The impact of financial crises on the finance-growth relationship: a European perspective

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JEL classification: C23, E44, G21, O11, O16, O52

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Paper submitted for publication in the Journal of Banking & Finance
This version as of July 30, 2011

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1. Introduction

Until very recently, there was general consent about the important role and the positive impetus of financial market development on economic growth. Spurred by the seminal work of Goldsmith (1969), McKinnon (1973) and Shaw (1973), the economic agenda has seen a remarkable progress of integration and liberalization of financial (and physical) markets throughout the last three decades. Following an era of financial “repression”, financial systems have been deregulated and opened for international competition on the grounds of the theory of efficient markets.

Aiming at the superior purpose of widespread growth, stability and wealth, especially the European Union has put considerable effort into this matter. The development and integration of financial systems within the New Member States and Candidate Countries were amongst the first steps in the transition towards a market-based economy. In the aftermath of the most severe financial and economic crisis since the Great Depression, much of the last years’ achievement seems to be at stake.

Despite the broad belief in the supportive effect of highly developed financial markets and economic integration on growth, empirical research could not unambiguously back this hypothesis. As Rousseau and Wachtel (2011; hitherto RW 2011) have shown for a broad sample of countries, the beneficial impact of financial development on growth, which was empirically strong throughout the 1970s and 80s, seems to have vanished during the following decades. Why so? Is this due to financial crises? Does this finding hold with more recent data, and for Europe as a strongly integrating region as well?

Along with the increase in the frequency of financial crisis episodes for the same period (Laeven and Valencia 2008, 2010; Caprio and Klingebiel 2003), the weakening impact of
finance on growth as reported by RW (2011) is of special interest in respect of the recent economic events. So far, the possible downside risk of financial liberalization was rather treated separately in the mainstream finance-growth literature, with the notable exception of Ranciere et al. (2006) who argue that positive liberalization effects outweigh a growing propensity to risk. In the light of the global financial collapse of 2007/08, which turned nearly all leading economies of the world into recession, the finance-growth link needs renewed consideration. To answer these questions, we conduct a panel data analysis to replicate and update the RW (2011) investigation on a 30 country sample solely focused on European economies. While many studies rather concentrate on bank lending (e.g. Buch and Neugebauer, 2011) in this notion, we extend the basic model from domestic bank credit by including bond and stock finance to capture total financial intermediation, and also include crisis dummies. The more recent boom years of the 2000s and the ultimate crash will certainly be of special interest regarding the development of the finance-growth relationship. By focusing our country sample to the extended European Union (both the mature EU-15 and the New Member States which are mainly former transition economies, including Croatia and Turkey as EU Accession Countries and Switzerland as economically interwoven) we follow Abiad et al. (2007) and Wachtel (2011) in studying the growth process of countries with common growth dynamics, with similar institutional structures in the financial industry and in patterns of financing. Rioja and Valev (2004) and Fink et al. (2009) similarly group countries according to their level of development. The extended European Union shares a number of institutional arrangements and harmonisation efforts to deepen and widen economic integration with strong repercussions on the interaction of the financial with the real sector (Goddard et al, 2007; Romero-Avila, 2007; Sun, 2011). European integration and the interaction of mature and New Member States poses a specific institutional environment
which is reflected in quite a number of related studies (e.g. Festic et al, 2011; Cottarelli et al, 2005; Lucy and Zhang, 2011; Barry et al, 2011; Hasan et al, 2009).

Our results support the notion that particularly excessive deepening of financial markets does not only make the finance-growth relationship disappear by inducing financial distress but is even able to destabilize the whole economy under certain circumstances. An alternative explanation can be found in the structural changes in European financial markets, particularly in the interaction between bank-based and market-based systems, as suggested by Deidda and Fatouh (2008). Although the causal relationships are not clear-cut, various studies were able to empirically identify certain initial macroeconomic patterns that historically reappear prior to episodes of financial market distress (e.g. Reinhart and Rogoff 2008; Claessens et al. 2008). The same holds for the aftermath effects of systemic banking crises (Reinhart and Rogoff 2009; Haugh et al. 2009; Abiad et al. 2009).

The remainder of the paper is structured as follows. The first section reviews research done in the field of finance and growth, e.g. King and Levine (1993). In order to broaden the view on this issue, we also incorporate the literature on financial crises and financial market risk, e.g. drawing on Bordo (2006), Rajan (2006) and Demirgüç-Kunt and Detragiache (1998). This permits a critical assessment of the role of financial markets in our economy. The second section is the empirical part. We apply the growth regression framework provided by Barro (1991) and augmented by King and Levine (1993) to estimate the finance coefficient on real output growth with and without dummy variables controlling for systemic banking crises and currency crises. The estimation is then conducted for different financial development proxies, covering the most important financial market segments. In the light of the findings we finally discuss the outcome of and the implications for EU financial integration and present the issues for future research on the role of financial markets.
The contribution of this study consists of two parts. First, we provide empirical evidence on the role of financial markets supporting growth, considering the impact of financial crises for a European sample. Second, we include the views of financial crises theory to examine the dynamics of the finance-growth nexus. In combining different methods and different measures for financial markets, we find a slightly negative link from finance to growth, i.e. reconfirm the RW (2011) finding for a European sample over a recent period. This result is of special interest in the current economic environment, and calls for further investigations about the efforts undertaken to strengthen and integrate financial markets within the EU. Without questioning the potential of the financial sector to boost economic growth, it seems that the potential to channel this momentum into the desired direction is not beyond doubt. We argue that incorporating alternative approaches might help to cope with the fragility of financial markets and achieve a better understanding of the relationship between finance and growth.

