First, has financial development played a significant role for the growth performance of “emerging market” transition and accession countries? Second, do different financial segments (i.e. banking intermediation, stock markets, bond markets) affect real growth differently in these countries? Thus, we hope to find out which form of external finance is most efficient in terms of inducing future growth and why. With regard to EU-enlargement the examination of those research questions may be of special relevance for securing long-term growth of new EU-member states and accession countries and in speeding up real convergence to the EU.

We use a production function approach to investigate the relationship between financial markets and economic growth during the 1996-2000 transition period of 9 EU accession and new EU member countries.¹ First we use an aggregate measure of financial development covering credit, bond and stock markets, which is less influenced by differences in financial market structures

¹ The group of countries labeled as EU accession countries includes: Bulgaria (BUL), Czech Republic (CZ), Slovakia (SLK), Hungary (HUN), Slovenia (SLO), Poland (POL), Romania (ROM), Malta (MLT) and Turkey (TUR). This group largely consists of transition economies, and we therefore, although not completely correctly, use both terms: transition and accession countries. For a recent study on transition countries including the CIS (Commonwealth of Independent Nations), see Cottarelli et al, 2003.

between countries, and changes of financial market structures within countries. The following analysis of causal links between single financial market segments and economic development is a first step in determining interdependencies between the structure of financial markets and economic growth, an issue rather ignored by the literature so far. In the context of accession countries, bond markets are, to our knowledge, taken explicitly into account for the first time.

Methodologically, we rely on a panel data approach. As for the specification of growth regressions, we follow the standard approach by Mankiw et al (1992), who use physical capital stock, labor, and human capital as explanatory variables of economic growth. We add different financial market variables: two different measures of total financial intermediation, domestic credit, private credit, stock market capitalization and bonds outstanding. Such extensions of a standard growth model are the most common approach in the literature.

We find that the overall financial sector development, and especially two single segments, i.e. domestic credit expansion and development of bond markets, stimulate economic growth in our sample. In contrast to earlier studies in other regions (e.g. Atje and Jovanovic, 1993, and Levine and Zervos, 1998), we find no significant influence of private credit and stock markets on growth for accession countries. As for the other growth determinants, real capital stock growth turned out to be an important factor contributing to economic development, while labor participation and educational attainment did not play a significant role. The results indicate a clear distinction between the growth effects of the financial funds channeled to/through the public sector and those directed to the private sector at this stage of development. It turns out that in order for the private sector to be more effective in promoting growth, different potential obstacles need to be removed as identified in the literature and in this paper. The results are especially relevant in the context of EU enlargement, i.e. for securing rapid development and real convergence of new EU-member states, but also of other accession countries and emerging markets.

The remainder of the paper is organized as follows. Section 2 reviews relevant empirical literature that deals with the nature of the finance - growth link in accession countries. Section 3 outlines the basic theory on finance and growth, discusses some methodological issues for empirical research and states the econometric model. Section 4 analyzes summary statistics of data and gives an overview of the econometric results. In the fifth section the results are discussed and interpreted.

2. FINANCE AND GROWTH IN ACCESSION COUNTRIES – EARLIER RESULTS

Since most (but not all) of the accession countries considered in this study were transition economies of Central and Eastern Europe during the period covered here, this section will concentrate on reviewing the literature on finance and growth in transition. In general, UNECE (2000a) finds a strong positive correlation between financial depth and the intensity of private savings in transition countries. Increased domestic savings lead to higher levels of investment and

thus contribute to long run growth. But in discussing the previous evidence on the impact of financial intermediation on growth, it is useful to separately analyze the effects of individual financial sectors. We mostly rely on the study by Bonin and Wachtel (2003) who give an extensive review of developments in banking sectors and capital markets. Other literature on this topic has mostly been concerned with the banking sector only, because of its dominant role in the financial sectors of these countries.

Banks in the former socialist countries prior to the 1990s were largely inefficient and characterized by a large amount of bad loans and preferential allocation of credit (Drakos 2003; Eller and Haiss 2003; Fink et al 1998). Therefore, one of the most urgent goals of the policy makers at the beginning of transition was to create a stable banking system. This was viewed as extremely important for the success of the whole transition process. The inherited, mostly monobank systems, were eliminated in the late 1980s and early 1990s. The banking sectors have experienced a large number of new entries and declining state ownership due to privatization. However, soon it turned out that liberalization and privatization alone are not enough to create a strong and stable banking sector. It became clear that it will take longer time to achieve higher independence from the state and to restructure the banks – i.e. to remove the mostly inherited bad loans from their balance sheets, but also to stop the continuing bad lending practices (Bonin and Wachtel 2003; Fink and Haiss 1999).² In addition, although the regulatory framework was created rather early, bank supervision was not effective because of the lack of trained and experienced personnel and infrastructure. This problem was especially profound in the countries that chose to promote competition by imposing very soft initial licensing conditions on banks, leading to entry of many “[...] small weak banks engaged in risky, and sometimes fraudulent activities.” (Bonin and Wachtel 2003; see also Fink et al 1998). All these reasons led to banking crises in many transition economies forcing the governments to intervene and often recapitalize the banks. More and more, the governments were turning to foreign participation in the bank privatization process as an effective and possibly necessary way to promote competition, enhance the efficiency and to strengthen the independence of the banking sector. Five issues still stick out with regard to the microeconomic safety and soundness of the New Member States’ financial sectors: the small size of the financial sector in absolute and relative terms; large foreign bank ownership; the level of concentration and competition; bad debt; and the product range (Breuss, Fink and Haiss 2004). With time, nonperforming loans have gradually disappeared from the balance sheets and banking supervision has become more and more effective (ECB, 2004).

Drakos (2003) finds that the banking sector has improved its efficiency as measured by the net interest margins in the period between 1993 and 1999. Using a panel of banks for a set of 11 transition countries he showed that foreign banks contributed to this improvement by intensifying competition and by producing positive externalities to the banking sector through demonstration effects. In addition, selling the controlling shares to foreign banks helped the governments to

² The quality of the existing relationships in state-owned banks could only be recognized gradually. It is also worth noting that the approach to cleaning up bank balance sheets differed across countries (Berglöf and Bolton 2002).

credibly signal the end of bank bailouts. The result that foreign ownership of banks in transition countries increases the overall efficiency of banking sector is confirmed by Weill (2003) for the Czech Republic and Poland, after controlling for differences in scale of operations and the structure of activities. It must be stressed that the policies and especially the timing of policy implementation varied across different transition countries. For example, in Hungary the controlling shares of state-owned banks were sold to strategic foreign partners relatively early and quickly, enabling the comparatively successful restructuring of the banking sector.³ On the other hand, Romania was facing banking crises still in 1998 and 1999. Fries et al (2002) give some evidence that bank performance and increased efficiency depends on the reform environment as well as the competitive conditions in which they operate. They conclude that an appropriate regulatory framework may be a necessary condition for an efficient banking system. Pistor et al (2000) analyze the impact of legal change in the protection of shareholder and creditor rights in transition countries and of effectiveness of legal institutions on the propensity of firms to raise external finance. Their results clearly emphasize the role of effective institutions. Bonin and Wachtel (2003) argue that although more order and better business practices in banking sectors of the transition economies have been established, although there have been less and less nonperforming loans in the banks' balance sheets, and although the regulation and supervision have become much more effective, this still does not mean that the banks are always effectively serving the economy. In some transition countries banks still may be lacking the willingness or ability to lend to enterprises.

Koivu (2002) performed an econometric investigation, using a fixed-effects panel model in order to answer the question whether relatively larger and more efficient banking sectors have promoted economic growth in 25 transition economies. The efficiency is measured by the margin between lending and deposit interest rate and the size of the banking sector is defined as the share of bank credits to the private sector in GDP. The period under consideration is from 1993 to 2000, and thus, includes the early years of transition with very few implemented reforms. She concludes that the interest rate margin is a significant determinant of growth, and that lower margins promote economic growth. The size of the banking sector, on the other hand, is not found to be growth enhancing. Moreover, when used in a regression its lagged value is found to have a significant but negative influence on growth. The reasons for such results are found in specific features of the transition process and the relatively slow banking sector reforms with all of its problems, such as preferential allocation of credits leading to bad loans, lack of effective supervision and weak competition. Since the quality of banking intermediation and indirectly the success of the reforms in the banking sector can be measured by the interest margin (Drakos 2003) one can conclude that a significant determinant of growth might be the degree of how advanced a country is with respect to reforms of the banking sector.

³ In 1995, in the privatization of the largest Hungarian bank (OTP) no majority influence of the foreign investor was permitted in order to prevent the foreign dominance in the banking sector (Bonin and Wachtel 2003). Bonin, Hasan and Wachtel (2004) provide some more evidence that foreign banks are more efficient than domestic banks, and especially than those owned by the government. In addition, they find that the method and timing of privatization matters for bank efficiency.

