

FINANCIAL INTERMEDIATION BY BANKS AND ECONOMIC GROWTH: A REVIEW OF EMPIRICAL EVIDENCE

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Abstract

This paper provides a review of empirical research on the link between financial intermediation by banks and economic growth. Special attention is paid to the issues of causality, non-linearity, time perspective, financial intermediation proxies, and interaction terms. The review shows that there are still quite a few unresolved issues in empirical research, which causes scepticism towards prioritizing financial sector policies in order to cause economic growth. Progress in the finance and growth literature is slow and researchers seem to go round in circles. A possibly fruitful direction for future empirical research is the relationship between government and banks, especially from the standpoint of political economy.

Key words: financial intermediation, banks, economic growth

1 Introduction

The goal of this paper is to provide a review of empirical research on the link between financial intermediation by banks and economic growth. Namely, in the last two decades or so, with progress in econometric research on economic growth, and development of endogenous growth theory, many papers examining the link between financial intermediation and economic growth have been published, and interest in the topic does not diminish. However, opinions of economists about the role of financial intermediation in economic growth are still polarized. On one hand there are economists like Lucas (1988) who think that the role of financial factors in economic growth is overemphasized, or like

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Dornbusch and Reynoso (1989:204) who believe that financial factors are similar to foreign trade regimes; unless they are badly distorted, they have almost no influence on the level of GDP per capita. On the other hand there are several economists who are convinced not only that finance is very important for economic growth, but also that finance causes growth.

At the very beginning it should be stressed that there is a lot of confusion with the terms used in existing research on financial intermediation and growth, which will unfortunately be present in this paper too, since it is based on previous research. Terms which appear in titles of papers are: financial intermediation, finance, financial development, financial system, financial markets and so on. Although authors use different terms, in almost all papers the same indicators are used – those that refer to financial intermediation by banks. Furthermore, even though existing research encompasses different functions of the financial system, through which it can influence growth, financial intermediation dominates. It is considered to be the main function of banks. Banks act as intermediaries between savers and persons who are able and willing to borrow money. This relationship is often described as that between savers and investors, but the borrower is not obliged to invest, in the sense of obtaining new capital goods (Cameron, 1972:7). As intermediaries, banks “may vigorously seek out and attract reservoirs of idle funds which will be allocated to entrepreneurs for investment in projects with a high rate of social return; or they may listlessly exploit their quasi-monopolistic position and fritter away investment possibilities with unproductive loans” (Cameron, 1972:7-8). It can probably be assumed that in both cases financial intermediation might have certain consequences on economic growth.

There are many theoretical models available to us in which different channels through which finance influences growth are observed. Montiel (2003) states that a financial system can contribute to economic growth in three ways: by a) creating incentives for accumulation of physical and human capital, by b) allocating capital to the most productive activities, and by c) decreasing the amount of resources used in the process of intermediation. Levine (1997:691) differentiates five basic functions of financial systems, which are:

- facilitation of risk management;
- allocation of resources;
- monitoring of managers and control over corporate governance;
- savings mobilization;
- easing the exchange of goods and services.

Financial systems differ in how successful they are in performing these functions.

It is important to mention that in this paper, publications/studies on the way in which different types of financial system influence economic growth will not be considered. Based on Levine’s (2005) review, it could be concluded that for economic growth it is not important whether a financial system is based on banks or securities markets, but whether it performs its functions successfully. However, more recent research has challenged that view (e.g. Luintel et al., 2008; Deidda and Fattouh, 2008). Furthermore, the link between growth and international finance (e.g. cross-border capital flows and importation

of financial services) will not be analyzed in this paper. This means that the effects of a financial system on economic growth will not be examined with respect to whether it is domestically or foreign owned. One more important thing to stress is that even though there are many papers on the link between finance and companies' or industries' development (the most cited article is written by Rajan and Zingales (1998)), here macroeconomic papers with aggregate data will be privileged. Finally, authors of available papers on finance and growth do not differentiate between different types of banks, e.g. universal from investment banks. That will be the case in this paper as well.

There are already several literature reviews on the relationship between finance and economic growth: Gertler (1988),¹ Pagano (1993), Levine (1997; 2005),² Trew (2006), and Demirgüç-Kunt and Levine (2008). Levine's (2005) review is the most extensive and should be read for details on theoretical models since here attention is given to empirical research. This paper is distinct from previous literature reviews because it is organized by what seem to be the most important, usually unresolved, issues in the finance and growth literature, rather than by estimation techniques, industry-level vs. macro-level papers, case studies vs. cross-section of countries, etc. This kind of approach should facilitate a critical discussion on what we know and what we do not know about the impact of financial intermediation by banks on economic growth. Furthermore, papers which deal with transition economies have been included.

2 Overview of empirical research

The first results of econometric research were based on cross-country regressions in which the dependent variable is the average real GDP per capita growth rate in a certain period, and independent variables are different indicators of financial system development and various control variables. Recently, panel analysis and time-series analysis have come to dominate econometric research. Beck (2008) provides a review of different econometric methodologies to assess the link between finance and growth. In this paper empirical research will be organized under five sections: a) causality, b) non-linearity, c) time perspective, d) proxies and e) interactions. Naturally, this is not a perfect division since there is some overlapping between papers in terms of the main focus of their interest. The first two aspects have been chosen because they seem to generate the most interest among researchers. The direction of causality is said to be crucial because it has significantly different implications for development policy (Calderon and Liu, 2003). Non-linearity is examined in more detail because groundbreaking papers in the finance and growth literature assumed linearity. The time perspective has been taken into account to check to what extent results change depending on the observed time period. Choosing a right proxy for financial intermediation still represents the biggest challenge researchers have to face. Finally, interactions have been included in this analysis to show potential for future research.

¹ Gertler's review is focused on microeconomic aspects of finance and growth.

² Levine is also one of the most cited authors in this field of research, but his weakness is that in the literature reviews he writes he devotes too much space to his own papers, forgetting to mention criticisms or relegating them to footnotes.

2.1 Causality

In order to enable a better overview, papers dealing with the issue of causality are organized in two sections. In the first are papers in which the conclusion is that finance generally causes growth. The second focuses on papers with a sceptical tone, where the conclusion is that finance only sometimes causes growth.

Finance generally causes growth

When it comes to econometric research on economic growth, the chronology can probably be split into before and after Barro (1991). His seminal paper does not include any financial intermediation variables. However, only two years later King and Levine (1993; 1993a) expanded Barro's model with four financial variables: a) ratio of liquid liabilities to GDP; b) ratio of deposit money bank domestic assets to deposit money banks domestic assets plus central bank domestic assets; c) credit issued to private enterprise divided by credit issued to central and local government plus credit issued to public and private enterprises; d) credit issued to private enterprises divided by GDP. Their sample includes 80 countries and the time period observed is from 1960 to 1989. Their key finding is that financial services are importantly linked to economic growth and productivity improvements. Furthermore, the level of financial development predicts future economic growth and future productivity advances. In other words, finance does not merely follow economic activity.