2. Review of the finance – growth literature and empirical studies

Before analyzing the empirical relation between episodes of financial distress and the finance-growth effect, it is necessary to introduce the theoretical approaches concerning the interaction of the financial and the real sector. Today, the links between global financial and non-financial markets sometimes resembles a black box and the mechanisms behind have been subject to controversial debates and a myriad of empirical studies. While the long-term growth supporting effect of financial development could largely be confirmed (e.g. King and Levine 1993; Rajan and Zingales 1998; Levine et al. 1999; Fink et al. 2009), there are still ambiguous results concerning the causal direction, the optimal design and the importance of finance at different stages of economic development (Wachtel 2003; RW 2011). Also, at every outburst of financial crises – and especially in the course of the recent events – a vast
body of research is dedicated to analyse the downside risks of financial development and the necessary regulatory framework (e.g. Demirgüc-Kunt and Detragiache 1998; Rajan 2006; Reinhart and Rogoff 2008, 2009). The following section is meant to give a comprehensive overview of the prevailing theoretical models and empirical findings.

2.1. Theoretical approaches to finance and growth

Joseph Schumpeter (1911) was among the first economists who argued that the credit supply created by the banking system was a determinant factor for economic growth in the years of industrialisation by facilitating funding for innovative and entrepreneurial projects. Gurley and Shaw (1955), Goldsmith (1969) and Hicks (1969) claimed that underdeveloped financial systems impede real economic growth. Although empirical evidence was not yet given, there was a major shift towards a more market oriented approach to the financial sector over the following decades (Wachtel 2003: 33). Developing a formal model to verify the “financial liberalization view”, the contributions of McKinnon (1973) and Shaw (1973) were certainly seminal for its widespread acceptance (Ang 2008: 541) and triggered considerable empirical research in this field. Both McKinnon and Shaw focused on the negative influence of loans at artificially low interest rates. They claimed that too much interference in the financial system in the form of directed credit and high reserve requirements for banks hindered the efficient accumulation and mobilisation of savings: Negative real interest rates discouraged saving and decreased the volume of available funding for investment. Moreover, the remaining funds were not efficiently distributed, which diminished productivity and thus slowed down economic growth. While McKinnon put more emphasis on the capital accumulation channel, Shaw postulated that the credit allocation by financial intermediaries lacked efficiency. Eventually, one may suppose that these considerations prepared the ground for endogenous growth models and the attempt to liberalise financial markets on a global scale (Ang 2008:
Despite the accuracy of their observations, the core problem at that time might have also been the dominating cronyism and corruption, materializing in government-led allocation of credit (Demetriades and Andrianova 2004: 49-50).

The relationship between finance and growth was (and still is) a contentious issue and produced a fertile ground for further research and discussion. One notable alternative approach towards the finance-growth link came from Robinson (1952), who argues that finance is demand-following rather than leading economic growth. He suggests that financial development is a reaction to intensified demand for financial services in the private sector. In an expanding economy, this leads to the emergence of new financial institutions, services and products and a deepening of the financial system (Ang 2008: 540). Based on empirical research, this relationship is often described as temporary, e.g. within the transition to a market-based economy (Fink et al, 2009; Mehl et al, 2006).

In the light of failing development policies at the beginning of the 1980s, a group of economists labelled as “neo-structuralists” held the view that financial liberalisation did not have the desired effects and that its efficiency enhancing capacity was overrated. Van Wijnbergen (1983) and Buffie (1984) referred to the enforced financial and trade liberalisation of developing economies. Buffie criticised the neglect of “curb markets”\(^1\) in the McKinnon/Shaw framework and highlighted their importance in the transmission process between the financial and the real sector in practice. For this reason Buffie called financial liberalisation “a step in the dark” and a “perilous undertaking” (Buffie 1984: 306, 320). Lucas (1988: 6), on the other hand, suggests that the capacity of finance is “overemphasised” by economists and that the financial system does not seem to have a significant impact on

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\(^1\) “The curb market is an informal (sometimes illegal) credit market in which loan suppliers and demanders can transact freely at uncontrolled interest rates” (Buffie 1984: 306).
growth, whereas technological progress is the relevant factor. The hypothesis is however limited by the assumption of frictionless market conditions\(^2\), which will hardly be found in practice. Considering technological progress as an endogenous factor for long-term growth, Lucas (1988) has however provided a theoretical framework that implicitly allows the financial system to play a more important role for the real economy. Following an endogenous growth approach, finance can foster growth by directing incentives to research and innovation via the “efficiency channel” (Thiel 2001: 6).

With the evolution of growth literature, more complex and sophisticated modelling was applied to incorporate financial intermediation into endogenous growth models at the beginning of the nineties. These models were a fundamental improvement over the McKinnon/Shaw framework and produced further support for the beneficial effects of financial development. The policy implication was to overcome inefficient resource allocation and informational frictions in the financial system of developing countries by lifting domestic government restrictions and financial liberalization (Ang 2008: 542). McKinnon (1993) stated that “Now, however, there is widespread agreement that flows of saving and investment should be voluntary and significantly decentralized in an open capital market at close to equilibrium interest rates”. However, he characterizes the path towards liberalization as a minefield where one misstep might be the last (Wachtel 2003: 33). Given the empirical evidence, the link between finance and growth is still characterized by mixed findings and the causal direction is likely to depend on the level of economic development (Levine 2004: 86). A non-taxative summary of the empirical findings is provided in the following section.

\(^2\) The absence of taxes, information asymmetries and bankruptcy costs in a perfectly efficient market according to Modigliani and Miller (1958).
2.2. **Empirical evidence from endogenous growth models**

The examination of the finance-growth nexus has spurred the development of a wide array of different estimation techniques ranging from simple cross-country regressions to more complex time series vector auto regressions and dynamic panel estimations. To unveil the “mystery” (Wachtel 2003: 34) of the specific mechanisms relating financial sector deepening to economic growth, the examination was expanded to different financial market segments and transmission channels using a variety of indicators for financial development (Temple 1999). Various studies put their focus on the comparison of country clusters or regions with common growth dynamics to avoid biased and misleading correlations (e.g. Fink et al 2009, RW 2011). Due to data availability, macroeconomic approaches still account for the major share of empirical research in the field but interest in disaggregated data analysis (e.g. Rajan and Zingales 1998) is rising (Wachtel 2003: 43-44). A growing number of researchers also concentrate on legal, governance and institutional factors (e.g. Fischer and Sahay 2000, Beck et al. 2000b). Eventually, financial intermediaries and financial markets may only be as good as the environment in which they operate. The limitation to this approach, however, is to find appropriate proxies for those factors (Ang 2008: 569).