Stock markets in transition economies developed relatively quickly on average, but uneven across countries. The most important cause of the rapid emergence of stock markets was the privatization process, especially in countries that relied on voucher methods (e.g. Czech Republic). The ratio of market capitalization to GDP (a common measure of the development of stock markets) tends to be highest where privatization has gone the furthest. But when these ratios are compared with the corresponding value in a typical country with similar per capita output, then they still turn out to be relatively small for the transition economies. This measure, however, is not always a good indicator of how well stock markets perform their function as financial intermediaries. Their effectiveness may be limited by illiquidity and lack of transparency, as is often the case in transition countries (Bonin and Wachtel 2003). Another measure of stock market intermediation – the ratio of value traded to capitalization - reveals comparatively low values for most of the transition economies during the first ten years of transition (with the exceptions Hungary, Czech Republic and Poland at the end of the 1990s). Although the number of listed companies kept increasing due to further mass privatization programs, the value traded ratio remained relatively low.⁴ The reasons are very diffuse ownership structures and the fact that many small companies were listed whose stocks were hardly traded (Bonin and Wachtel 2003).

In transition economies the expectations that stock markets can provide access to capital for so many firms turned out to be unrealistic. The intermediating activity was concentrated on only a few large companies. As was the case for banks the institutional framework and the infrastructure became effective only with a time lag, causing many problems with transparent transfer of ownership and price manipulations, thus further reducing the effectiveness of stock markets as financial intermediaries. An important aspect for the development of the stock markets in transition economies was the increased interest of foreign capital in shares of the local companies, leading to high capital inflows especially between 1995 and the Russian financial crises in 1998 (Bonin and Wachtel 2003). Despite the slowdown in 1998 a significant share of total market capitalization in some transition countries is foreign owned (e.g. over 50% in Hungary). Another important issue is that larger companies which were successfully privatized in more advanced transition countries have access to international capital markets.⁵ This is an indicator of the attractiveness of these companies and achievement of accounting and disclosure standards. On the other hand, it may represent an obstacle to further development of local capital markets, which may remain restricted to small and illiquid issues. This problem is not specific to transition countries. Virtually all emerging economies (except for the very large ones) and even some of the small developed countries face similar problems (Bonin and Wachtel 2003).

Given that the described circumstances affect the development of stock markets and their effectiveness as financial intermediaries, it is hard to expect that stock markets could have

⁴ While there are less than 10,000 firms listed on the national exchanges in the United States and about 3,000 on the New York Stock Exchange, 8,748 companies were listed in transition stock exchanges in 1999 (Bonin and Wachtel 2003).

⁵ At the end of 1999 there were 72 companies from transition countries listed at the New York Stock Exchange or Nasdaq (Berglöf and Bolton 2002).

significantly promoted economic growth in transition economies. Kominek (2003) analyzes the likely effect of stock markets on growth in the Czech Republic and Poland, two countries with significant progress in implemented economic reforms. A major finding of the paper is that the less favorable conditions and circumstances of the Czech stock market have not caused any important disadvantages to industries traditionally regarded as financially dependent on external financing, but firms listed in Poland (not only those considered financially dependent) have outperformed their counterparts in the Czech Republic. In general, quoted companies developed better than the non-listed firms in both countries. Still, the direction of causality does not seem to be from stock markets to industry growth. Kominek (2003) believes that the most important impulses in the development of the Warsaw Stock Exchange were only responses to increasing demand by firms and sectors, which before had successfully started to look for funding on other European financial markets.

Another potentially important segment of the financial sector is the bond market. In the transition economies bond markets are mostly small, only governments and few large companies are potential issuers (ECB 2003; Haiss and Marin 2003), which have also direct access to international markets. Although large government deficits have also led to the sale of debt to the local public, there are rarely secondary markets for bonds, since these are mostly bought and held by the banks. An additional reason for the lacking secondary market activity is that other institutional market participants, such as pension funds and insurance companies have been underdeveloped as well. The situation is even worse with private bond markets in transition countries, which are so rare that they have been considered "... a missing element of capital market development" (Bonin and Wachtel 2003). Yet, there are some corporate issues on domestic markets, especially in more advanced transition economies. For example, in the Czech Republic corporate bond issues by so-called "blue chip" issuers are an exception on the relatively undeveloped capital markets. In 1995 bond volume outstanding from eight issues amounted to about 1.25 billion USD (Bonin and Wachtel 2003). The further development of institutional investors can contribute to faster development of the bond markets by strengthening the demand side of the market. With progress in enterprise restructuring, regulatory framework, accounting and disclosure standards, also the supply side of the bond markets can start developing more rapidly since the restructured larger companies, which are able to issue bonds, have access to finance at more favorable rates than bank loans. This segment of financial intermediation, although relatively small, can be expected to have had stronger positive consequences for economies in transition than bank credits or stock markets. As described earlier, among other difficulties, bank credits have been afflicted with a significant portion of nonperforming loans. At the same time, stock market capitalization has been inflated with many listed companies whose shares were not actually traded. In other words, they have been illiquid. By contrast, bonds are either issued by governments and are therefore of very low default probability, or by restructured, large and sound companies, which have achieved higher accounting and disclosure standards, therefore increasing transparency and enabling better management monitoring.

While Bonin and Wachtel (2003) ask whether the capital raised by the government, either through bond issues or, more importantly through privatization, represents an improvement in allocation of resources, since it rarely increases private capital stock,⁶ this is not the crucial question in the context of our study, since the improved access to finance for public sector does not have to improve growth only by increasing private capital stock. Public infrastructure expenditures, education expenditures, or implementing efficiency-enhancing public administration reforms may lead to higher growth rates as well.

Another important remark by Bonin and Wachtel (2003) should not be left out here. In conclusion of their study, they argue that many problems, with which financial sectors of transition countries have been confronted at the end of 1990s, are also typical problems of other emerging market countries. This justifies adding two emerging economies, Malta and Turkey, to the sample together with transition countries.

3. THEORY, METHODOLOGY AND THE PRODUCTION FUNCTION APPROACH

3.1 *THEORY*

Already Schumpeter emphasized the importance of financial intermediaries and financial markets in the process of economic development. In the 1960s and 1970s this interest was renewed and later, with the development of endogenous growth theory, for the first time the functions of financial systems and the positive impact they exert on economic development could be modelled. Berthelemy and Varoudakis (1996b), Becsi and Wang (1997), Pagano (1993) and especially Levine (1997) give excellent surveys of the functions of financial markets and how they help to improve economic development.⁷ Fink, Haiss and Mantler (2004) provide an extension to financial sector macro efficiency.

Financial intermediaries and financial markets arise because there exist market frictions which include information costs, costs of enforcing contracts, and exchanging goods and financial claims (Levine 1997). The primary function of financial systems is to facilitate the allocation of resources. More specifically, financial systems may facilitate risk management - they help to diversify liquidity risks (Greenwood and Smith 1997, Bencivenga and Smith 1991, Levine 1991) and idiosyncratic investment and demand risks (Greenwood and Jovanovic 1990, Levine 1991, Saint-Paul 1992, Obstfeld 1994). On the other hand, diversification makes possible the financing of riskier, but more productive investments and innovations (Greenwood and Jovanovic 1990,

⁶ Krkoska (2001) finds that foreign direct investment, capital market financing and domestic credit have made significant contribution to overall gross fixed capital formation in transition countries. Capital market liquidity (defined by turnover ratio), on the other hand, has played no significant role.

⁷ A survey of the theoretical literature is out of the scope of this paper. We only give a very brief overview of the basic theoretical insights together with the most important references. An interested reader is advised to consult the above surveys. We mostly rely on Levine (1997).

Greenwood and Smith 1997, Levine 1991, Bencivenga and Smith 1991, Obstfeld 1994, Saint-Paul 1992, King and Levine 1993a): "The mere trading of risks, taken as given, is only part of the story and in many aspects the less interesting part. The possibility of shifting risks, of insurance in the broadest sense, permits individuals to engage in risky activities they would not otherwise undertake" (Arrow, 1971).

Financial intermediaries and financial markets also decide directly on the allocation of resources, gather information and exert corporate governance (Greenwood and Jovanovic 1990, King and Levine 1993b). Intermediaries may be seen as specialized economic agents in performing these tasks, what lowers the information costs for the whole economy. They may mobilize savings and facilitate exchange of goods, services and contracts. In addition, financial markets are a necessary condition for the increasing specialisation of the economy (e.g. Saint-Paul 1996, Greenwood and Smith 1997) and build the basis for an efficient payment system.

By reducing market imperfections and frictions the development of financial markets promotes economic growth ("supply leading approach", Patrick 1966), but simultaneously there exists a reverse channel from economic growth to financial development: economic growth produces an increased demand for financial services; thus, financial development must be understood as a demand driven phenomenon ("demand driven approach", Patrick 1966).

It is possible to analyse theoretically both causal channels within a single model and allow for feedbacks among them if we assume that the development of financial systems is - similar to other networks - expensive and characterised by large fixed costs: Economic growth increases the amount of savings; savings will be intermediated more and more efficiently in a financial system characterised by increasing returns to scale; thus, an increasing amount of investments can be financed which further stimulates economic growth. Berthelemy and Varoudakis (1996a, 1996b) developed a model with reciprocal causality using an increasing returns to scale technology in the financial and an AK type model in the real sector. This set-up also allows for the existence of multiple equilibria. As described in the works of Saint-Paul (1992) and Arnold (1998) they may take on the form of poverty traps. Different levels of financial development may therefore serve as a possible explanation for the missing empirical convergence of growth rates and the existence of convergence clubs as described by Durlauf and Quah (1998).