Even though King and Levine take into account the issue of endogeneity, later on Levine (1998) pays more attention to it by using legal indicators as instrumental variables to extract the exogenous component of banking development.³ The observed time period is from 1976 to 1993 and the sample consists of forty three countries. His results show that there is a statistically significant and economically large relationship between banking development (measured as credit allocated by commercial and other deposit-taking banks to the private sector divided by GDP) and long-run rates of economic growth. Furthermore, differences in creditor rights and efficiency of the judiciary explain more than half of the variation in the level of banking development. Basically, the legal environment influences the banking sector and this component of banking-sector development is strongly linked with economic growth. He stresses that his paper does *not* show that economic growth does not influence the banking system. Unfortunately, he does not test for it and still concludes that banking development leads economic growth. Two years later he and his colleagues put in additional effort to control for endogeneity. Levine et al. (2000) use dynamic panel analysis on a sample of seventy four countries for the period 1960 to 1995 with five-year averages. Financial intermediation measures are similar to those in King and Levine (1993; 1993a), and instruments to those in Levine (1998), except that they use some internal instruments too. The main result is that financial system is positively correlated with economic growth and that this relationship is not a result of simultaneity, omitted variables or reverse causation. Their policy advice is to carry through legal and

³ The most commonly used instrumental variable is "legal origin". However, it is questionable that it influences economic growth only through financial intermediation. Furthermore, it is not very useful in transition economies which have rewritten their laws.

accounting reforms to strengthen creditor rights, contract enforcement and accounting practices in order to boost financial intermediary development and thereby accelerate economic growth.⁴

The “finance causes growth” hypothesis is supported by Odedokun’s (1996) findings as well. Unlike the previously mentioned authors, he uses a time-series regression analysis (71 developing countries, varying periods that generally span the 1960s and 1980s) and concludes that financial intermediation promotes economic growth in roughly eighty five percent of the countries and that the growth-promoting patterns of financial intermediation are practically invariant across various countries and regions. Calderon and Liu (2003) analyze a larger number of countries (one hundred and nine countries from 1960 to 1994) and on pooled data employ the Geweke decomposition test. Their results are the following: “a) financial development generally leads to economic growth; b) the Granger causality from financial development to economic growth and the Granger causality from economic growth to financial development coexist; c) financial deepening contributes more to the causal relationship in the developing countries than in the industrial countries; d) the longer the sampling interval, the larger the effect of financial development on economic growth; e) financial deepening propels economic growth through both a more rapid capital accumulation and productivity growth, with the latter channel being the strongest”. Unlike Calderon and Liu, but on a sample of ten developing countries⁵ from 1970 to 2000, Christopoulos and Tsionas (2004) find that long-run causality runs from financial development to economic growth but that there is no evidence of bi-directional causality. However, they do not find any short-run causality between financial deepening and output. The authors stress that an important policy implication is that policies aimed at improving financial markets will have an effect on growth that is delayed but nevertheless significant. Fink et al. (2005) obtain the opposite result in terms of the time perspective. They find a strong finance-growth link in eleven transition countries⁶ (1990-2001) and the main growth impact runs via the productivity channel. However, financial sector development triggers short run growth effects rather than spurring long term growth. Their financial indicator includes not only bank credit, but also stock market capitalization and value of outstanding debt securities divided by GDP.

In sum, authors of papers presented in this section use different econometric methodologies (cross-section, panel analysis, time-series), observe different time periods, as well as countries, and all conclude that finance leads economic growth. Should we be sceptical about their conclusion? The answer follows.

Finance only sometimes causes growth

The authors in this section emphasize country heterogeneity, which makes them more careful in making their conclusions. For example, De Gregorio and Guidotti (1995) did a

⁴ In a sequel to Levine et al. (2000), Beck et al. (2000) examine the channels through which financial intermediary development is associated with growth. They argue that the finance-growth nexus runs primarily through total factor productivity growth and not through savings and physical capital accumulation.

⁵ Colombia, Paraguay, Peru, Mexico, Ecuador, Honduras, Kenya, Thailand, Dominican Republic, Jamaica.

⁶ Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia.

survey similar to that of King and Levine (1993). They extend the sample to 98 countries for the period from 1960 to 1985 but use only one financial indicator: ratio of bank credit to the private sector to GDP. They also separately explore the relationship between financial intermediation and growth for the data set of twelve Latin American countries during 1950 to 1985. The authors show that although the impact of financial development on growth is broadly positive, it changes according to regions, time periods, and levels of income. The positive effect is especially strong in middle- and low-income countries. It is stronger in the 1960s than in the 1970s and 1980s. Furthermore, the effect of financial intermediation on growth is due mainly to its impact on the efficiency rather than the volume of investment. For Latin America they find negative correlation due to, according to their opinion, financial liberalization during the 1970s and 1980s in conditions of an inadequate regulatory environment. Demetriades and Hussein (1996) partly confirm their finding by stressing country heterogeneity. They apply time series analysis to sixteen countries⁷ for the period between 1960 and 1990, with the ratio of bank deposit liabilities to GDP and ratio of bank claims on the private sector to GDP as financial development indicators. The authors stress that the direction of causality between financial development and long run growth runs in different ways for different countries. They even find evidence that in quite a few countries growth causes financial development. Hence, it cannot be concluded that it universally holds that finance causes growth nor that finance follows growth: the “average” country for which cross-country regression results hold need not exist. This is why they strongly oppose the use of cross-section equations; differences in financial sector development may reflect different institutional characteristics, different policies, and differences in their implementation.⁸

Ram (1999) shares the opinion of Demetriades and Hussein (1996). He tries to take into account individual-country evidence but for ninety five countries, whereby he just looks at covariation between financial development (liquid liabilities to GDP) and economic growth in each country for the period 1960-1989. He finds negative correlations in fifty six countries and the mean of the ninety five correlation coefficients is -0.06. However, when he uses averages for all countries for the whole period, then correlation is 0.33. Later he runs basic multiple-regressions that also indicate a picture consistent with bivariate correlations. Ram suggests that cross-country estimates, which have been used in most studies, might be spurious. He especially stresses that cross-country results cannot be used to make general statements about individual countries. Neusser and Kugler (1998) work along the same lines. They use time-series analysis on a sample of thirteen OECD⁹ countries for 1970 to 1991. They measure financial depth by the GDP of financial institutions, insurance companies, and pension funds because it covers a broad range of financial activities that includes the deposit and credit business by commercial banks, service charges, commissions related to stocks and bond issues and off-balance activities. Based on their results they conclude that it is not possible to make a general statement whether financial development is truly an engine of growth or just a sign of the evolution of the

⁷ Costa Rica, El Salvador, Greece, Guatemala, Honduras, India, Korea, Mauritius, Pakistan, Portugal, South Africa, Spain, Sri Lanka, Thailand, Turkey, Venezuela.

⁸ For general critiques of cross-country econometric research of economic growth see McCartney (2006).

⁹ USA, Canada, Japan, Germany, France, Italy, Great Britain, Australia, Belgium, Denmark, Norway, Sweden, Finland.

whole economy due to independent factors. The causal link is empirically weak for most of the smaller countries, which the authors explain by different degrees of capital mobility. Luintel and Khan (1999) find bi-directional causality between financial development (ratio of total deposit liabilities of deposit banks to one period lagged GDP) and economic growth for all ten countries in their sample.¹⁰ They apply multivariate time-series. Heterogeneity is especially emphasized by Favara (2003) who finds out that the effects of financial development vary considerably across countries and that there is no obvious pattern related to geographic location, the level of economic development, or institutional characteristics (85 countries in the sample; 1960-1998). This leads him to the conclusion that standard growth regressions estimated by previous authors, which tend to “disguise” these properties of the data, might be misspecified. In sum, the level of financial development has ambiguous effects on economic growth. For some specifications, the effects are positive, and for some negative. Favara believes that business cycles and measurement errors are the driving force of these findings.