Building up on Schumpeter’s assumptions, King and Levine (1993) drew from their empirical findings the now classic conclusion that financial development fosters long-term economic growth. In their cross-country analysis of a broad sample of 80 countries applying an endogenous growth model, they found that different indicators for financial development were positively and significantly correlated with real growth. King and Levine further concluded that the growth enhancing effect worked through capital accumulation and improvement in the efficiency to allocate capital. Their paper provided the starting point for intensified research that grew further with the increasing availability and quality of data (Thiel 2001: 20). Many authors also established the growth regression based on Barro (1991) as the
standard methodological framework for their research. While King and Levine (1993) used banking sector intermediation measures as a proxy for financial market development, subsequent studies soon examined and added other financial market segments. Atje and Jovanovic (1993) showed that stock markets exert a positive impact on growth, while they could not support the positive effect of bank sector intermediation. Levine and Zervos (1998) found evidence for a positive effect of both financial segments, as well as Rajan and Zingales (1998), who conducted their study on industry-level basis. Using the same approach as Atje and Jovanovic (1993), Harris (1997) challenged their findings for a sample of 49 countries. He observed a rather weak influence of stock markets. A limited significant effect could be determined for very few high-income countries only. A recent study on 35 developing countries by Cooray (2010) however points towards an important role of stock markets. Market liquidity, activity and capitalization are valuable predictors of long-term economic growth in this study. Cooray (2010) also points out that the extension of a country’s stock market in the same terms provides better protection to macroeconomic shocks, permits greater risk diversification and lowers capital costs.

A burgeoning body of research is also dedicated to the question whether bank-based or market-based\(^3\) financial systems are more favourable to economic growth. Bank-based systems provide the largest share of firms’ external funds via the banking sector and thus entitle financial institutions to exercise corporate monitoring and control directly. Due to this strong involvement, financial contracts tend to be long-term and the incentive to acquire credible information on the borrower and the financed project is very high. In contrast, market-based systems provide public information on the worthiness of investments in the

\(^3\)The European Central Bank (ECB) uses the terms “bank-oriented” and “securities-oriented” instead to describe an economy’s financial structure, as the provision of finance in bank-oriented systems naturally incorporates “markets” as well. Although the traditional terminology could be misleading for this reason, most authors still stick to it.
form of prices. The ownership structure of firms under this system facilitates takeovers and mergers and thus allows corporate control at “arm’s length”, simply by (not) purchasing and selling shares. These arguments lead to the assumption that bank-dominated systems are more likely to spur long-term economic growth, while market-based systems trigger short term growth effects, as firms are generally more concerned with their immediate performance (Ang 2008: 543). Empirical results (e.g. Beck et al. 2000b; Platek 2002) could however not find evidence for the superiority of either of the two types of financial structure (Fink et al. 2005: 12). Overall financial development can be driven by capital markets and financial intermediaries equally. Therefore credit and equity markets are complements rather than substitutes. This complementary relation results in spill-over effects reinforcing total financial sector development and, in turn, economic growth (Levine 2005: 34-35). Fink et al. (2005) hold a slightly different view in this matter. After having compared the financial sectors’ growth effects in detail for homogenous (in terms of the empirical finance-growth nexus) country clusters, they claim that the influence of financial structure might be more relevant than hitherto assumed. In analyzing the interaction between market and bank-finance, Deidda and Fattouh (2008) show that the structural change from a bank-based financial system to a financial order in which market-finance and bank-finance coexist may have an adverse effect on economic growth.

The findings of Ram (1999) contest the general support for the positive effect of financial development. For a set of 95 countries, he found a low negative or negligible correlation of finance and growth in the overall sample and links this finding to the huge heterogeneity among parameters. Levine (2005:85), on the other hand, states that numerous empirical analyses, employing all kinds of different techniques, clearly “demonstrate a strong positive link between the functioning of the financial system and long-run economic growth”. But as the comprehensive reviews of empirical studies by Thiel (2001) and Ang (2008) reveal, the
overall picture is not so straightforward. The question about which features characterize a well-functioning and well-developed financial system (and how these could be properly measured) remains. Wachtel (2003: 44-45) concludes that:

“*The observed association between financial development and growth does not [...] translate into a simple prescription to encourage the unrestricted growth of financial intermediaries. [...] It is easy to see how rapid credit expansion in a booming economy could wreak economic and political havoc even when a government is following a generally prudent prescription for financial sector development.*”

No matter what the “real” empirical interdependencies between finance and growth may be, financial integration and development became first order objectives for economic policy, especially within the EU. The process towards closer financial integration of the former transition countries, which was fostered over the last 20 years, is meant to strengthen economic growth. By loosening domestic savings constraints and creating access to credit, financial development enables entrepreneurial and educational projects to be realized. The resulting amelioration of macroeconomic stability pulls further investment and capital inflows from abroad. In turn, foreign investment facilitates the transfer of skills, knowledge and technologies to the domestic corporate sector, accelerating the development process of the transition economies.