It must be noted that although the theoretical literature is mostly concerned with two channels of influence from finance to growth: private capital accumulation and technological innovation, there may be other channels as well. It is not necessarily the level of (private) capital stock in the economy that is affected, but its quality with respect to expected returns on investment, because some of the functions of financial systems mentioned above, such as gathering information and deciding directly on the allocation of resources, may affect the choice of projects which are financed and carried out. In addition, it has also been a widely accepted fact that investing in human capital, public infrastructure or efficiency enhancing reforms in public administration may also be

growth promoting although not through the above channels. Still, all of these investments must be financed and are therefore reinforced by the well-functioning financial system.

3.2 *METHODOLOGY AND THE MODEL*

According to Temple (1999), the most popular method among economists exploring economic growth are cross-section growth regressions. Still, there are many problems associated with this approach like e.g. parameter heterogeneity, unobserved fixed effects, measurement errors, or endogeneity. Economists have used different techniques to mitigate some of these potential problems (e.g. using initial and not average values of variables to alleviate endogeneity), so that the popularity of cross-section regressions is still rather high. Temple (1999) argues that the use of panel data models has some advantages. For example, panel data techniques may automatically account for omitted variables and heterogeneity of the initial conditions. Or, when longer spans of data are available, one can use several lags of regressors as instruments, when needed, and thus alleviate problems of potential measurement error and endogeneity.

Wachtel (2001) believes that although the above techniques (using the initial or lagged variables) are commonly used to ameliorate the effects of simultaneity, they do not completely solve the problem. He argues that the dynamic panel data methods (panel VARs) do a much better job. On the other hand, Temple (1999) believes that the “[...] finite sample properties of most dynamic panel data estimators are not yet well understood.” He gives a detailed discussion of advantages and disadvantages of different approaches and argues that conventional panel data regressions, used to supplement (or supplemented with) cross-section results, is a better method than dynamic panel data approach. Researchers are not unanimous in deciding what kind of data to use, either. Since the underlying relationship is a long-run one, some argue that five or ten year averages of variables should be used in regressions, preventing short-term macroeconomic effects from influencing the results. Research by Rousseau and Wachtel (2000), Hahn (2003) and Beck and Levine (2004) follows this approach. On the other hand, using averages lowers the number of observations that can be used in estimations. If we do not have longer time series for over two decades or longer, it is impossible to implement such an approach with panel data techniques. In such cases, cross section studies should be used if the potential problem with short term effects is to be alleviated. But if the number of cross-section units is not large enough, one might get into trouble of not having enough observations for a meaningful estimation. In this case, switching to annual data and applying the panel data method is probably a much better choice.

For example, Koivu (2002) and Mencinger (2003) follow this approach in similar settings for transition countries. Admittedly, in such cases, one actually addresses the short-run economic activity or performance, rather than long-run economic growth or development. Another open question is whether fixed or time effects, both or none of those, should be used in panel data specifications. Fixed effects may account for omitted variables, but many researchers believe that these effects are lost with the differencing, i.e. in derivation of the estimated equation from a

production function relationship, and that they should not be used in regression. On the other hand, some economists think that they should be used if they enter the equation significantly, but one needs to be cautious because they may cause problems in the context of financial intermediation and growth research (Wachtel, 2001). The reason for this is that the measures of financial development vary significantly across countries, but in a single country very slowly over time.⁸

In this study, we rely on a panel data approach because our sample is small: we have only 9 cross section observations for accession countries. Our findings reconfirm preliminary results based on simple cross-country-regressions (Fink, Haiss and Vukšić, 2006). By using the panel data approach with annual data, we get more observations. That the results of two approaches are not very different is often the case when applying different techniques in finance and growth research (even when applying different panel data methods, see Wachtel 2001 or Rousseau and Wachtel 2005). As for the specification of growth regressions, we rely on the modification of the approach formally derived in Mankiw et al (1992). They use capital stock, labor, and human capital as explanatory variables, modeled as inputs in the production function.⁹ We augment their production function by adding different financial markets variables in our empirical specifications. So basically, we run a regression, controlling for the sources of growth other than financial intermediation, which were formally derived from the standard model of Mankiw et al (1992) and empirically confirmed. As argued by Temple (1999), extensions of this kind are not perfect, and make the interpretation of the results difficult. Nevertheless, he states that informal regressions, whose specification is mostly driven by earlier results rather than by a formal model, are the most common approach in the literature.¹⁰

It must be noted that in many cross section and panel data studies dealing with the relationship between finance and growth (e.g. King and Levine 1993a, 1993b, Levine and Zervos 1998, see also Wachtel 2001) change in capital stock is used as an alternative dependent variable, and does not enter the regression as an explanatory variable. This is motivated by the theory described above, which asserts that an important, but not the only, channel of influence to growth is capital accumulation. While it is likely (as many empirical studies confirm) that this is an important channel, we believe that capital stock variable must be taken into account as explanatory variable as well, when analyzing output growth. The reason is that financial intermediation, as captured by the most commonly used variables, may not be the only factor behind capital accumulation.¹¹ Thus, omitting the capital accumulation variable, if it is significant, would lead to inconsistent estimates (unless fixed effects are used in panel data model specification). In addition, in such approach, the effect of capital accumulation on growth could possibly be (partly) picked up by the financial

⁸ Koivu (2002) disagrees with this argument in the context of transition economies and allows for the fixed effects.

⁹ This model has become a text book model, and will not be formally derived here. An explanation of the model is also available from e.g. Temple (1999), or Romer (1996). In addition, our approach is an informal modification and extension of the model what reduces the relevance of its formal derivation and exposition.

¹⁰ Specifically, standard specifications used in the empirical finance-growth studies (see Wachtel 2001) can also be regarded as informal.

¹¹ Capital accumulation may, for example, be promoted by entrepreneurial finance (Bonin and Wachtel 2003) or international capital flows (see Krkoska, 2001, for evidence on this in the context of transition countries).

intermediation variable, but in this case, it is not the impact of the financial variable on growth that is (possibly) found, but the effect of capital accumulation. Comparable situations arise in studies dealing with the effect of foreign direct investment (FDI) on growth (see e.g. Borensztein et al 1998, Campos and Kinoshita 2002, or Mencinger 2003). FDI can also contribute to capital formation, but is usually used in regressions in addition to capital accumulation variable in an augmented production function approach, similar to ours. In addition, in the approach by Greenwood and Jovanovic (1993) the investment rate and financial variables enter the regression together. They use a similar argument that we have mentioned earlier; that there may be effects of financial intermediation on growth which do not necessarily affect the level of capital stock in an economy.

For our regressions, we use the following model specifications:

$$\Delta y_{i,t}/y_{i,t-1} = \alpha + \beta_1 \Delta k_{i,t}/k_{i,t-1} + \beta_2 \Delta part_{i,t} + \beta_3 \ln(e_{i,t}) + \beta_4 FI_{i,t} \quad (1)$$

$$\Delta y_{i,t}/y_{i,t-1} = \alpha + \beta_1 \Delta k_{i,t}/k_{i,t-1} + \beta_2 \Delta part_{i,t} + \beta_3 \ln(e_{i,t}) + \beta_4 FI_{i,t-1} \quad (2)$$

$$\Delta y_{i,t}/y_{i,t-1} = \alpha + \beta_1 \Delta k_{i,t}/k_{i,t-1} + \beta_2 \Delta part_{i,t} + \beta_3 \ln(e_{i,t}) + \beta_4 FI_{i,t-2} \quad (3)$$

where $y_{i,t}$ denotes real output per capita in country i at time t and $\Delta y_{i,t}$ stands for $y_{i,t} - y_{i,t-1}$. Thus, the dependent variable $\Delta y_{i,t}/y_{i,t-1}$ is real output growth per capita, in percent. As for the explanatory variables, $k_{i,t}$ denotes real capital stock per capita in country i at time t and $\Delta k_{i,t}$ stands for $k_{i,t} - k_{i,t-1}$. Thus, $\Delta k_{i,t}/k_{i,t-1}$ stands for real growth rate of per capita capital stock. Change in labor participation rate ($\Delta part$) is defined as a percentage change of the ratio of the number of employed persons to total population. The natural logarithm of a constructed indicator for educational attainment ($\ln(e_i)$) is used to describe the quality of human capital. FI stands for the different financial intermediation variables which are expressed in relationship to GDP. More detailed definitions of variables as well as the data sources are given in the data section that follows, as well as in the Appendix. Subscript i stands for cross-section units, i.e. countries ($i = 1 \dots 9$), while t denotes time i.e. years ($t = 1996 \dots 2000$).