The most sceptical view of the importance of finance and growth can be found in papers written by Shan (2005) and Zang and Kim (2007). The first author applies time-series and the other two panel analysis, but their results are similar. Based on Shan’s variance decomposition analysis, there is little evidence that financial development leads economic growth in the eleven countries in his sample (from 1985 to 1998, quarterly data). Also, no substantial differences were found between eight Western countries¹¹ that have more developed financial systems and the three Asian countries¹² with less developed financial systems. The author concludes: “To the limited extent that one does find some support for the hypothesis that financial development leads economic growth, it seems clear that financial development is no more than a contributing factor and, almost certainly, not the most important factor. It is clear that whatever causality may exist, it is not uniform in direction or strength, and highlights the inappropriateness of cross-sectional analysis in this regard”. Zang and Kim (2007) use the large panel data set provided by Levine et al. (2000) but get completely different results: there is no evidence of any positive unidirectional causal link from financial development indicators to economic growth. On the contrary, there is substantial indication that economic growth precedes subsequent financial development. The authors emphasize that their result does not imply that the role of financial development is not important, but that the bottom line is that a more balanced approach to studying the relationship between finance and growth needs to be adopted. The motivation for their paper came from the “casual observation that superstar East Asian countries with the world’s highest growth rates for the last four decades, such as Japan, South Korea, and China, could not be classified as more financially developed than their competitors”. This is especially true for South Korea whose financial institutions did not operate under market forces until very recently.

When it comes to transition economies, existing research does not show a strong link between finance and growth. Koivu (2002) analyzes twenty five countries during 1993-2000 and emphasizes that a large banking sector is not in itself something that promotes

¹⁰ Colombia, Costa Rica, Greece, India, Korea, Malaysia, Philippines, Sri Lanka, South Africa, Thailand.

¹¹ Australia, Canada, Denmark, Finland, Italy, Portugal, UK, USA.

¹² China, Japan, South Korea.

economic growth. In her paper she finds no robust link between the amount of credit to the private sector and economic growth. Also, causality seems to run mostly from economic growth to credit growth. In addition, she uses the margin between lending and deposit interest rates as a measure of banking sector efficiency because it is closely linked to theoretical models of finance and growth. Her result is that the interest rate margin is negatively and significantly associated with economic growth. Dawson's (2003) result is similar: financial development, measured by liquid liabilities as a proportion of GDP, has an insignificant effect on economic growth: economic growth in thirteen Central and East European countries¹³ (1994-1999) is not constrained by underdeveloped financial sectors. Mehl et al. (2005) also do not find evidence that financial deepening impacted growth positively in Southeast Europe during 1993-2003.¹⁴ They offer several explanations for this result: a) short time series; b) standard growth regression framework which is maybe ill-suited for transition countries; c) maybe quality of banking sector matters for economic growth rather than financial deepening per se. In a follow-up paper to Fink et al. (2005), but on a sample of nine accession countries¹⁵ (1996-2000), Fink et al. (2006) state that there is some evidence that total financial intermediation (the same indicator as in the previous paper) contributed to economic growth in accession countries. More precisely, stock market capitalization turned out to be insignificant, as did private credit, while bond markets and domestic credit (volume of loans of deposit money banks and monetary authorities to all residents divided by GDP) played an important role in promoting growth. The difference in importance between domestic and private credit stems from the many bad loans made to the private sector, while the former also includes bank credits to local and central government, which have a very low default probability.

To sum up this section, the number of economists who are less keen in concluding that finance causes growth is larger than the number of those who are confident that it does. Their results do not give uniform policy prescriptions. The authors show that the results differ depending on the observed countries, time periods, proxies for financial intermediation, etc. A few claim that the results change depending on the countries' income levels. This leads us to the next section.

2.2 Non-linearity

After developing a theoretical model of multiple steady states, Berthelemy and Varoudakis (1996) test it on a sample of ninety five countries for the period from 1960 to 1985. In their model one of the steady states leads to a poverty trap in which the financial sector disappears and the economy stagnates. The other steady state is characterized by positive endogenous growth and normal development of financial intermediation. In the empirical part of their paper the authors try to find convergence clubs based on the starting level of financial development and human capital. Based on these criteria they organize the countries in four groups where two are especially interesting from the standpoint

¹³ Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Moldova, Poland, Romania, Russian Federation, Slovak Republic, Ukraine.

¹⁴ Albania, Bosnia and Herzegovina, Croatia, FYR Macedonia, Serbia & Montenegro, Bulgaria, Romania, and Moldova.

¹⁵ Bulgaria, Czech Republic, Slovakia, Hungary, Slovenia, Poland, Romania, Malta, Turkey.

of finance and growth. They find out that in countries with very high starting levels of human capital, and low level of financial development, the financial variable (measured as ratio of M3 to GDP) does not have any effect on growth. Their explanation is that above a certain level of educational development, the benefits from the accumulation of human capital become conditional on changes in the sectoral allocation of investment. These changes are difficult to carry out if no sufficiently developed system of financial intermediation exists. In other words, financial repression (e.g. as in Latin America in 1960s and 1970s) can be a great obstacle to growth in countries in which basic conditions such as a certain level of human capital are met. It is interesting that in that group of countries government consumption has a positive effect on growth, probably because the undeveloped financial system inhibits the growth of private sector savings and investment. The authors believe that in these countries externalities generated by public goods are the only potential source of endogenous growth because there is no private investment dynamism. In countries in which the starting levels of human capital and financial development are low, education, financial system, openness, and government spending do not have any effect on economic growth. The only significant variable is the number of coups and revolutions. These countries form a convergence club around the poverty trap.

By applying a threshold regression model to the King and Levine (1993a) data set Deidda and Fattouh (2002) find that in low income countries there is no significant relationship between financial development and growth whereas in high income countries they find that this relationship is positive and strongly significant. In other words, financial development is not associated with higher growth rates at all levels of economic development. Results obtained by Rioja and Valev (2004) are along similar lines. They use GMM dynamic panel techniques on the sample of seventy four countries for the period from 1960 to 1995 in order to find out whether the influence of finance on economic growth depends on the development level of financial system. They split the countries in three groups and find out that in countries with low financial development, additional improvements in the financial markets do not have a clear effect on growth - depending on the financial indicators used it is either positive (ratio of commercial bank assets to commercial bank and central bank assets) or nonexistent (share of credit to private sector to GDP). They explain this difference by indicators being better at measuring the size of the financial system, and others efficiency. In countries where financial development has passed a certain threshold (the "middle" region), it exerts a strong positive effect on economic growth. In the "high" region, the growth effect of financial development declines once it reaches very high levels. Common characteristic of countries in the "low" region is that they all have a high level of inflation (above a certain threshold), which maybe explains why there is no link between finance and growth. Favara (2003) also finds out that the relationship between financial development and economic growth is non-linear. The financial sector exerts positive effects on growth only at intermediate levels of financial development.