In the course of the transition process, many studies put an emphasis on the emerging markets of Europe. Following the evaluation of the turbulent early transition phase, another wave of research on the region was triggered prior to the EU enlargement in 2004. While overall financial market development does not seem to play a role for economic growth in industrialised market economies, a strong link was established between banking sector
development and growth in transition economies Jaffee and Levonian (2001) in their cross-section analysis of 23 transition economies, find that banking sector development and reforms exerted a positive and significant effect on growth. By means of panel data technique, e.g. Drakos (2002) documented that efficiency, measured in terms of banking sector competition had a positive effect on growth. Platek (2002) could confirm the beneficial impact of bank sector development and found a positive link between stock market development and growth. The examination of the effect of bond and stock markets in those countries produce mixed results (Fink et al. 2005: 8). Broadening the view to bond markets could not prove any significant effects. Considering the rather early stage of transition in most of these economies at the time the study was conducted the results are not surprising. The opening of financial markets to foreign banks, however, seemed to have a positive impact in the first instance (Eller et al., 2006). Mehl et al. (2006) interpret their diagnosis of the financial development in the transition region of South-Eastern Europe (SEE) with the aid of a conceptual framework. They claim that a poor legal and institutional environment, together with a poorly conceived privatization of state-owned banks and a lax regulation on licensing new private banks caused the financial sector to growth fast in terms of volume (size and depth) but eventually lead to high inflation (Romania 1996), bankruptcies and banking crises (Bulgaria 1996, Croatia 1998; see Table 2). The financial contraction then triggered massive output losses and cut-backs in investment in the whole region. The authors call this a “deep” but low quality financial sector, not capable of fulfilling its main functions due to an inadequate development of the relevant regulatory and legal environment (Mehl et al. 2006:189). They argue that to assess a growth-supportive effect, qualitative indicators need to complement quantitative indicators on the way towards a sound and deep financial sector. For the given period, Mehl et al. (2006) identified a significant negative impact on growth of both the private credit and the monetization variables. Conversely, foreign bank penetration showed some significant and
positive relationship to growth in one of the specifications. Higher creditor rights protection and macroeconomic stability are found to have a statistically significant and positive impact in nearly all specifications. The empirical results suggest that financial deepening alone is not sufficient to accelerate economic growth. In the light of these findings, confidence in the financial system seems to play a vital role for a sustainable development. Admittedly, the standard growth regression framework might be ill-suited for the very specific circumstances in these countries during the transition period. Fischer and Sahay (2000) had the same concerns when they obtained wrongly-signed or insignificant coefficients on human capital and initial income. Fink et al. (2005) explicitly address this heterogeneity of results. They examined the differences of the finance-growth effect in a sample of 22 market and 11 transition economies. Applying a growth accounting framework, they could conclude that the overall finance effect was strongly positive for the transition sample but had only weak impulses in the case of market economies. The strength of the growth impact, however, also seemed to vary considerably within the subsamples. To test whether the impact unfolds via the productivity channel or the factor accumulation channel, the countries were clustered into six groups of an equally strong finance-growth nexus. In five out of six country groupings the productivity channel is dominant over factor accumulation. This aspect of their study is analogous to the results of Beck et al. (2000a). Thus, the sheer volume of assets in financial sector seems to be inferior to the quality of financial intermediation in accelerating output growth. In contrast to earlier studies by Beck and Levine (2004) and Beck et al. (2000a), Fink et al. (2005) could not support a significant long-term impact of financial development. These findings provide evidence of the notion that failed attempts for financial sector reforms and excessive credit growth in the early transition phase might have induced unsustainable and short-run growth effects only.
Passing on to the post-Millennium years for the analysis, one might expect that this picture changes, especially regarding the prospect of EU membership and the Monetary Union. In fact, Caporale et al. (2009), prolonging the analyzed period to 2007, reported a positive but insignificant effect of private sector credit on economic growth. Again, the authors attribute this to the large proportion of non-performing loans in CEE, which accumulated during the early transition phase. In spite of this, they state that credit to private companies is crucial for the realization of investment projects, which in turn fuel long-term growth. Both the financial sector size and efficiency indicators are positively and significantly correlated with growth. In addition, the prudent expansion of the stock markets in the region is found having a slightly positive but significant coefficient. Caporale et al. (2009) see the need to attract more foreign investors to increase the domestic stock markets’ size. Complementary to the model used by Mehl et al. (2006), they find that the financial sector in these new EU member states lacks of depth but has developed institutional quality and recognised the need for financial sector reforms in recent years. Considering the low contribution of stock and credit markets, the time is due to re-deepen the financial sector, they argue.

Looking at this brief literature review and the variety of empirical results, it becomes clear that there remain quite a few unresolved issues in the research on the finance-growth link. As authors have increasingly considered heterogeneity in the growth process among countries and periods, they show that the results differ not only depending on the observed countries, but also with the chosen proxies, time periods and other specifications. Uniform policy guidance can hardly build up upon these ambiguous outcomes. Another striking feature of the vast body of empirical literature on the finance-growth link is the ignorance of the “dark side of finance” (Baðun 2009). Financial crises have become sort of a regular occurrence in the capitalist system (Laeven and Valencia 2010). Although numerous publications treat the economic effects of financial crises, their role in the finance-growth relationship has been
rather neglected. One aim of this study is to merge these two strands of literature. In the following section, we present a review of selected empirical literature on financial crises and some notable exceptions which tried to shed light on their influence in the finance-growth nexus.

2.3. Financial crises and the disappearance of the finance-growth relationship

While many studies up to the mid 1990s confirmed a significantly positive link between the financial sector and growth (King and Levine 1993), recent theoretical and empirical work discover a weakening link. RW (2011), in an attempt to test the robustness of King and Levine’s “core panel results”, reveal a substantially decreasing impact of financial depth and intermediation over time. The examination of the time period post 1980 shows that the finance coefficient loses its significance in the first half of the 90s at the latest. Using panel estimation techniques for the broad sample of countries, they show that all applied financial indicators are also significantly weaker compared to the classic approach.