In the second and third specifications, the financial intermediation variables with one- year and two- years lag are used. This is done in order to alleviate the potential simultaneity problem between financial development and output growth and to check for the direction of this relationship (i.e. for the predictive power of financial intermediation for future growth rates; see Levine and Zervos 1998 or Wachtel 2001 for an in-depth discussion).¹²

¹² We realize that using lagged values of some variables may not completely solve the endogeneity problem, but we would like to point out that the relationship between investment and growth, (as well as between human capital and growth, Temple 1999) may be problematic in this respect as well. As shown by Blomstrom et al (1996): “[...] economic growth induces subsequent capital formation more than capital formation induces subsequent growth”. Still, most of growth regressions, including ours, are carried out with devoting even less attention to this simultaneity problem. Rarely, some authors use instrumental variables (Temple 1999). As stated by Rousseau and Wachtel (2005), the choice of method for dealing with potential simultaneity problem is not crucial – using instrumental variables or lagged values for financial variables yields remarkably similar results.

Since, in our case, neither of the two effects – fixed effects nor time effects – turned out to be significant, we present the results of the pooled data regressions with common intercepts.¹³ It must be stressed that such a procedure also excludes taking different initial conditions (especially initial income) into account, which may be important for future growth rates according to the convergence discussion in growth theory. Since the time horizon under study here is relatively short, this problem should not be very serious (what is possibly already reflected in insignificant fixed effects).

4. IMPACT OF FINANCE ON GROWTH

4.1 DATA

Our sample consists of 9 countries.¹⁴ The time period considered is between 1996 and 2000, for all countries and financial market segments.¹⁵ We use data on real per capita output growth, real growth of capital stock per capita, change of labor participation rate, educational attainment as a proxy for the quality of human capital, and the following financial development indicators: two measures of total financial intermediation, domestic credit, private credit, stock market capitalization and bonds outstanding. The *first measure* of total financial intermediation is a sum of the following individual segments: domestic credit, stock market capitalization and bonds. The *second measure* uses private credit instead of domestic credit. Exact definitions of variables are given in the Appendix.

Table 1 presents summary statistics on output and capital stock growth, changes in labor participation, educational attainment and six financial intermediation indicators (TFI 1 and 2 stands for total financial intermediation 1 and 2). For the first three variables, we observe relatively high variability. For example, maximal value of output growth in the sample amounted to 10.32%, while the lowest value was -9.56%.

Table 1: Summary statistics - annual data 1996-2000

	Output	Capital stock	Labor	Education	TFI 1	TFI 2	Domestic credit	Private credit	Stock markets	Bonds
Mean	2.42	3.11	-0.85	4.13	100.19	84.98	50.86	35.65	17.87	31.47
Median	3.9	2.96	-0.45	4.10	79.11	65.36	41.17	24.43	12.84	21.47
Max.	10.32	8.21	3.52	4.40	311.72	285.66	143.15	117.09	111.67	63.22
Min.	-9.56	-3	-8.41	3.81	20.17	9.34	11.82	4.97	0.04	0.47
Std. dev.	4.16	3.1	2.66	0.15	62.46	58.61	34.24	31.61	23.11	19.13
Obs.	45	45	45	45	45	45	45	45	45	45

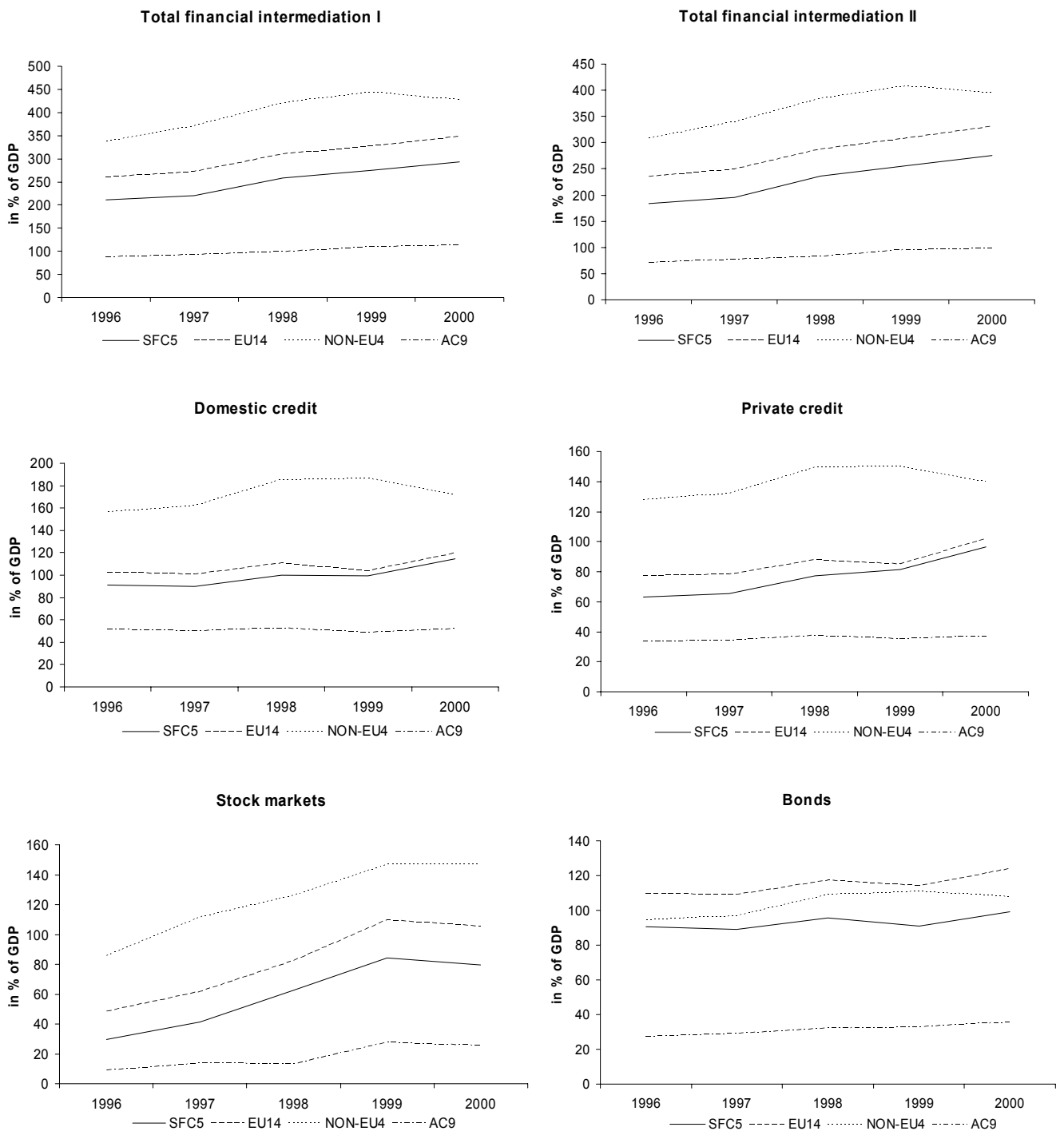
Output growth, capital stock growth and change in participation – in %; educational attainment – logarithm of constructed indicator (see Appendix); all financial variables – in % of GDP.

¹³ In addition, including fixed effects would further reduce the number of degrees of freedom which is already rather low for some specifications because the number of observations is not very big, especially in regressions with lagged financial variables.

¹⁴ It includes the following countries: Bulgaria, Czech Republic, Slovakia, Hungary, Slovenia, Poland, Romania, Malta and Turkey.

¹⁵ Although our initial sample contained another five countries, we had to exclude them from estimations because of more severe data limitations: there is no (or not enough) data on human capital (educational attainment) for three Baltic countries and Croatia. In addition, Cyprus was excluded from the sample because of insufficient number of observations on outstanding bonds.

Figure 1: Financial sectors in different groups of countries



SFC5 = Structural fund countries: Greece, Ireland, Italy, Portugal and Spain, EU14 = EU countries without Luxemburg and new member states, NON-EU4 = USA, Japan, Norway and Switzerland, AC9 = Accession countries

The standard deviation of educational attainment over time and across countries was comparatively low. At the same time, the variability of all financial variables, relative to the highest values was comparatively high in these accession countries. At the first glance, one might conclude that this reflects rapid development of the financial system in these countries over the period under study. Although this might be true for some countries, average development of the financial variables for

the whole region was not much, if at all, faster than in developed countries, as shown in the figure 1, where the development of the averages of these variables is compared to other country groups. The values of financial intermediation relative to GDP are, as expected, much lower in accession countries than in the more developed ones.

The summary statistics for single countries in the table 2 show a relatively high degree of heterogeneity in the sample. The average values for the first measure of total financial intermediation ranges from only 22.85% of GDP in Romania to 236.75% of GDP in Malta. Banking intermediation dominates the financial sectors in most of these economies, with domestic credit being considerably higher than stock markets capitalization and bonds outstanding. Exceptions include Bulgaria and Hungary with amounts on bonds outstanding substantially higher than the average (more than 50% of GDP), and Turkey where the amounts of funds intermediated on each of the segments of capital markets are close to the amount of domestic credit.