Related research was carried out by Aghion et al. (2005) but the focus was on convergence. The main finding is that countries above a certain threshold of financial development converge to the same long-term growth rate, while countries under the threshold have lower long-term growth rates. They use the same data (seventy one countries, 1960-1995) and methodology as Levine et al. (2000), but they add an interaction term between initial GDP per capita (relative to the USA) and financial development indicator (share of

private sector credit to GDP). The assumption is that low financial development decreases the probability of convergence on the growth rate of the country which is the technology leader (in their paper the USA); due to insufficient financial development, there is no technology transfer. The main channel by which finance influences growth is productivity, and not capital accumulation. The threshold is the share of credit to GDP of 25%; half of the countries in the sample are above it. The authors do robustness tests and once they include institutional variables significance of financial variables decreases. They conclude that some unspecified combination of financial development and institutions matters for development. Masten et al. (2008) also use level of financial development as the threshold variable and find explicit threshold effects: less developed countries in their sample (transition economies) benefit more from the development of domestic financial markets than EU-15 economies. However, the time period they observe is shorter (1996-2004), they apply dynamic panel analysis, and use both macro and industry-level data.

Even though it was stated at the beginning of this review that papers with industry data will not be taken into account, one such should be mentioned because the authors take a different perspective. Coricelli and Roland (2008) extend Rajan and Zingales (1998)¹⁶ in order to study the potential asymmetric effects of financial markets on growth. Their sample covers one hundred fifteen countries across twenty eight manufacturing industries between 1963 and 2003. When replicating the analysis of Rajan and Zingales they fail to uncover any robust evidence of a significant positive effect of financial sector development on industrial growth. However, they discover that financial development plays an important role during episodes of output decline. "In particular, industries which are relatively more dependent on external finance decline relatively faster in countries with lower financial sector development, measured as the credit-to-GDP ratio. These findings suggest that credit markets play a more important role in softening (or, depending on the quality of credit market institutions, magnifying) output declines than in fostering growth, which supports the conjecture that the impact of financial development on growth is asymmetric." Basically, credit markets matter most during recessions.

What can we conclude from this section? Simply, there is no consensus among researchers about which countries would most gain from financial deepening in terms of economic growth, although there is more evidence that it would benefit countries that are not already rich. One thing is certain: taking non-linearities into account is very important. Let us now see how the time dimension influences the results.

2.3 Time perspective

One way of investigating the finance-growth nexus is to go further into the past or expand the time periods of previous influential papers. Rousseau and Wachtel (2007) did

¹⁶ Rajan and Zingales (1998) show that industries that are more dependent on external finance grow faster in countries with a developed financial system. Their sample consists of thirty eight industries in forty one countries for the period from 1980 to 1990. Manning (2003) found out that their results change when Asian countries are included, and in those countries as far as economic growth is concerned, the main credit is not given to financial factors. For example, Park (1993) writes that deepening of the financial system was not crucial for mobilization of savings or improvement of allocation efficiency in South Korea and Taiwan. Exactly the opposite: fast development of the financial system was a result of high growth rates, high propensity to save and price stability - finance has in a passive way adjusted to changes in the real economy.

the second. They try to see whether the link between finance and growth in cross country panel data has weakened over time. They find that the impact of financial deepening on growth is not as strong with more recent data (1990 to 2003) as it appeared in studies with data for the period from 1960 to 1989. In fact, the effect of financial depth on growth disappears. The authors explain this by the frequent financial crises of the 1990s. In other words: "There is a thin line between financial deepening that comes from the expansion of financial intermediary activity and financial deepening that is the consequence of a credit boom. In the first instance increased intermediation is likely to be growth enhancing, while in the second instance credit standards deteriorate, nonperforming loans proliferate and a banking crisis ensues." The authors conclude that in order to understand better the finance-growth nexus, systemic study of the financial development experience of individual countries becomes necessary. In their paper they mention research done by Loayza and Ranciere (2005) who make a distinction between the short- and long-run effects of financial intermediation. They find that in the long run financial development supports and promotes economic growth. However, systemic banking crises, cycles of booms and busts, and overall financial volatility can harm economic growth. This holds for the short run. Financial depth leads to higher growth, and financial fragility has negative growth consequences. Total effect of financial liberalization and intermediation may be a combination of these effects, with weights for financial depth and financial fragility depending on the country's stage of financial development. They obtain their results on the sample of eighty two countries with annual data during the period 1960-2000. As mentioned above, Christopoulos and Tsionas (2004) and Fink et al. (2005) also do not "agree" on the short run vs. long run effects.

When it comes to the first group of papers, those that go further into the past, there are empirical papers in economic history which deal with the finance-growth nexus. As early as 1969 Goldsmith studied the link between financial development (share of bank assets in GDP) and economic growth on a sample of thirty five countries for the period from 1860 to 1963 and established a positive correlation. McKinnon (1973) focused on the link between financial system and economic growth for Argentina, Brazil, Chile, Indonesia, Korea, Germany and Taiwan after the Second World War and showed that a financial system can contribute to economic growth but that it depends on many factors (political, legal, industrial). It is difficult to figure out the importance of each of them. When it comes to causality, the author concludes that it is country- and period-specific. One of the most mentioned papers in this area comes from the 1990s and is written by Rousseau and Wachtel (1998). They apply time series analysis on data for USA, Great Britain, Canada, Norway and Sweden during industrialization (1870-1929). As financial indicators they use commercial bank deposits and assets of commercial banks, savings banks, and insurance companies. Their conclusion is that in that period and in these countries financial intermediation caused economic growth. It is interesting that their data series ends in 1929. Namely, Friedman and Schwartz (1963) wrote that banks contributed to the exacerbation of the Great Depression because they decreased shareholders' wealth and led to a fast decrease in the money supply. Bernanke (1983) adds that banks decreased the number of loans (especially to households and small enterprises) and thereby extended the crisis until 1933. A similar situation happened in Canada.

Rousseau and Sylla (2005) analyze the relationship between financial markets and economic growth in the USA for the period from 1790 to 1850, which is a long time series compared to other papers, but still their data sets are more limited than contemporary sets. They apply time series analysis and show that financial development helped the USA to, cross over onto a higher path of economic growth than other countries at the beginning of the 19th century. They conclude that: "Judging by US history, the widespread contemporary interest in developing and improving the financial system to foster economic growth is not misplaced." However, they use different measures of financial development than other papers reviewed here: money stock and number of listed securities. Burhop (2006) examined the relationship between growth of bank assets and economic performance (growth, capital accumulation, productivity) using a data set for Germany, covering the years 1860-1913, and a new data set for joint-stock credit banks covering the years 1851-1913. His result is that joint-stock credit banks played a vital role in the early industrial development of 19th century Germany. Total assets of credit banks positively influenced capital formation in the industrial sector between 1851 and 1882. However, using economy-wide data for financial depth, national income, capital stock and productivity, they detect no leading role of the financial sector during 1860-1913. Basically, the role of credit banks was the greatest in the early phases of Germany's industrialization when its economy may have been relatively backward. The debate on the role of banks in Germany's development is still ongoing among economic historians. The same is true for countries such as England, France and Japan.¹⁷

Bordo and Rousseau (2006) expand this historical line of research with institutional variables. They use data for seventeen countries for the period from 1880 to 1997 in order to explore the link between finance, growth, legal origin and political environment. The authors find that political variables such as proportional representation election systems, frequent elections, universal female suffrage, and infrequent revolutions or coups seem linked to larger financial sectors and higher conditional rates of economic growth. However, a large part of the growth-enhancing role of financial development remains unexplained by institutional fundamentals. Still, they stress that institutions are important for avoidance of financial crises, which can also affect economic growth. It is important to mention that there are several papers/books which cover historical case studies in which econometrics is not applied. The most influential are: Cameron et al. (1967), Cameron (1972), Gerschenkron (1962), Sylla et al. (1999), Cassis (2002) etc.