How can this dramatic change in the relationship that formerly seemed so robust be explained? RW (2011) test two potential hypotheses to this puzzling phenomenon. First, they find that the incidence of financial crises is highly related to the vanishing impact of the financial sector. Second, following the well-known Lucas critique⁴, they assume that the policy induced financial liberalization fundamentally altered the structure in the finance-growth relationship. The latter hypothesis could not be proven empirically though. Yet, premature liberalization may exhibit indirect effects on real growth when it triggers financial crises. But RW’s notions are in line with Kaminsky and Reinhart (1999) who found that accelerating growth of domestic credit and monetary aggregates is a good predictor for

⁴ The critique in Lucas (1975) originally referred to the misuse of the Phillips curve for policy making.
banking crises. Demirgüç-Kunt and Detragiache (1998) conducted a comprehensive test of the empirical connection between banking crises and financial liberalization for a broad sample of countries. The examined period (1980-1995) was characterized by worldwide efforts to liberalize domestic financial systems but also by a remarkable number of systemic banking crises in industrial as well as developing countries (Demirgüç-Kunt and Detragiache 1998: 2). The measured inverse effect of liberalization is robust to a number of macroeconomic control variables and offsets the positive impetus of financial development especially in the case of developing economies. The policy implication drawn from this paper is that liberalization in the absence of macroeconomic stability and a strong institutional environment is likely to destabilize the financial system. Demirgüç-Kunt and Detragiache (1998: 41) conclude that:

“[…] even in an otherwise well-functioning economy weaknesses in the institutions and regulatory framework necessary for financial markets to operate efficiently may fail to check perverse behaviour on the part of financial intermediaries, creating the foundation for systemic financial sector problems.”

Indeed, as the consensus on the need for “strong” institutions and a law enforcing environment seems ubiquitous, it is puzzling why financial collapses happen to reoccur on a regular basis and why literally no economy, despite its institutional strength, seems to be immune against it. This raises the question on the explanatory power of proxies for institutional soundness (Badun 2009; Ang 2008; Temple 1999). On the other hand, their significance might be simply offset under certain circumstances, which we will examine in the following section.
In parallel, a growing strand of literature discusses the sources of financial crises. Surprisingly, there were few efforts to incorporate these in the literature on the finance-growth relationship. In the aftermath of the recent financial meltdown in 2008, some groundbreaking contributions to the subject were re-discovered (e.g. Minsky 2008), alternative approaches (e.g. Shiller 2003a/b, 2008; Rajan 2006) attained increased attention and historical perspectives were emphasized (e.g. Reinhart and Rogoff 2009, Bordo 2006). Some of the theories reveal strikingly similar aspects. Frequently reappearing patterns are pro-cyclicality of the financial system and the underestimation or misconception of risk. These potential risks to and within financial systems eventually transmit onto the real sector, possibly constraining economic growth. The process might be translated into an unobserved risk channel, which shall be deemed to explain the disappearing finance-growth relationship.

The implications of a structural change in financial markets were picked up by Rajan (2006), asking: “Has finance made the world riskier?” Rajan detects a major change in financial systems around the world, induced by three main drivers, namely technical change, deregulation and institutional change. These changes, or this “new financial architecture” (Crotty, 2009) have basically broadened the number of participants in the market and replaced the classic banking business model, making financial transactions more arm’s length at the same time. Technical change does not only stand for the application of new communication technologies but also the widespread commercial use of sophisticated mathematical methods fuelling financial innovation (Shiller 2008: 117-121). Deregulation and institutional change in the meanwhile have produced a fertile ground for new financial institutions, such as hedge funds, pension and insurance funds, venture capital and private equity firms (Rajan 2006: 499-500). Considering recent media coverage in response of the global financial crisis, it is important not to forget the valuable benefits of financial innovation (e.g. Pantel and Haiss 2008; Shiller 2003a). For Shiller (2008: 23-26), the extension of the benefits of financial
innovation to more and more people resembles an act towards “financial democracy”. The point is, however, that the new financial architecture has, at first quite unnoticed, exposed itself to considerable risk.

The classic retail and commercial banking model was replaced by the so-called “originate to distribute” model. Instead of matching deposits with loans, banks can sell claims off their balance sheets through securitization and standardization of credit contracts, while accessing funds on the money market. As banks only have to bear a certain (usually illiquid) proportion of loans, their leverage increases significantly. Credibility largely determines their financing costs, which is why banks theoretically have a strong incentive to “act carefully”. Profits are increasingly gained through fees and commissions, not only by investment banks but also by commercial bank units (IMF, 2008).

Financial crises are mostly “credit booms gone wrong” including asset price bubbles and overshooting of markets. But we have to differentiate the roots of the current crisis in Europe. While accession countries might still need further financial deepening and efficiency to unfold their full growth potential, the mature EU member states had reached a level of financial intermediation that has decoupled from the real economy (Turner 2010; Taylor and Schularick 2009). This suggests that macroeconomic performance is rather independent of financial sector performance – as long as the financial sector does not encounter distress. The positive relationship between finance and growth has disappeared, as the given countries have reached a state of “financial maturity” about twenty years ago (Turner 2010: 23-24). As global imbalances were one distinct cause for the global financial crisis of 2007-2009, imbalances at the EU level play a strikingly similar role. Ireland, Spain and the UK have been booming economies fuelled by massive credit growth preceding the nearly meltdown of the European banking system, which could only be saved with extensive governmental interventions. Those interventions are now reflected in large budget deficits and austerity
policies throughout the Union. The shock triggered by the default of the US subprime mortgage market first transmitted to the global financial players in the UK and mature Europe, then unfolded its effects indirectly on emerging Europe. The vulnerability due to increased leverage and fixed exchange rates was enough to cause the worst output contractions among all emerging economies (Berkmen et al. 2009). However, with some notable exceptions (the Baltics), the pace of credit growth was not too excessive, especially compared to some of the “old” member states during the boom years. There was still a relatively low level of financial intermediation (see Figure 1) and banking business was more down-to-earth.