Table 2: Data for all countries – 1996-2000 averages

	Output	Capital stock	Labor	Education	TFI 1	TFI 2	Domestic credit	Private credit	Stock markets	Bonds
BULGARIA	-0.07	-0.96	-2.31	4.3854	73.6	62.61	20.18	9.19	0.66	52.77
CZECH REPUBLIC	1.09	2.39	-1.95	4.0989	119.61	121.25	64.11	65.75	20.34	35.15
SLOVAKIA	3.97	5.73	-1.88	4.0979	77.26	53.27	59.33	35.34	4.17	13.76
HUNGARY	3.56	2.29	1.34	4.1490	143.65	109.73	58.43	24.52	26.22	58.99
SLOVENIA	4.34	6.28	1.2	4.1208	69.61	62.32	38.94	31.66	12.27	18.4
POLAND	5.15	7.25	-0.28	4.3643	66.41	51.21	34.16	18.97	13.2	19.05
ROMANIA	-1.3	-0.51	-0.49	4.0558	22.85	13.94	16.56	7.65	0.93	5.36
MALTA	3.1	1.79	-1.56	3.8291	236.75	212.81	133.75	109.81	53.01	49.98
TURKEY	1.93	3.69	-1.74	4.0783	92	77.67	32.27	17.95	29.99	29.73
<i>AVERAGE</i>	<i>2.42</i>	<i>3.11</i>	<i>-0.85</i>	<i>4.1311</i>	<i>100.19</i>	<i>84.98</i>	<i>50.86</i>	<i>35.65</i>	<i>17.87</i>	<i>31.47</i>

Output growth, capital stock growth and change in participation – in %; educational attainment – logarithm of constructed indicator (see Appendix); all financial variables – in % of GDP.

Table 3 shows the simple correlation coefficients between all the variables used in panel estimations. As expected, the coefficients between single financial market segments and the two measures of total financial intermediation are relatively high, ranging between 0.6452 and 0.8945. Output growth, on the other hand, is strongly positively correlated with capital stock growth (0.5586), less strongly, but still positively with change in labor participation (0.1873), and barely with educational attainment (0.0236). The correlation coefficients between output growth and other explanatory variables are also positive (except for bonds outstanding), albeit at times rather small, except for domestic and private credit for which the correlation coefficients are 0.1358 and 0.1101 respectively.

Table 3: Correlations

	Capital stock	Labor	Education	TFI 1	TFI 2	Domestic credit	Private credit	Stock markets	Bonds
Output	0.5586	0.1873	0.0236	0.0884	0.0742	0.1358	0.1101	0.0705	-0.0397
Capital stock	--	0.3003	0.1092	-0.1046	-0.1075	0.0276	0.0372	0.0199	-0.4149
Labor	--	--	0.0234	0.0244	0.0097	-0.0720	-0.1081	0.2326	-0.0724
Educational attainment	--	--	--	-0.5462	-0.5511	-0.6997	-0.7007	-0.4490	0.0114
TFI 1	--	--	--	--	0.9852	0.8945	0.8198	0.8185	0.6753
TFI 2	--	--	--	--	--	0.8793	0.8602	0.8258	0.6452
Domestic credit	--	--	--	--	--	--	0.9462	0.5986	0.4078
Private credit	--	--	--	--	--	--	--	0.5625	0.3038
Stock markets	--	--	--	--	--	--	--	--	0.3930

4.2 RESULTS

This section presents the results of our panel data regressions. Findings reconfirm preliminary results derived from simple cross-country-regressions (Fink, Haiss and Vukšić, 2006). Looking at the table 4 and 5, we see that the strongest positive and significant effect on growth stems from the capital stock growth. This is true for all model specifications, using both measures of total financial intermediation. In addition, we find some evidence that total financial intermediation has positively affected economic development in accession countries, when it enters in regression with a one year (for both measures) or two year lag (for total financial intermediation 2). Change in labor participation was always insignificant, and educational attainment was significant with the predicted positive sign only in the specifications where financial variables entered with a two year lag.

Table 4: Results – Total financial intermediation 1

	Dependent variable is output growth					
	Financial variable with 2 year lag		Financial variable with 1 year lag		Financial variable with no lag	
Constant	-0.4309**	(0.1978)	-0.3240	(0.2082)	-0.0759	(0.2058)
Capital stock growth	0.3204**	(0.1380)	0.6358***	(0.1910)	0.7636***	(0.1923)
Change in participation	0.1118	(0.2345)	0.0039	(0.2074)	0.0173	(0.1868)
Educational attainment	0.1016**	(0.0458)	0.0728	(0.0496)	0.0156	(0.0491)
Total financial intermediation 1	0.0277	(0.0167)	0.0268**	(0.0115)	0.0120	(0.0094)
R ²	0.166		0.294		0.270	
Observations	27		36		45	

Notes: Heteroskedasticity-consistent standard errors in parentheses, *** significant at 1% level, ** significant at 5% level and * significant at 10% level.

Table 5: Results – Total financial intermediation 2

Dependent variable is output growth						
	Financial variable with 2 year lag		Financial variable with 1 year lag		Financial variable with no lag	
Constant	-0.4243**	(0.1842)	-0.3019	(0.2031)	-0.0647	(0.2040)
Capital stock growth	0.3220**	(0.1392)	0.6329***	(0.1876)	0.7616***	(0.1913)
Change in participation	0.1370	(0.2564)	0.0219	(0.2191)	0.0227	(0.1897)
Educational attainment	0.1012**	(0.0433)	0.0688	(0.0486)	0.0135	(0.0488)
Total financial intermediation 2	0.0275*	(0.0153)	0.0256**	(0.0117)	0.0116	(0.0098)
R ²	0.144		0.268		0.266	
Observations	27		36		45	

Notes: Heteroskedasticity-consistent standard errors in parentheses, *** significant at 1% level, ** significant at 5% level and * significant at 10% level.

Tables 6 and 7 contain the results of panel estimations of regressions using domestic and private credit as financial variables. Findings with respect to capital stock growth, change in participation and educational attainment remain basically unchanged. We find evidence that domestic credit expansion was a significant engine of growth in those specifications into which it entered the regression with one or two year lag. Private credit was never significant.

Table 6: Results – Domestic credit

Dependent variable is output growth						
	Financial variable with 2 year lag		Financial variable with 1 year lag		Financial variable with no lag	
Constant	-0.6035**	(0.2400)	-0.4036	(0.2641)	-0.1187	(0.2540)
Capital stock growth	0.2279	(0.1375)	0.5671***	(0.2062)	0.7133***	(0.1987)
Change in participation	0.2031	(0.2788)	0.0743	(0.2390)	0.0622	(0.1951)
Educational attainment	0.1439**	(0.0560)	0.0935	(0.0628)	0.0264	(0.0604)
Domestic credit	0.0536**	(0.0245)	0.0454*	(0.0223)	0.0237	(0.0204)
R ²	0.191		0.257		0.266	
Observations	27		36		45	

Notes: Heteroskedasticity-consistent standard errors in parentheses, *** significant at 1% level, ** significant at 5% level and * significant at 10% level.

Table 7: Results – Private credit

Dependent variable is output growth						
	Financial variable with 2 year lag		Financial variable with 1 year lag		Financial variable with no lag	
Constant	-0.5372**	(0.2315)	-0.2873	(0.2585)	-0.0688	(0.2507)
Capital stock growth	0.2438*	(0.1320)	0.5805***	(0.1935)	0.7196***	(0.1940)
Change in participation	0.2441	(0.2970)	0.0858	(0.2445)	0.0626	(0.1956)
Educational attainment	0.1306**	(0.0540)	0.0682	(0.0615)	0.0157	(0.0600)
Private credit	0.0451	(0.0276)	0.0303	(0.0258)	0.0180	(0.0227)
R ²	0.133		0.206		0.255	
Observations	27		36		45	

Notes: Heteroskedasticity-consistent standard errors in parentheses, *** significant at 1% level, ** significant at 5% level and * significant at 10% level.

As for the findings of regressions with stock market capitalization and bonds outstanding (tables 8 and 9), again capital stock growth was a significant factor strongly contributing to the economic development. Change in participation, educational attainment and stock markets turned out to be insignificant in all specifications. Bond markets, on the other hand, significantly and relatively strongly promoted growth with a time lag.

Table 8: Results – Stock markets capitalization

Dependent variable is output growth						
	Financial variable with 2 year lag		Financial variable with 1 year lag		Financial variable with no lag	
Constant	-0.1816	(0.1939)	-0.1520	(0.1804)	0.0152	(0.1673)
Capital stock growth	0.3408*	(0.1834)	0.5932***	(0.1895)	0.7487***	(0.1907)
Change in participation	0.2515	(0.2574)	0.0311	(0.2218)	0.0136	(0.1970)
Educational attainment	0.0497	(0.0461)	0.0368	(0.0444)	-0.0038	(0.0413)
Stock markets capitalization	-0.0698	(0.1256)	0.0282	(0.0220)	0.0092	(0.0216)
R ²	0.081		0.193		0.247	
Observations	27		36		45	

Notes: Heteroskedasticity-consistent standard errors in parentheses, *** significant at 1% level, ** significant at 5% level and * significant at 10% level.