A general conclusion from this section is that every country is specific, and that even for a single country there are different views on the role of financial development in economic growth, even if the same time period is observed. It is not clear whether financial intermediation is more important for economic growth in the short or long run, even though there is more evidence in favour of the long run. It will be interesting to observe how the results change when the data series reaches 2009. Let us now focus on the proxies used for financial intermediation.

¹⁷ For a short review of papers written on the role of financial revolutions in the economic growth of Germany, Belgium, Sweden and Japan, see Rousseau and Sylla (2006).

2.4 Proxies

Probably the most important problem in the whole finance-growth literature is that theory and empirics are disconnected. While theory focuses on financial efficiency, data limitations determine the focus of empirics, which is financial depth (share of private sector credit in GDP) or size (share of bank assets in GDP). Basically, theory is not confronted with data (Trew, 2006). This leads to another important issue: it is possible that, due to data limitations, the role of finance in determining economic growth is exaggerated. Furthermore, there are no clear quantitative lessons to be drawn from the existing literature. Here is a list of the most pronounced problems regarding the proxies used in research.

- Monetary aggregates, which are often used in the literature, are probably not a good measure of financial intermediation because they show how good the financial system is in providing liquidity. For example, a low level of M1 in GDP can show that the financial system is developed and that individuals need not hold a lot of cash. Fortunately, these proxies are used less and less.
- The trend of financial development measured by the credit-to-GDP ratio is itself rising over time across countries. As a result, those countries that did converge have necessarily had a higher measure of financial development over the observed period (Trew, 2006). It would be necessary to compare countries at a similar stage of economic development, which several papers confirm.
- Research does not differentiate between loans to companies and consumers. A notable exception is a paper by Beck et al. (2008).
- Countries for which data are not available (usually undeveloped economies) are excluded from the sample, and their inclusion would probably change the results. There is thus a selection bias towards the developed economies. In addition, papers that observe a large number of countries mostly exclude former socialist countries. It is recommendable to study groups of similar countries, or each country individually.
- Increasing the share of credit to the private sector need not be a sign of growing financial development. Rather, it can be a sign of a forthcoming financial crisis. This has been ignored by most researchers.

Benhabib and Spiegel (2000) think that there are indications that the financial development indicators are proxying for broader country characteristics. Namely, they find that indicators of financial development are correlated with both total factor productivity and investment. However, indicators that are correlated with total factor productivity growth differ from those that encourage investment. Research done by Hasan et al. (2007) differs from the “standard” research insofar as they suggest a more direct measure of finance quality rather than quantity (credit to the private sector). They test if bank profit efficiency, estimated at the firm-level (around 7,000 banks in EU-25 between 1997 and 2003) significantly spurs economic growth. The authors establish a positive relation between banking quality and economic growth in the EU-25 and find out that the quality channel has approximately three times the effect of the quantity channel. Koivu (2002) also uses a non-standard proxy, net interest margin, which was already mentioned. An overview of

proxies used in the finance and growth literature can be seen in appendix 1. Future research should focus on the efficiency of financial intermediation, rather than on financial deepening. Standard proxies for financial intermediation could be enhanced with other variables in order to add dynamics into the relationship between finance and growth. This leads us to interaction terms.

2.5 Interactions

A gold-mine regarding future progress on the finance and growth literature could be interactions, and not only those between financial variables and GDP. It is surprising that such a small number of “combinations” has been used so far. Ahlin and Pang (2008) focus on the interaction between corruption control and financial development in order to find out whether they work as complements or substitutes in promoting economic growth. They find out, using dynamic panel analysis on both macro and industry data during 1960-2000 that financial development and low corruption are substitutes. In other words, the growth impact of reducing corruption is higher when the financial system is less developed. Conversely, the growth impact of improving the financial system is higher when corruption is high. They however point out that there is overlap in the institutions and other ingredients behind financial development and corruption control. Detragiache et al. (2005) also analyze this link and find out that corruption is associated with a shallower and less efficient financial system in the sample of low-income countries. However, they find no significant relationship between legal origin and characteristics of the supervisory and regulatory framework with financial system performance. Furthermore, better contract enforcement and information about borrowers are associated with more private sector credit.

Demetriades and Law (2006) interact financial development and institutional quality indicators for seventy two countries for the period 1978-2000. Their main result is that in low-income countries institutional quality represents a more robust determinant of long-term economic development than financial development. “It seems that without good institutions any positive effects of financial development are weakened substantially, if they are to be found at all”. Their conclusion is that improvements in institutions are likely to deliver much larger direct effects on economic development than finance on its own. Allen et al. (2005) point out that China is an important counterpart to the findings in law, institutions, and growth literature: “neither its legal nor financial system is well developed, yet it has one of the fastest growing economies”. Their conclusion is that the faster growing private sector in China, compared to the public one, is supported by alternative financing channels and governance mechanisms, such as those based on reputation and relationships. They challenge the view that property rights and the lack of government corruption are crucial in determining financial and economic outcomes. China’s advantage in this respect seems to be its high level of social trust, stemming from Confucian beliefs. This shifts the focus of research from formal to informal institutions.

2.6 A comment

A general conclusion which could be made from the existing literature is that there is a broadly positive correlation between financial intermediation (i.e. financial deepening)

and economic growth but there is still no consensus on the direction of causality. Progress in research has been achieved in terms of econometric methodology, paying more attention to nonlinearities as well as heterogeneities, and including transition economies in this field of research. However, it seems that no breakthrough papers have yet appeared. Rather, the progress is slow and researchers seem to go round in circles.

Given all the available results, it is surprising how easily researchers sometimes conclude that finance causes growth - everywhere and all times. It was even an official stand of the World Bank (World Bank, 2001). In a more recent paper, two World Bank researchers conclude: "In summary, despite the weaknesses and qualifications, the accumulation of evidence suggests that financial development is *crucial* for growth. While the evidence may not convince all sceptics, it is strong enough to motivate the policymakers to prioritize financial sector policies and devote attention to policy determinants of financial development as a mechanism for promoting growth" (Demirgüç-Kunt and Levine, 2008:36). It is interesting to note that in their review they present results of only two papers written by "the sceptics": Rioja and Valev (2004) and Loayza and Ranciere (2005). In addition, Levine appears as author in most of the papers cited.

Less attention is given to stressing that it can be difficult to separate the individual influence of finance from other correlated factors. In a stagnating economy it is difficult to say what hinders economic growth: lack of financial funds, lack of entrepreneurship or something else. For example, innovations in telecommunications and computers have influenced the development of the financial system. Something similar could be said about the legal system and the political institutions that influence both the financial system and economic growth. All generalizations could lead to wrong policy advice. There is one more obvious problem in the reviewed papers: almost everybody ignores the dark side of finance, i.e. the financial crises, which can also have an effect on economic growth. However, it is important to note that there is a vast literature on the effects of financial liberalization on economic growth, where authors usually focus on financial crises. Unfortunately, this strand of the literature is not merged with that reviewed in this paper. Since bank crises are both numerous and expensive, authors should take them into account when making conclusions about the importance of finance for growth.¹⁸ Also, there is not much attention given to differentiating transitory growth based on unsustainable debt and sustainable based on production increase. Furthermore, the authors do not differentiate between financial development related to consumer loans to that directed to investment in production. Beck et al. (2008) point out that this differentiation is very important. For according to their findings, it is bank lending to enterprises and not to households that drives the positive impact of financial development on economic growth.