**Figure 1: Financial intermediation in different groups of countries, 1990-2009**

![Graphs showing financial intermediation](image)

Notes: **MATURE** = Austria (AT), Belgium (BE), Germany (DE), Denmark (DK), Finland (FI), France (FR), Netherlands (NL), Sweden (SE), United Kingdom (UK) + Switzerland (CH); **NMS+AC** = New member states (Bulgaria (BG), Czech Republic (CZ), Estonia (EE), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Slovenia (SI), Slovakia (SK), and Croatia (HR), Turkey (TR)); **PIIGS/Cohesion countries** = Portugal (PT), Italy (IT), Ireland (IE), Greece (GR), Spain (ES); **PRC** = Private credit; **DC** = Domestic credit provided by banking sector; **TFI_I and II** = Total Financial Intermediation; **TFI I** comprises Private Credit, Bonds outstanding and Stock market capitalization; **TFI II** contains Domestic credit instead of private credit. All indicators are expressed as % of GDP.
The securitization and distribution of the infamous subprime mortgages, unfortunately, was accompanied by misconception and poor management of the underlying risks. The subsequent crisis was not the result of an external shock but rather originated by the nature of human behaviour (Shiller, 2008: 24-25). The reaction of the markets in the case of the accession economies might have been similarly overemphasized. The strong ties resulting from EU-wide financial market integration were a curse and a blessing at the same time. While foreign banks contributed to the fragility in financial markets and were the primary originators of the situation, there was also a strong commitment to the emerging regions and immediate efforts to contain the crisis (Berglöf et al. 2009). We can draw from this that human behaviour is a factor that must not be neglected when dealing with financial markets and extreme events. This does not only apply to individual investors but mainly to people in key positions (portfolio managers) who manage large funds. On the one hand, dysfunctional incentives and moral hazard can result from short-sighted compensation structures and benchmarking (Rajan 2006). On the other hand, according to Minsky (2008), there is a natural tendency towards unsustainable levels of indebtedness (“Ponzi finance”), which at a certain point in time (“Minsky moment”) triggers an immediate downward spiral of deleveraging and liquidity freeze. Originally, his model applied to corporate financing only, but in the light of past crises it seems to fit equally well for financial businesses as well as private households and governments. Minsky (2008) also emphasized the difference between uncertainty and risk, which became mixed up especially with the growing reliance on mathematical models (e.g. Value-at-Risk modelling) to evaluate risk. As uncertainty cannot be quantified by definition, managers are neglecting its potential impact when making decisions on the basis of ratios and ratings exclusively (Taleb, 2008). Additionally, the same measures are used by computer software and fund managers all over the world, which easily leads to herding behaviour and thus increases systemic risk – another factor that cannot be adequately monitored yet. The
history of investing behaviour of individuals has also shown that periods of relative economic
stability and positive growth prospects easily lead to underestimation of risk, ignorance of
fundamentals and euphoria, resulting in flawed judgement and overshooting of asset prices.
To justify the general optimism, historical data is often presented, ignoring the fact that the
time series for financial assets are often too short to generate robust predictions (e.g.

3. The finance-growth nexus in crisis periods

3.1. Methodology and the model

This section provides a panel data analysis of the impact of financial development on
economic growth in consideration of the growing frequency of financial crises. The effects
are estimated on the basis of King and Levine’s (1993) version of the Barro (1991) growth
regression, in order to gain comparable results regarding earlier studies (RW, 2011).
Additional explanatory variables and controls are incorporated, following the methodology of
Mehl et al. (2006) and Caporale et al. (2009).

Cross-section and panel data techniques are the most popular methods for estimating the
sources of economic growth. In contrast to King and Levine (1993) and RW (2011), who
examine a very broad sample of countries in their finance-growth studies, this research is
focused solely on EU countries, extended to Switzerland, Croatia and Turkey. Panel data
estimation techniques have become the standard approach in empirical research, as the time
dimension is incorporated into the analysis of broad country samples (Ang 2008: 561-562).
Temple (1999) argues that panel data techniques are advantageous because they allow
controlling for omitted variables and unobserved heterogeneity of the countries’ initial
conditions. One is also able to use lagged explanatory variables to alleviate issues of endogeneity or measurement error. The panel is unbalanced because particularly in the case of the New Member States the available data does not cover the observed period completely.

The model specifications for the estimations are as follows:

\[
    r\text{GDP}_{pc_{i,t}} = \alpha + \beta_1[\ln(\text{iniGDP})]_{i,t} + \beta_2[\ln(\text{iniEDU})]_{i,t} + \beta_3[\text{FinVar}]_{i,t} + \beta_4[\text{GFCE}]_{i,t} + \beta_5[\text{INV}]_{i,t} + \beta_6[\text{TRADE}]_{i,t} + \beta_7[\text{banking}]_{i,t} + \beta_8[\text{currency}]_{i,t} + \beta_9[\text{gr}]_{i,t} + \epsilon_{i,t}
\]  

The dependent variable \(r\text{GDP}_{pc}\) is defined as the annual percentage growth of real GDP per capita. \(\text{FinVar}\) stands for the respective financial variable (domestic and private credit and liquid liabilities) expressed as a ratio of GDP. \(\text{iniGDP}\) accounts for the individual countries’ level of economic development at the beginning of the time period, proxied by initial real GDP per capita. As the sample consists of “mature” economies (EU-15) and former transition countries (new member states), the initial value of GDP per capita is used to capture convergence effects across economies and over time (Temple 1999:123). \(\text{GFCE}\) stands for government final consumption expenditure as a percentage of GDP and represents the size and importance of public demand versus private sector activity (Wachtel 2003: 36). \(\text{INV}\) denotes gross fixed capital formation in relation to GDP and serves as a proxy for physical capital accumulation. \(\text{TRADE}\) denotes the trade ratio (total imports plus exports) to GDP, which is an indicator for the openness and interconnectedness of an economy. The variable \(\text{iniEDU}\) denominates the initial gross secondary school enrolment rate and is a proxy for human capital. The two dummy variables, \(\text{banking}\) and \(\text{currency}\) indicate a systemic banking or currency crisis, taking the value of one in the designated initial crisis years according to Laeven and Valencia (2008, 2010). Another dummy (“\(\text{gr}\)”’) was added to control for the dynamics of the global recession in 2009, when all countries in the sample suffered from output losses or decelerating economic growth (Poland was the only economy in the sample
reporting positive growth rates in 2009). Subscript i stands for cross-section units, i.e. countries ($i = 1\ldots30$), while $t$ denotes time i.e. years ($t = 1990\ldots2009$).