Table 9: Results – Bonds outstanding

Dependent variable is output growth						
	Financial variable with 2 year lag		Financial variable with 1 year lag		Financial variable with no lag	
Constant	-0.1734*	(0.0974)	-0.0636	(0.1258)	0.0361	(0.1448)
Capital stock growth	0.5063***	(0.1721)	0.8592***	(0.1961)	0.8871***	(0.2168)
Change in participation	-0.0201	(0.2124)	-0.0916	(0.1870)	0.0117	(0.1676)
Educational attainment	0.0379	(0.0242)	0.0073	(0.0310)	-0.0134	(0.0352)
Bonds outstanding	0.0844*	(0.0446)	0.0949**	(0.0377)	0.0512	(0.0364)
R ²	0.223		0.362		0.295	
Observations	27		36		45	

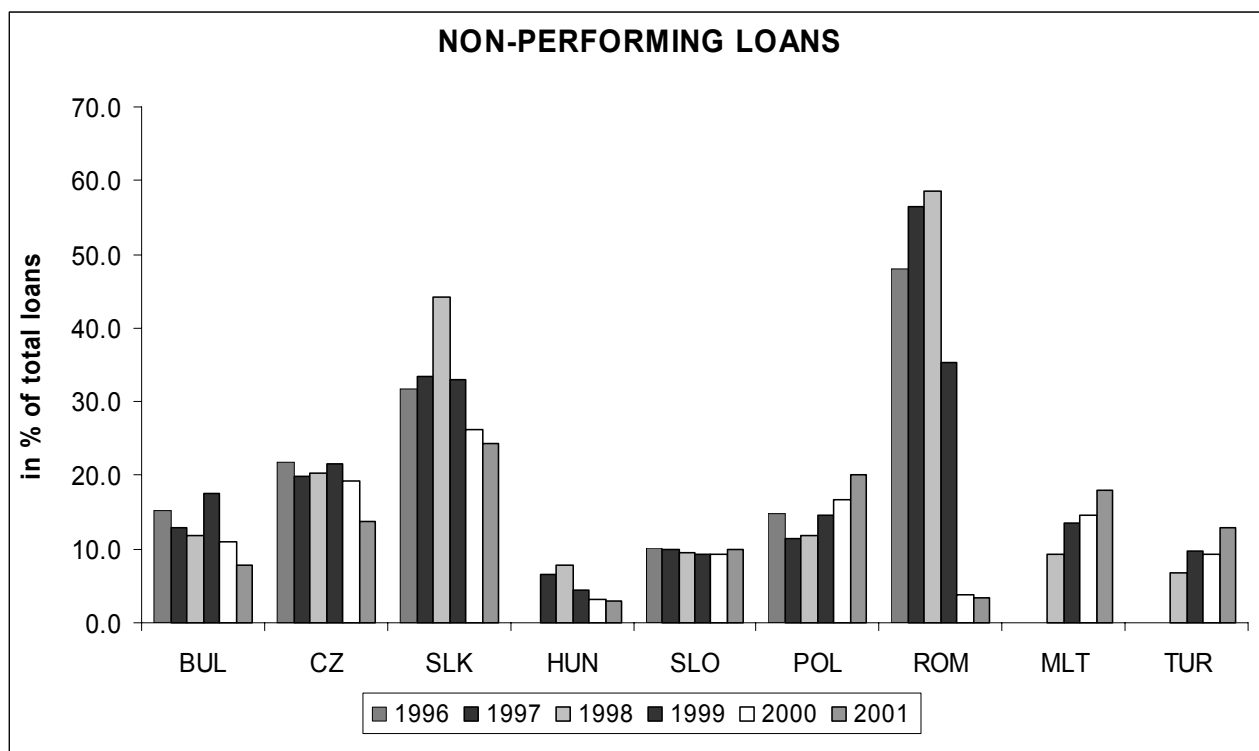
Notes: Heteroskedasticity-consistent standard errors in parentheses, *** significant at 1% level, ** significant at 5% level and * significant at 10% level.

5 DISCUSSION

As a summary, we can state that there is some evidence that total financial intermediation contributed to economic growth in accession countries. This positive and partially significant relationship between finance and growth is confirmed in our regressions with single financial market segments. Unlike private credit, which was never significant, domestic credit made an important contribution to economic growth. In addition, there is solid evidence that bond markets played an important role in promoting growth, while stock market capitalization turned out to be insignificant in all of the specifications. This is an important finding, as addressing financing needs efficiently through bond markets has been rather neglected during transition in most countries.

That private credit expansion was not significant coincides with the results of Koivu (2002). One of the possible explanations for different findings for two measures of bank credit for transition countries is that there have been many bad loans to the private sector (see figure 2), which were only gradually removed from the banks' balance sheets. This made the contribution of private credit to growth relatively weak compared with domestic credit which also included bank credits to central and local government, for which there is very low default probability. In addition, as stated by Berglöf and Bolton (2002), banks, which mostly dominate financial sectors of the transition economies, mostly provide working capital finance to enterprises, while investment finance mostly comes from retained earnings and foreign direct investment.

FIGURE 2: NON-PERFORMING LOANS



Source: EBRD Transition Report 2003; MLT and TUR: European Commission (2002).

Similar arguments about a different impact of financing the private and the public sector can possibly be applied in interpreting the results of the impact of bond markets on growth, since these markets are heavily dominated by government issues in all accession countries. This is because only the near-monopoly public sector and a few larger and sound companies can issue bonds and expect the market participants to actually buy these. In addition, interest rates on long term government bonds are an important reference value for the whole financial sector, therefore facilitating the efficiency of financial intermediation and improving the risk diversification possibilities of other market participants. As a consequence, bond markets have had the strongest, positive and significant impact on output growth in accession countries among all financial segments. Fink, Haiss and Hristoforova (2004) report a less clear cut relationship between bonds outstanding and GDP growth for EU countries. Applying a sectoral split, Fink, Haiss and Kirchner (2005) provide preliminary evidence for reverse Granger causality from GDP growth to public bond issues in the European Union.¹⁶ Taken together, these results indicate a different relationship between bond issuance and GDP growth depending on the level of development.

Stock markets, on the other hand, turned out not to have had any significant influence on growth in accession countries. This can possibly be explained with their relative underdevelopment. Minier (2003) showed that the positive relationship between finance intermediation (as measured by stock market turnover, but also by private credit) and growth depends on the level of stock market development. According to her findings, finance is not a significant determinant of growth for the

¹⁶ Fink, Haiss and Kirchner (2005) also report some evidence for Granger causality from bond issues by corporations and financial institutions to GDP growth for EU countries.

group of countries with low stock market capitalization.¹⁷ Although stock markets in transition countries developed relatively rapidly due to privatization, the resulting capitalization was comparatively low in the end of 1990s. Moreover, these low amounts were “artificially” inflated by a large number of listed companies, whose shares were not traded at all. Thus, the activity at the stock markets was even lower than the relatively low capitalization suggests. This observation is also in line with findings of Kominek (2003) for Poland and Czech Republic.

The above line of argumentation is in contrast to the theoretical literature on channels of influence from financial intermediation to growth, which emphasizes the role of the private sector. We believe that some of the specific problems in transition countries, discussed earlier, sufficiently explain the difficulties of financing the private sector, which then lead to our results (e.g. low accounting and disclosure standards in business practices of many enterprises, poor business practices in the banking sector and questionable criteria of credit allocation, weak law standards in general, inefficient legal institutions etc.¹⁸). According to Bonin and Wachtel (2003) banks in some of these countries maintained very conservative liquid portfolios and were largely unwilling or unable to lend to enterprises during the transition period. On the other hand, as mentioned earlier, it has been recognized that public expenditure (or at least some segments) may also be growth promoting (see e.g. Shioji 2001 for recent evidence). In addition, it is possible that the increase of consumption (private and public) financed by expanding bank credit has contributed to higher growth rates over the relatively short period of five years. It is important to mention that Berglöf and Bolton (2002), who conclude that there is little evidence that financial expansion has promoted growth in transition, also stress the important limiting role of soft budget constraints, weak rule of law i.e. contract enforcement and lack of fiscal and monetary discipline. Although their conclusions imply that stronger fiscal discipline would contribute to strengthening the finance growth nexus, they do not consider possible positive growth effects of public expenditure, especially if it is not financed by higher tax rates. Relations between banks and central and local governments can be assumed to be less sensitive to e.g. weak contract enforcement and some other obstacles typical for financing private sector of accession countries. Therefore, it is not unexpected that the financial funds channeled through/to public sectors turn out to be more effective in promoting economic development.

As for the other three potential sources of growth, only capital accumulation turned out to be significant and a positive predictor. We believe that this can be explained by the relatively large capital scarcity in transition countries, making its accumulation crucial for development (UNECE, 2000a). This has also led to large capital inflows into these countries. In the context of transition economies Lipschitz et al (2002) state that: “Capital flows to economies undergoing far-reaching structural change are expected, as they reflect investment opportunities in excess of those that can be financed by domestic savings.” These flows included both large portfolio and foreign direct

¹⁷ This argument applies to stock markets and private credit. Bank credit to public sector and bond markets were not considered in the study by Minier (2003).

¹⁸ For a detailed discussion, see Fink, Haiss, Orlowski and Salvatore (1998) or more recently Eller and Haiss (2003).

investment. Such international capital flows may have played an important role for the economic growth of transition countries, but the empirical evidence on their impact on growth (for FDI) is mixed. While Mencinger (2003) finds no significant positive relationship (but only negative for some specifications), Campos and Kinoshita (2002) report a significant positive impact of FDI on growth. In addition, UNECE (2000b) reports that FDI inflows may have relaxed balance of payment constraints and contributed to output growth “[...] by increasing the availability of resources for development”. Further research will be necessary to verify the finding that access to bond markets is important for development and growth in transition economies reported here.