Several researchers checked the robustness of economic growth determinants. Salai-Martin et al. (2004) employ Bayesian Averaging of Classical Estimates to check the robustness of explanatory variables in cross-country economic regressions. Of sixty seven explanatory variables they find only eighteen to be significantly and robustly partially cor-

¹⁸ Laeven and Valencia (2008) state that fiscal costs of a bank crisis are about thirteen percent of GDP on average. In addition, output losses average about twenty percent of GDP. It is interesting that there is a low correlation between the size of fiscal costs and output losses, suggesting that the crisis is paid either through fiscal costs or larger output losses.

related with long-term growth. Surprisingly, they do not check the robustness of any financial intermediation variables. Durlauf et al. (2008) find little evidence, by using model averaging methods, that new growth theories play an important role in explaining aggregate growth. In contrast, they find that variation in growth rates across countries are more robustly explained by differences in macroeconomic policies and unknown heterogeneity associated with regional groupings. They suggest more work in uncovering potential nonlinearities and heterogeneity in growth processes across countries and more attention to microeconomic and historical studies. Just like Sala-i-Martin et al. (2004), they do not check the robustness of financial intermediation variables. The same holds for Levine and Renelt (1992). Hanousek et al. (2008) emphasize one more important point: measured rates of growth in real per capita income differ drastically depending on the data source. They replicate several recent studies of growth determinants and show that results are sensitive to the choice of data (PWT, WDI, IFS). These studies include Aghion et al. (2005): significance of the key interaction variable (financial development and initial GDP) tends to be both smaller in magnitude and less significant than reported in the original paper when using IFS, rather than PWT, growth rates. PWT adjustments bias upwards measures of growth for rich countries and downwards those for low income countries, leading to underestimates of the degree of convergence.

In sum: empirical research does not give clear answers on the importance of financial intermediation by banks for economic growth. The most important lesson, which was pointed out by Henderson et al. (2008:34) is that “failure to account for nonlinearities, variable interactions, and parameter heterogeneity could lead to gross misconceptions about what is really going on. If one ignores nonlinearities, policy recommendations based off a specific growth theory may not offer the correct prescription.” This is what we so far know about finance and growth. However, the key question still remains unanswered: if finance matters for growth, why do some countries have financial systems that spur economic growth, and the other do not? It is important to find out when and under what circumstances does a financial sector have a positive influence on economic growth and what determines its efficiency in this context? Instead of pushing the causality issue, changing countries in the sample, choosing between the short run and the long run, a different approach is needed. Suggestion of a possible way ahead follows in the next section.

3 Which way ahead?

One natural way ahead is multidisciplinary. Cassis (2002) suggests that we should study the interaction among the economic, political and social aspects of finance as well as the different levels of each of these aspects for each country individually. The economic aspect refers to the share of finance in the economy, social to the position of financial elites, and the political to the influence of financial interests on politics. One of the reasons why the financial system has always been interesting as a determinant of growth is because the government can influence it. Since the financial system determines who will use society’s savings, political factors have always shaped policies directed at the financial system and its functioning (Levine, 2005). Economic historians Sylla et al. (1999) wrote that the more historical roots and the development of modern financial system are

studied, the more obvious it becomes that in most critical points when a financial system changed, for better or worse, the role of government was of crucial importance. This does not surprise because government has always needed financial funds, mostly for political ambitions, of which the most important has been war financing. Apart from needing financial funds, the government also had the ability of coercion which enabled it to collect taxes. This also means that it had greater ability to borrowing and repay debts than private agents. Furthermore, the government had the power to create financial institutions and markets, as well as to influence their development, through legislation.¹⁹

Sylla (2002:291) later adds: “In this age of neo-liberalism, the disproportionate emphasis given especially to banks and also stock markets, with a corresponding de-emphasis of the role of the state, its public finances, and to a lesser extent its central banks seems not fully in accord with history’s lessons. In history, when the state got its finances right, stabilized the currency, and had an effective central bank, the securities markets, banks, and other financial intermediaries usually flourished.” Table 1 in the Appendix shows that government’s role does seem to be deemphasized. Government usually enters the growth regressions as part of the conditioning set in terms of the share of government consumption in GDP, i.e. government size.²⁰ Other than that, a possible way of government influencing the results in the reviewed studies is through political stability and institutional variables such as property rights, corruption, administrative barriers, efficiency of the bureaucracy, etc. With a surge in institutional fundamentalism, institutional variables are more and more present in growth regression.

The main suggestion is that we should look closer at the relationship between government and banks, especially from the political economy point of view, in order to discover possible “hidden” factors that are left out of the finance-growth theory and empirics. For banks do not operate in a neutral environment; they are a part of a larger financial and social system in which government has an important role and which is susceptible to many economic and political influences. The recent financial crisis gives additional evidence that more attention should be paid to the complex interplay between government and banks, especially in the situations of government and financial market failures. Most policy measures directed at financial systems implicitly assume that the government will strive for the common good, but such an attitude neglects the incentives with which policy makers are faced and the political structure within which they operate.

Haggard and Lee (1993) point out that too often personal interest of policy makers created and sustained distorted incentives in financial sectors which led to crisis or allocation of banks resources in government ownership for political or personal causes. In addition, special interest groups affect economic activity, the financial industry being no exception. Grossman and Helpman (2001) note that in the USA in 1999 financial and real estate industry had the largest share in federal lobbying expenditure. Bankers can exert powerful influence over governments and regulators, so that regulations serve the inter-

¹⁹ Stiglitz (1994) gives an interesting overview of the role of the state in financial markets.

²⁰ Roubini and Sala-i-Martin (1992) wrote a paper on the effects of governments’ financial repression on economic growth, which represents an exception worth mentioning. In general, there is a vast literature on the economic effects of financial repression (including government ownership of banks) but it is not merged with the “standard” literature on the role of finance in economic growth.

ests of incumbent bankers rather than promote social welfare. Empirical research in this field is very rare. One recent example is a paper written by Mian, Sufi and Trebbi (2008). They examine congressional voting patterns in the US on the American Housing Rescue and Foreclosure Prevention Act 2008 (AHRFPA) and the Emergency Economic Stabilization Act of 2008 (EESA). They find that constituent interest strongly influences political voting patterns on the AHRFPA, with Republicans being more likely to vote in favour of the legislation if their district is experiencing high mortgage default rates. In addition, special interest campaign contributions from the financial services industry are positively related to votes in favour of the EESA. EESA is a bill that transfers wealth from taxpayers to the financial services industry. This line of research (rent-seeking by policy makers and bankers) would be very interesting to follow in terms of the role of finance in economic growth.

4 Conclusion

Based on this review of almost two decades of intense empirical research, it could be concluded that there are still quite a few unresolved issues in the link between financial intermediation by banks and economic growth. The biggest obstacle to further progress is lack of appropriate data which would better proxy for bank efficiency in financial intermediation. It is possible that due to data limitations, the role of finance in economic growth is exaggerated. Hence, researchers should do more careful robustness checks in terms of the proxies and data sources they employ. In addition, they should pay more attention to possible nonlinearities and heterogeneity in growth processes across countries, as well as to the dark side of finance.