$$rGDPpc_{i,t} = \alpha + \beta_1[\ln(\text{iniGDPpc})]_i + \beta_2[\ln(\text{iniEDU})]_i + \beta_3[\text{FinVar}]_{i,t-1} + \beta_4[\text{GFCE}]_{k,i} + \beta_5[\text{INV}]_{k,i} + \beta_6[\text{TRADE}]_{k,i} + \beta_7[\text{banking}]_{k,i} + \beta_8[\text{currency}]_{k,i} + \beta_9[gr]_{k,i} + \epsilon_{i,t}$$  \hspace{1cm} (2)

$$rGDPpc_{i,t} = \alpha + \beta_1[\ln(\text{iniGDPpc})]_i + \beta_2[\ln(\text{iniEDU})]_i + \beta_3[\text{FinVar}]_{i,t-2} + \beta_4[\text{GFCE}]_{k,i} + \beta_5[\text{INV}]_{k,i} + \beta_6[\text{TRADE}]_{k,i} + \beta_7[\text{banking}]_{k,i} + \beta_8[\text{currency}]_{k,i} + \beta_9[gr]_{k,i} + \epsilon_{i,t}$$  \hspace{1cm} (3)

In the second and third regressions, the financial variable enters the equation with a one-year and two-year lag in order to alleviate potential problems of endogeneity and check for the direction of the link between financial development and economic growth. Researchers mostly prefer the use of lagged values of the explanatory variables over other instrumental variable regressions to deal with reverse causation and measurement error (Beck et al. 2000a, Temple 1999). We follow this approach and use one- and two-year lags of the financial variables, as RW (2011) have shown that the results for both techniques are quite similar. The financial variables used in this model are total financial intermediation I and II. Total financial intermediation I is a measure for the aggregated financial market and consists of the sum of credit allocated to the private sector, stock market capitalization and bonds outstanding as a percentage of GDP. The second measure of total financial intermediation uses domestic credit provided by the bank sector instead of private credit to proxy financial depth and bank sector development. To test for the individual influence of the financial market components, the coefficients of the financial variables are estimated each separately in the regressions.

3.2. Data
The data set consists of observations from all current European Union member states including Turkey (TR) and Croatia (HR) as well as Switzerland (CH), all of which are strongly integrated economically and increasingly so also institutionally. The investigated time period is between 1990 and 2009 but starts later for several former transition countries where not all data were available from 1990. The data was mainly collected from International Financial Statistics (IFS) and the World Economic Outlook database provided by The International Monetary Fund (IMF), The European Bank for Reconstruction and Development (EBRD) and The World Development Indicators (WDI) database. Table 1 summarizes mean values, maximum values and standard deviations of the employed variables for the given period. The gap in GDP per capita is still considerable, while relative levels of education and trade are rather narrow. In terms of growth, the post-transition region accounts for the highest rates but also the largest volatility (6.8%), followed by the so-called PIIGS-cohesion countries, receiving structural aid from EU funds.

The post-transition countries’ (NMS and AC) financial sector is lagging behind in all individual sectors, with the lowest size in terms of GDP (18%) attributed to the stock market. In contrast, the PIIGS-cohesion sample records relatively high levels of financial sector development. Financial depth (particularly private and domestic credit) and size (liquid liabilities) are nearly equal to the mature sample. Figure 1 depicts the evolution of financial markets within the observed country samples over the past two decades. After a stuttering start, New Member States and Accession Countries have seen a considerable rise in the credit

5 Austria (AT), Belgium (BE), Bulgaria (BG), Cyprus (CY), Czech Republic (CZ), Denmark (DK), Estonia (EE), Finland (FI), France (FR), Germany (DE), Greece (GR), Hungary (HU), Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Luxembourg (LU), Malta (MT), Netherlands (NL), Poland (PL), Portugal (PT), Romania (RO), Slovak Republic (SK), Slovenia (SI), Spain (ES), Sweden (SE) and the United Kingdom (UK).

6 New EU Member States (NMS) and EU Accession Countries (AC) in the sample comprise BG, CY, CZ, EE, HU, LT, LV, MT, PL, RO, SK, SI, HR and TR.
markets with the new millennium. Stock and bond markets, however, still play a minor role. Despite the rather modest growth performance, private credit to GDP has increased by about 50% in mature economies and more than doubled in the cohesion country sample. The lower boxes in Figure 1 illustrate the peak in total financial intermediation in the year 2007 followed by a sharp decline. This is mainly a reflection of the downswing of the stock and bond markets, while there are only weak signs of credit contraction.

Data on financial crisis episodes in the respective period is obtained from Laeven and Valencia (2010, 2008) and Caprio and Klingebiel (2003). These comprehensive databases on financial crises provide information on timing, fiscal cost, output losses and resolution policies from the 1970s to present. Over the last 20 years, 23 events of systemic banking crises and 11 currency crises have been recorded (see Table 2). Laeven and Valencia (2008: 5) identify the initial year of a systemic banking crisis by the following criteria:

- a large number of defaults in a country’s financial and corporate sector

- a sharp increase of non-performing loans

- exhaustion of all or most of the aggregate banking system capital.

As also documented by Reinhart and Rogoff (2008), this situation is mostly preceded by a fast accumulation of asset prices, real interest rates and a slowdown of capital flows that typically end with a “sudden stop” (Calvo, 1998). More generally spoken, a banking crisis arises when systemically important institutions are in distress. To validate the timing of each crisis, Laeven and Valencia (2008) check for bank runs, the introduction of a deposit freeze or liquidity support from monetary authorities in the relevant year. We use the data provided by

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7 Cohesion countries or PIIGS are defined as countries receiving funds from the European Regional Development Fund (ERDF) and the European Social Fund (ESF) to overcome disparities between Member
Laeven and Valencia (2010)\textsuperscript{8} to take into account also the latest wave of systemic banking crises. Following RW (2011), we include a dummy variable for the initial years of systemic banking crises to control for their direct impact on growth. A second crisis dummy is added to capture the effect of currency crises (see Table 2). A currency crisis is indicated by a depreciation of at least 30 percent of the currency along with a minimum increase of 10 percent in the rate of depreciation compared to the preceding year (Laeven and Valencia 2008: 6).