6 CONCLUSION

We examine whether the development of financial markets has played a significant role for real GDP growth in EU accession countries and what role different segments of the financial markets play. By applying a panel data approach to 9 transition countries for the 1996-2000 period, we find that aggregate financial sector development stimulates economic growth. These initial results confirm the paradigm of the growth-supporting role of the financial sector also for transition countries. However, our findings about the role of different sectors of the financial markets deviate from the expectations that free stock markets are a major driver of growth: bond markets and total domestic credit expansion - both of which include public finance - stimulated economic growth in our sample, whereas private credit and stock market capitalization (i.e. solely private finance) had no significant influence on growth. For transition economies, financial funds channeled through the combination of public and private sectors seem to provide stronger growth triggers than those channeled solely through the private sector in the intermediate stage of development. In emerging markets bond markets play a far more important role than hitherto assumed. As foreign direct investment plays a more prominent role for private finance in transition economies compared to established market economies, its role also needs renewed attention. We argue that possible obstacles hindering private credit and stock markets to exploit their full potential need to be explored further.

A main reason for mixed effects of private finance seems to be that efficient government policies, which channel funds from financial markets into infrastructure investment, can provide a significant stimulus to economic growth in the intermediate phase of transition. As long as corporate governance in the private sector is weak the risk of financial investment into the private sector may be considered to be far too high and thus providing finance to an efficient state can be a major way to reasonably foster economic growth during transition. While we are by no means arguing that the private sector is unimportant for economic development in emerging markets, our findings support Rousseau and Wachtel (2005) in arguing that the widely accepted aggregate effect of finance on growth varies with the level of economic development and, therefore, country characteristics need to be considered. This draws renewed attention to the role of individual financial market segments and to specific effects of economic transition onto the ability of these segments to foster real economic growth in transition and emerging market economies.

REFERENCES

- Ahmed, S., 1998. Comment on: The legal environment, banks, and long-run economic growth. *Journal of Money, Credit, and Banking* 30 (2), 614-620.
- Arrow, K.J., 1971. Essays in the theory of risk-bearing.
- Atje, R., Jovanovic, B., 1993. Stock Markets and Development. *European Economic Review* 43, 632-40.
- Arnold, L., 1998. Poverty Traps and Financial Development in a Model of Finance and Growth. *Zeitschrift für Wirtschafts- u. Sozialwissenschaften* 118, 415-24.
- Barro, R.J., Lee, J. 2000. International Data on Educational Attainment: Updates and Implications. CID Working Paper No. 42.
- Beck, T., Levine, R., 2004. Stock markets, banks, and growth: Panel evidence. *Journal of Banking and Finance* 28, 423-442.
- Becsi, Z., Wang, P., 1997. Financial Development and Growth. *Economic Review of the Federal Reserve Bank of Atlanta* 82(4), 46-62.
- Bencivenga, V.R., Smith, B.D., 1991. Financial Intermediation and Economic Growth. *Review of Economic Studies* 58, 195-209.
- Berglöf, E., Bolton, P., 2002. The Great Divide and Beyond – Financial Architecture in Transition. *Journal of Economic Perspectives* 16(1), 77-100.
- Berthelemy, J.C., Varoudakis, A., 1996a. Economic Growth, Convergence Clubs, and the Role of Financial Development. *Oxford Economic Papers* 48, 300-328.
- Berthelemy, J.C., Varoudakis, A., 1996b. Models of Financial Development and Growth: A Survey of Recent Literature, in: Hermes, N., Lensink, R., (Eds.), *Financial Development and Economic Growth*, Routledge, pp. 7-35.
- BIS, 2004. Securities Statistics, Bank for International Settlement, Basle.
- Blomstrom, M., Lipsey, R.E., Zejan, M., 1996. Is fixed investment the key to economic growth? *The Quarterly Journal of Economics* 111 (1), 269-276.
- Blum, D., Federmair, K., Fink, G., Haiss, P., 2002. The Financial-Real Sector Nexus – Theory and Empirical Evidence. IEF Working Paper No. 43, EuropeInstitute WU-Wien.
- Bonin, J., Wachtel, P., 2003. Financial Sector Development in Transition Economies: Lessons from the First Decade. *Financial Markets, Institutions & Instruments* 12 (1), 1- 66.
- Bonin, J., Hasan, I., Wachtel, P., 2004. Privatisation matters: Bank efficiency in transition countries. BOFIT Discussion Papers No. 8.
- Borensztein, E., De Gregorio, J., Lee, J.-W., 1998. How does Foreign Direct Investment Affect Economic Growth? *Journal of International Economics* 45 (1), 115-135.
- Breuss, F., Fink, G., Haiss, P., 2004. How Well Prepared are the New Member States for the European Monetary Union? *Journal of Policy Modeling* 26, 769-791.
- Campos, N. F., Kinoshita, Y., 2002. Foreign Direct Investment as Technology Transferred: Some Panel Evidence from the Transition Economies. *The Manchester School* 70 (3), 398-419.
- Cottarelli, C., Dell’Ariccia, G., Vladkova-Hollar, I., 2003. Early Birds, Late Risers, and Sleeping Beauties: Bank Credit Growth to the Private Sector in Central and Eastern Europe and the Balkans. IMF Working Paper WP/03/213.

- Demirgüç-Kunt, A., Levine, R., 1999. Bank-based and Market-based Financial Systems: Cross-country Comparisons. World Bank Working Paper No. 2143.
- Drakos, K., 2003, Assessing the success of reform in transition banking 10 years later: an interest margins analysis, *Journal of Policy Modeling* 25, 309-317.
- Durlauf, S.N., Quah, D.T., 1998. The New Empirics of Economic Growth. NBER Working Paper No. 6422.
- Easterly, W., Levine, R., 2001. What have we learned from a decade of empirical research on growth? It's Not Factor Accumulation: Stylized Facts and Growth Models. *The World Bank Economic Review* 15 (2), 177-219.
- EBRD, 2003. *Transition Report 2003: Integration and regional cooperation*, London: EBRD.
- Eller, M., Haiss, P., 2003. Strukturschwächen im Finanzsektor der Bewerberstaaten als Verstärker spekulativer Blasen: Implikationen für die EU-Erweiterung. *Bankarchiv* 50 (3), 253-264.
- European Central Bank (ECB), 2003. Bond Markets and Long-Term Interest Rates in European Union Accession Countries. European Central Bank. Frankfurt.
- European Central Bank (ECB), 2004. The Acceding Countries' Economies on the Threshold of European Union, *ECB Monthly Bulletin* 2/2004, 45-56.
- European Commission, 2002. Update of the Report on macroeconomic and financial sector stability developments in candidate countries. European Economy - Enlargement Papers No. 111.
- FIBV, 2004. Stock Market Capitalization Statistics, Federation of International Stock Exchanges.
- Fink, G., Haiss, P., 1999. Central European Financial Markets from an EU Perspective: Theoretical aspects and statistical analyses. IEF Working Paper No. 34, EuropeInstitute WU-Wien.
- Fink, G., Haiss, P., Hristoforova, S., 2004. Growth Triggers in the European Union, in: Dreger, C., and Hansen, G. (Eds.), *Advances in macroeconometric modeling*, Baden-Baden, pp. 205-237.
- Fink, G., Haiss, P., Kirchner, H., 2005. Die Finanzierung über Anleihenemissionen und Zusammenhänge zum Wirtschaftswachstum. *Kredit und Kapital* 38(3), pp. 351-376.
- Fink, G., Haiss, P., and Mantler, H., 2004. Financial sector macro-efficiency, in: Balling, M., Lierman, F., Mullineux, A. (Eds.), *Financial Markets in Central and Eastern Europe*, London, pp. 61-98.
- Fink, G., Haiss, P., Orłowski, L., Salvatore, D., 1998. Central European Banks and Stock Exchanges: Capacity-building and Institutional Development. *European Management Journal* 16 (4), 433-446.
- Fink, G., Haiss, P., Vukšić, G., 2006, Preliminary Conjectures on the Finance and Growth Nexus in Eastern Europe. *Osteuropa Wirtschaft* 51, forthcoming.
- Fries, S., Neven, D., Seabright, P., 2002. Bank performance in transition economies. EBRD Working Paper No. 76.
- Greenwood, J., Jovanovic, B., 1990. Financial Development, Growth and the Distribution of Income. *Journal of Political Economy* 98, 1076-1107.
- Greenwood, J., Smith, B.D., 1997. Financial Development and the Development of Financial Markets. *Journal of Economic Dynamics and Control* 21, 145-81.
- Hahn, F.R., 2003. Financial Development and Macroeconomic Volatility: Evidence from OECD Countries. WIFO Working Paper No. 198.
- IMF (2004): *International Financial Statistics*, Washington, D.C.