Although the direction of causality is a very important question, it seems that it is keeping the researchers away from trying to understand the “bigger picture”. They are “always crashing in the same car”.²¹ The key question still remains unanswered: if finance matters for growth, why do some countries have financial systems that spur economic growth, and others do not? It is important to find out when and under what circumstances a financial sector has a positive influence on economic growth and what determines its efficiency in this context. One way of achieving progress could be by looking more carefully into the relationship between government and banks. As remarked above the evidence of economic history suggests that whenever a financial system has changed, for better or worse, the role of government was of crucial importance. Interaction terms could be useful in including the relationship between government and banks in growth regressions. The biggest challenge lies in developing political economy models of finance and growth capable of being empirically tested.

²¹ “Always Crashing in the Same Car” is a song by David Bowie (Low, 1977).

APPENDIX

Table 1 *Empirical evidence on financial intermediation (by banks) and economic growth (chronologically)*

Author	Sample	Research method	Financial indicators	Government & institutions	Key findings
King and Levine (1993; 1993a)	1960-1989; 80 countries	cross-section analysis	a) ratio of liquid liabilities to GDP b) ratio of deposit money bank domestic assets to deposit money banks domestic assets plus central bank domestic assets c) credit issued to private enterprise divided by credit issued to central and local government plus credit issued to public and private enterprises d) credit issued to private enterprises divided by GDP	a) ratio of government spending to GDP b) political stability	Financial services are importantly linked to economic growth and productivity improvements. The level of financial development predicts future economic growth and future productivity advances.
De Gregorio and Guidotti (1995)	a) 1960-1985; 98 countries b) 1950-1985; 12 Latin American countries	a) cross-section analysis b) panel analysis	a) ratio of bank credit to the private sector to GDP	a) ratio of government spending to GDP b) political stability	Although the impact of financial development on growth is broadly positive, it changes according to regions, time periods, and levels of income. For Latin American economies it is negative.
Demetriades and Hussein (1996)	1960-1990; 16 countries	time-series analysis	a) ratio of bank deposit liabilities to GDP b) ratio of bank claims on the private sector to GDP	–	The direction of causality between financial development and long run growth runs in different ways for different countries.
Berthelemy and Varoudakis (1996)	1960-1985; 95 countries	cross-section analysis	ratio of money plus quasi-money to GDP	a) ratio of government spending to GDP b) political stability	Financial underdevelopment may become a particularly severe obstacle to growth in countries with relatively high starting levels of human capital.

Author	Sample	Research method	Financial indicators	Government & institutions	Key findings
Odedokun (1996)	1960s-1980s; 71 developing economies	time-series analysis	credit issued to private enterprises divided by GDP	–	Financial intermediation promotes economic growth in roughly eighty five percent of the countries and the growth-promoting patterns of financial intermediation are practically invariant across various countries and regions.
Neusser and Kugler (1998)	1970-1991; 13 OECD countries	time-series analysis	GDP of financial institutions, insurance companies, and pension funds	–	There is a positive correlation between financial development and growth, but the causal structure underlying this relationship varies widely across countries and points at the importance of historical and institutional factors.
Levine (1998)	1976-1993; 43 countries	cross-section IV analysis	credit allocated by commercial and other deposit-taking banks to the private sector divided by GDP	a) ratio of government consumption to GDP b) creditor rights c) efficiency of the legal system in enforcing contracts d) legal origin	There is a statistically significant and economically large relationship between banking development and long-run rates of economic growth. Furthermore, differences in creditor rights and efficiency of the judiciary explain more than half of the variation in the level of banking development.
Rousseau and Wachtel (1998)	1870-1929; 5 countries	time series	a) commercial bank deposits b) assets of commercial banks, savings banks, and insurance companies	–	In the observed period and in observed countries financial intermediation caused economic growth.
Luintel and Khan (1999)	beginning of the 1970s + 36 to 41 years; 10 countries	multivariate time series	ratio of total deposit liabilities of deposit banks to one period lagged GDP	–	There is bidirectional causality between financial development and economic growth.
Ram (1999)	1960-1989; 95 countries	correlation and time-series	liquid liabilities to GDP	–	It cannot be claimed with certainty that financial development has a positive effect on economic growth.

Author	Sample	Research method	Financial indicators	Government & institutions	Key findings
Benhabib and Spiegel (2000)	1965-1985; not specified	dynamic panel analysis	a) M2/GDP b) deposit money bank assets/ deposit money bank domestic assets + central bank domestic assets c) credit issued to private enterprises/GDP	–	Indicators of financial development are correlated with both total factor productivity and investment. However, indicators that are correlated with total factor productivity growth differ from those that encourage investment. There are indications that the financial development indicators are proxying for broader country characteristics.
Levine et al. (2000)	1960-1995; 71 countries	a) cross-section IV analysis b) dynamic panel analysis	a) ratio of liquid liabilities to GDP b) ratio of deposit money bank domestic assets to deposit money bank domestic assets plus central bank domestic assets c) credit issued to private enterprises divided by GDP	a) ratio of government consumption to GDP b) political stability c) efficiency of the bureaucracy d) level of corruption e) role of the state-owned enterprises in the economy f) index of the strength of property rights g) index of the costs of business regulation h) risk of expropriation i) rule of law	Financial system is positively correlated with economic growth and that relationship is not a result of simultaneity, omitted variables or reverse causation.

Author	Sample	Research method	Financial indicators	Government & institutions	Key findings
Beck et al. (2000)	1960-1995; 63 countries	a) cross-section IV analysis b) dynamic panel analysis	a) ratio of liquid liabilities to GDP b) ratio of deposit money bank domestic assets to deposit money banks domestic assets plus central bank domestic assets c) credit issued to private enterprises divided by GDP	j) accounting standards k) creditor rights l) efficiency of the legal system in enforcing contracts m) legal origin a) share of government expenditure in GDP b) legal origin	Finance-growth nexus runs primarily through total factor productivity growth and not through savings and physical capital accumulation.
Deidda and Fattouh (2002)	1960-1989; 119 countries	cross-section analysis	ratio of liquid liabilities to GDP	a) general government consumption as a percentage of GDP b) political stability	In low income countries there is no significant relationship between financial development and growth whereas in high income countries they find that this relationship is positive and strongly significant.
Koivu (2002)	1993-2000; 25 transition countries	panel analysis	a) interest rate margin b) credit to private sector/GDP	government expenditure as a percentage of GDP	There is no robust link between the amount of credit to the private sector and economic growth. Also, causality seems to run mostly from economic growth to credit growth. Interest rate margin is negatively and significantly associated with economic growth.
Calderon and Liu (2003)	1960-1994; 109 countries	panel analysis	a) M2/GDP	general government consumption as a percentage of GDP	Financial development generally leads to economic growth. Financial deepening contributes more to the causal relationship in the developing

Author	Sample	Research method	Financial indicators	Government & institutions	Key findings
Dawson (2003)	1994-1999; 13 transition economies	panel analysis	M3/GDP b) ratio of credit provided by financial intermediaries to the private sector to GDP	–	countries than in the industrial countries. The longer the sampling interval, the larger the effect of financial development on economic growth. Financial deepening propels economic growth through both a more rapid capital accumulation and productivity growth, with the latter channel being the strongest. Economic growth in CEECs is not constrained by underdeveloped financial sectors.
Favara (2003)	1960-1998; 85 countries	GMM panel analysis	a) liquid liabilities/GDP b) private sector credit/GDP	a) government consumption/GDP b) legal origin	The relationship between financial development and economic growth is weak and non-linear.
Christopoulos and Tsionas (2004)	1970-2000; 10 developing countries	dynamic panel analysis	ratio of bank total deposits liabilities to nominal GDP	–	Long-run causality runs from financial development to economic growth but there is no evidence of bi-directional causality. However, there is no short-run causality between financial deepening and output.
Rioja and Valev (2004)	1960-1995; 74 countries	dynamic panel analysis	a) private sector credit/GDP b) liquid liabilities/GDP c) commercial bank/central bank loans	government size	In countries with low financial development additional improvements in the financial markets do not have a clear effect on growth - depending on used financial indicators it is either positive (ratio of commercial bank assets to commercial bank and central bank assets) or nonexistent (share of credit to private sector to GDP). In countries where financial development has passed a certain threshold (the

Author	Sample	Research method	Financial indicators	Government & institutions	Key findings
Aghion et al. (2005)	1960-1995; 71 countries	cross-section IV analysis	value of credits by financial intermediaries to the private sector/GDP	a) government size b) political stability c) KKZ d) efficiency of the bureaucracy e) expropriation risk f) property rights g) index of state-owned enterprises h) rule of law i) business regulation j) legal origin	“middle” region), it exerts a strong positive effect on economic growth. In the “high” region, the growth effect of financial development declines once it reaches very high levels. Countries above a certain threshold of financial development converge to the same long-term growth rate, while countries under the threshold have lower long-term growth rates.
Fink et al. (2005)	1990-2001; 33 countries (22 market economies and 11 transition countries)	dynamic panel analysis	total financial assets	government size	There is a strong finance-growth link in eleven transition countries and the main growth impact runs via the productivity channel.
Loayza and Ranciere (2005)	1960-2000; 82 countries	panel analysis	a) average ratio of private credit to GDP b) frequency of systemic banking crises c) standard deviation of the growth rate of private credit/GDP	government size	In the long run financial development supports and promotes economic growth. However, systemic banking crises, cycles of booms and busts, and overall financial volatility can harm economic growth.

Author	Sample	Research method	Financial indicators	Government & institutions	Key findings
Mehl et al. (2005)	1993-2003; 9 transition economies	panel analysis	a) ratio of broad money to GDP b) credit to private enterprises to GDP	a) government size b) index of creditor rights	There is no evidence that financial deepening impacted growth positively in Southeast Europe during 1993-2003.
Rousseau and Sylla (2005)	1790-1850; USA	time-series	a) number of listed securities b) money stock	–	Financial development helped USA to, at the beginning of the 19th century, cross on a higher path of economic growth compared to other countries.
Shan (2005)	1985-1998; 8 Western industrialized countries and 3 Asian economies	time-series	total credit	–	There is little evidence that financial development leads economic growth.
Bordo and Rousseau (2006)	1880-1997; 17 countries	cross-country analysis	broad money/GDP	a) proportional representation b) frequency of elections c) universal female suffrage d) revolutions and coups	Political variables seem linked to larger financial sectors and higher conditional rates of economic growth. However, a large part of the growth-enhancing role of financial development remains unexplained with institutional fundamentals.
Burhop (2006)	1860-1913; Germany	time-series analysis	banks assets	–	Role of credit banks was the greatest in the early phases of Germany's industrialization when its economy may have been relatively backward.
Demetriades and Law (2006)	1978-2000; 72 countries	cross-country; panel analysis	a) liquid liabilities/GDP b) private sector credit/GDP c) domestic credit provided by the banking sector/GDP	a) government repudiation of contracts b) risk of expropriation ICRG indicators: a) corruption	Improvements in institutions are likely to deliver much larger direct effects on economic development than finance on its own. Financial development is most potent in delivering real economic benefits in middle-income countries.

Author	Sample	Research method	Financial indicators	Government & institutions	Key findings
Fink et al. (2006)	1996-2000; 9 transition countries	panel analysis	a) total financial intermediation b) private credit c) volume of loans of deposit money banks and monetary authorities to all residents divided by GDP	– b) rule of law c) bureaucratic quality	There is some evidence that total financial intermediation contributed to economic growth in accession countries. Stock market capitalization turned out to be insignificant, as well as private credit, while bond markets and domestic credit played an important role in promoting growth.
Hasan et al. (2007)	1997-2003; EU25	dynamic panel analysis	bank profit efficiency	–	There is a positive relation between banking quality and economic growth in EU-25 and the quality channel has approximately three times the effect compared to the quantity channel.
Rousseau and Wachtel (2007)	1960-2003; 84 countries	cross-section and panel analysis	a) liquid liabilities/GDP b) liquid liabilities (M3) – narrow money (M1) c) credit allocated to the private sector	government consumption/GDP	The impact of financial deepening on growth is not as strong with more recent data as it appeared in studies with data for the period from 1960 to 1989. In fact, the effect of financial depth on growth disappears.
Zang and Kim (2007)	1961-1995; 74 countries	panel analysis	a) ratio of liquid liabilities to GDP b) ratio of deposit money bank domestic assets to deposit money banks domestic assets plus central bank domestic assets c) credit issued to private enterprises divided by GDP	measures of government size	There is substantial indication that economic growth precedes subsequent financial development.

Author	Sample	Research method	Financial indicators	Government & institutions	Key findings
Ahlin and Pang (2008)	1960-2000; 48 countries	dynamic panel analysis	a) total credit issued to private enterprises by deposit money banks and other financial institutions/GDP b) liquid liabilities/GDP c) deposit money bank assets/GDP	a) government expenditure/GDP b) ICRG corruption indicator c) CPI	Financial development and low corruption are substitutes. In other words, the growth impact of reducing corruption is higher when the financial system is less developed. Conversely, the growth impact of improving the financial system is higher when corruption is high.
Beck et al. (2008)	1994-2005; 45 countries	IV cross-country regressions	a) bank credit to GDP b) enterprise credit to GDP c) household credit to GDP	a) government expenditure/GDP b) institutional development c) creditor rights d) cost of contract enforcement	Bank lending to enterprises, not to households, drives the positive impact of financial development on economic growth. The finance-growth relationship is non-linear.
Coricelli and Roland (2008)	1963-2003; 115 countries across 28 manufacturing industries	panel analysis	external dependence indicator interacted with private sector credit-to-GDP ratio	–	Industries which are relatively more dependant on external finance decline relatively faster in countries with lower financial sector development. Credit markets play a more important role in softening (or, depending on the quality of credit market institutions, magnifying) output declines than in fostering growth, which support the conjecture that the impact of financial development on growth is asymmetric.
Masten et al. (2008)	1996-2004; 31 European countries (EU27, Croatia, Ukraine, Russian Federation, Iceland, Norway)	dynamic panel analysis	a) share of market capitalization and domestic credit provided by the banking sector in GDP b) domestic credit and share of GDP	a) protection of property rights b) administrative barriers etc.	Transition economies benefit more from the development of domestic financial markets than EU-15 economies.

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