- Haiss, P., Marin, S., 2003. Corporate Bonds as Financing Vehicle in Central and Eastern Europe, in: Chadraba, P., Springer, R. (Eds.), *Proceedings of the 11th Annual Conference on Marketing and Business Strategies for Central and Eastern Europe*, Vienna, pp. 196-204.
- King, R.G., Levine, R., 1993a. Finance and Growth: Schumpeter Might Be Right. *Quarterly Journal of Economics* 108 (3), 717-37.
- King, R.G., Levine, R., 1993b. Finance, Entrepreneurship and Growth: Theory and Evidence. *Journal of Monetary Economics* 32, 513-42.
- Koivu, T., 2002. Do efficient banking sectors accelerate economic growth in transition countries? BOFIT Discussion Papers No. 14.
- Kominek, Z., 2003. Stock markets and industry growth: an eastern European perspective, EBRD Working Paper No. 81.
- Krkoska, L., 2001. Foreign direct investment financing of capital formation in central and eastern Europe. EBRD Working Paper No. 67.
- Levine, R., 1991. Stock Markets, Growth and Tax Policy. *Journal of Finance* 46 (4), 1445-65.
- Levine, R., 1997. Financial Development and Economic Growth: Views and Agenda. *Journal of Economic Literature* 35, 688-726.
- Levine, R., Loayza, N., Beck, T., 2000. Financial Intermediation and Growth: Causality and Causes. *Journal of Monetary Economics* 46, 31-77.
- Levine, R., Zervos, S., 1998. Stock Markets, Banks and Economic Growth. *American Economic Review* 88 (3), 537-58.
- Lipschitz, L., Lane, T., Mourmouras, A., 2002. Capital Flows to Transition Economies: Master or Servant?, IMF Working Paper WP/02/11.
- Mankiw, G., Romer, D., Weil, D., 1992. A Contribution to the Empirics of Economic Growth. *Quarterly Journal of Economics* 107, 407-34.
- Mencinger, J., 2003. Does Foreign Direct Investment Always Enhance Economic Growth? *Kyklos* 56, 493-510.
- Minier, J.A., 2003. Are small stock markets different? *Journal of Monetary Economics* 50, 1593-1602.
- Obstfeld, M., 1994. Risk Trading, Global Diversification and Growth. *American Economic Review* 84 (5), 1310-29.
- OECD, 2004a. OECD Historical Statistics, Paris.
- OECD, 2004b. National Accounts of OECD Countries, Paris.
- OECD, 2004c. Quarterly Labour Force Statistics, Paris.
- OECD, 2004d. OECD Main Economic Indicators, Paris.
- Pagano, M., 1993. Financial Markets and Growth: An Overview. *European Economic Review* 37, 613-22.
- Patrick, H.T., 1966. Financial Development and Economic Growth in Underdeveloped Countries. *Economic Development and Cultural Change* 15, 174-189.
- Pistor, K., Raiser, M., Gelfer, S., 2000. Law and finance in transition economies. *Economics of Transition* 8 (2), 325-368.
- Romer, D., 1996. *Advanced Macroeconomics*, New York: McGraw-Hill.
- Rousseau, P.L., Wachtel, P., 2000. Equity Markets and Growth: Cross Country Evidence on Timing and Outcomes, 1980-95. *Journal of Banking and Finance* 24, 1933-1957.

- Rousseau, P.L., Wachtel, P., 2001. Inflation, Financial Development and Growth, in: Negishi, R. et al. (eds.), *Economic Theory, Dynamics and Markets: Essays in the Honor of Ryuzo Sato*, Deventer, Kluwer.
- Rousseau, P.L., Wachtel, P., 2002. Inflation thresholds and the finance-growth nexus. *Journal of International Money and Finance* 21, 777-793.
- Rousseau, P.L., Wachtel, P., 2005. Economic Growth and Financial Depth: Is the relation extinct already? UNU/WIDER conference on *Financial Sector Development for Growth and Poverty Reduction*, July 2005, Helsinki.
- Saint-Paul, G., 1992. *Technological Choice, Financial Markets and Economic Development*. *European Economic Review* 36, 763-81.
- Saint-Paul, G., 1996. Demand Driven Financial Development, in: Hermes, N., Lensink, R. (Eds.) *Financial Development and Economic Growth*, Routledge, pp. 37-52.
- Shioji, E., 2001. Public Capital and Economic Growth: A Convergence Approach. *Journal of Economic Growth* 6, 205-227.
- Singh, A., Singh, A., Weisse, B., 2000. Information Technology, Venture Capital and the Stock Market, University of Cambridge Accounting and Finance Discussion Papers No. 00-AF47.
- Temple, J., 1999. The New Growth Evidence. *Journal of Economic Literature* 37 (1),112-56.
- UNECE, 2000a. Financing Growth and Development in the Transition Economies: The Role of Domestic Savings, Background paper by the Economic Analysis Division for the UNECE Regional Conference “Financing for Development”.
- UNECE, 2000b. FDI and the Macroeconomy in the Transition Economies, Background paper by the Economic Analysis Division for the UNECE Regional Conference “Financing for Development”.
- UNECE, 2004. Economic Survey of Europe, 2004/2, Geneva.
- Wachtel, P., 2001. Growth and Finance: What Do We Know and How Do We Know It? *International Finance* 4 (3), 335-62.
- Wachtel, P., 2003, How Much Do We Really Know about Growth and Finance, *Economic Review of the Federal Reserve Bank of Atlanta* 88(3), 33-47.
- Weill, L., 2003. Banking efficiency in transition economies. *Economics of Transition* 11 (3), 569-592.

APPENDIX: DEFINITIONS OF VARIABLES

Output growth – growth rate of real gross domestic product per capita. (Source: primarily International Financial Statistics (IFS) of the IMF (2004); where necessary time series were supplemented with data from the OECD Historical Statistics (OECD, 2004a) and OECD National Accounts of OECD Countries, OECD, 2004b).

Capital stock growth – growth rate of real physical capital stock per capita; time series on physical capital stock (K) were calculated by using perpetual inventory methods:

$$K_t = K_{t-1} \cdot (1 - d) + I_t$$

whereby I denotes gross fixed capital formation and d represent the constant rate of depreciation that is assumed to be 0.07; the initial capital stock values (K_0) were calculated following Easterly/Levine (2001) by

$$\frac{K_0}{Y_0} = \frac{(I/Y)^\theta}{(g_y^\theta + d)}$$

where $(I/Y)^\theta$ represents annual average investment rates over a ten year period and g_y^θ denotes output growth averaged over a ten year period. Since data for transition countries are only available for some years, we use for calculations the longest period available for each country. (Source: real gross fixed capital formation data mainly from OECD Historical Statistics (OECD, 2004a) and National Accounts of OECD Countries (OECD, 2004b), for transition economies from UNECE (2000) and International Financial Statistics of the IMF, 2004).

Change in participation rate – changes of the ratio of the number of employed persons to total population (Source: OECD Quarterly Labour Force Statistics, OECD 2004c, OECD Main Economic Indicators, OECD 2004d, and UNECE Economic Survey of Europe, UNECE, 2004).

Educational attainment – logarithm of the following measure: weighted population fraction under 25 years of age having completed 3 levels of education, attainment rates: primary education (weight: 1), secondary education (weight: 1.4), post-secondary education (weight 2) (Source: Barro, Robert J. and Jong-Wha Lee, International Data on Educational Attainment: Updates and Implications (CID Working Paper no. 42); Human Capital Updated Files (April 2000), available at: <http://web.korea.ac.kr/~jwlee/>).

Domestic credit: volume of loans of deposit money banks and monetary authorities to all residents divided by GDP (Source: International Financial Statistics of the IMF, 2004). In general we use line 32 (“Domestic Credit”) of the IFS monetary survey, which only contains deposit money banks and monetary authorities. For some countries with a different institutional setup (e.g. Malta and Turkey), we use IFS data from the banking survey (line 52) which additionally contains “other banking institutions” and “non-bank financial institutions.” For details, see Blum, Federmaier, Fink and Haiss (2002:51f).

Private credit: volume of loans of deposit money banks and monetary authorities to the private sector divided by GDP (Source: International Financial Statistics of the IMF). In general we use line 32d (“claims on the Private Sector”) of the IFS monetary survey (IMF, 2004), which only contains deposit money banks and monetary authorities. For some countries with a different institutional setup (e.g. Malta and Turkey), we use IFS data from the banking survey (line 52d; IMF, 2004) which additionally contains “other banking institutions” and “non-bank financial institutions.”

Stock market capitalization – value of listed domestic stocks on domestic exchanges divided by GDP (Source: for most countries Federation of International Stock exchanges, FIBV, 2004; additional data of national stock exchanges are used for Slovakia, Hungary and Romania).

Bonds outstanding – value of outstanding amounts of both domestic and international debt securities divided by GDP (Source: Bank for International Settlement/Securities Statistics, BIS, 2004; for countries other than Poland, Hungary, Czech Republic data are just available for the size of public bond markets; as it seems that total bond market size is almost identical with public bond market size in these countries, we use data on public bond markets to proxy total market size).

Total financial intermediation I – sum of *domestic credit*, *stock market capitalization* and *bonds outstanding* (Source: see sources for *domestic credit*, *stock market capitalization* and *bonds outstanding*).

Total financial intermediation II – sum of *private credit*, *stock market capitalization* and *bonds outstanding* (Source: see sources for *private credit*, *stock market capitalization* and *bonds outstanding*).