4. Results
This section presents the results of the panel data regressions. For the analysis, we had to omit Cyprus (CY) and Malta (MT) and Romania (RO) because of obvious measurement errors concerning the control and finance variables. Luxembourg (LX) was omitted in respect of the overproportional size of its mainly international financial market, which is likely to distort the estimations. Simple pooled ordinary least squares (POLS) regressions for the aggregated financial variables TFI_I and II, which are not reported here, yield a weakly negative correlation between the financial variables and growth. However, the scatterplots already suggest that heteroskedasticity might be an issue and that autocorrelation seems likely within the different time series.

\textsuperscript{8} In the latest version of their database on financial crises (Laeven and Valencia 2010), the authors turn to a slightly different definition to identify the initial year of a systemic banking crisis. Accordingly, a banking crisis is considered systemic if the system shows significant signs of financial distress (as described above) and significant policy interventions are introduced. The latter are regarded as significant, if at least three out of six of the following measures have taken place:
1) extensive liquidity support (5 percent of deposits and liabilities to nonresidents)
2) bank restructuring costs (at least 3 percent of GDP)
3) significant bank nationalizations
4) significant guarantees put in place
5) significant asset purchases (at least 5 percent of GDP), and
6) deposit freezes and bank holidays.
According to the results of the Cook-Weisberg test, presence of heteroskedasticity is not rejected. Scatters plotting the regression residuals on the x-axis and the lagged residuals on the y-axis also indicate a positive correlation of consecutive observations. This was confirmed applying the Wooldrige test for autocorrelation in panel data, which rejected the null hypothesis of no autocorrelation. To account for these issues, we turned to apply a feasible generalized least squares (FGLS) estimator. FGLS estimators are appropriate when one or more of the assumptions of homoskedasticity and noncorrelation of regression fails. In this case FGLS estimation is more efficient than POLS estimation leading to smaller standard errors, narrower confidence intervals, and larger t-statistics. This enables more precise estimation of parameters (Cameron/Trivendi 2009).

Table 3 contains the results for model specifications (1) - (3) based on the standard Barro framework and applying the FGLS estimator. The results for the one- and two-year lagged financial indicators are shown in the second and third columns. Each column contains the results with and without using dummy variables for banking and currency crises episodes.

As expected, the crisis dummy variables indicate a strong and significant negative impact on growth. However, the finance coefficients seem largely unaffected by the use of dummies. Generally, the relationship between the financial sector variables and economic growth is weakly negative. With regard to the individual segments, private and domestic credit, as well as liquid liabilities and bonds outstanding show a significant, inverted effect in all three specifications. The stock market variable (MCAP) remains an exception: A positive effect on growth is reported significantly at the 1% level when no lags are entered into the equation. The coefficients lose significance gradually using a one-year lag and become insignificant when MCAP is lagged two periods. This might indicate simultaneous effects or strong co-movement between the stock market and the real sector.
At the aggregated level (TFI_I and II), no significant effects can be identified with a zero-lag. Introducing lagged effects, both measures for total intermediation show a significant but weak negative coefficient on growth in the third specification. The overall adverse effect seems to be dampened by the stock market interaction in the short run. What does this tell us about the long-run finance effects? Do stock market gains in the short-run partly compensate for the underlying adverse nexus or do stock markets simply fluctuate with economic activity? The evidence is too scarce to make inferences upon this specific relation. As noted before, several studies have found mixed evidence on the particular role of the stock market (Cooray 2010, Fink et al. 2009, Harris 1997, Atje and Jovanovic 1993).

Initial GDP per capita has a negative sign but is not equally significant in all specifications, indicating that convergence effects might not be important looking at the complete country sample. Investment is a good predictor of growth when entering the regression together with the credit market variables (PRC, DC). Openness of the economy (TRADE) is positively and significantly correlated with growth in all specifications. Human capital is never significant which suggests that there are still different growth dynamics at work within the sample. However, if heterogeneity is an issue, the quite unambiguous relation between finance and growth seems even more puzzling. In order to check if the outcome is robust to the choice of the growth model framework, we compared them to the results yielding from the (no less popular) production-function based approach by Mankiw et al. (1992), which are not reported here for spatial reasons. First, the overall picture does not differ much from the Barro-regression. The finance coefficients behave similarly when lagged and generally are at the same levels as described above. However, the standard growth models might by ill-suited to illustrate the dynamic process of growth even within the EU (+3), and when panel data tools are used for the analysis (Mehl et al. 2007). In other words, it seems reasonable to cluster the
5. Conclusion and outlook

This paper aims at investigating the link between financial crisis episodes and the disappearing impact of finance on economic growth in the more recent past. For the empirical analysis, we use panel data of 30 European countries (27 EU Member States plus Turkey, Croatia and Switzerland) over the period 1990-2009. The contribution of this study consists of two parts: Existing research on the finance-growth relationship is updated by applying more recent data on an exclusively European country sample. Second, we try to interpret the empirical results and develop the potential malfunctions and adverse effects of finance on economic growth. The empirical analysis includes separate estimations for three different financial market segments (credit, stocks, bonds) and for an aggregated measure accounting for total financial intermediation. The applied model is based on the standard growth regression developed by Barro (1991) and augmented by King and Levine (1993).

Although the regression results alone cannot prove a causal (negative) relation between financial deepening and economic growth, they are equally striking. Size and depth of the extended EU’s financial market is not supportive of economic growth in Europe. We conclude that the development of financial markets did not have the desired effects on the real sector. Further research could analyze whether this finding for European financial markets is rooted in changed interaction patterns between market and bank-finance as suggested by Deidda and Fattouh (2008). Undoubtedly, the primary functions of finance are still a basic prerequisite to reach a certain level of economic development. The fragility of financial markets, which is reflected in the increasing number and impact (costs) of financial crises can however not be neglected. Our findings suggest that under the prevailing conditions, the financial sector is not capable of dampening unsustainable levels of indebtedness, risk-taking
and leverage or to avoid euphoria in the markets. Conversely, the financial sector increasingly works as a catalyst. In line with the early findings of Loyaza and Rancière (2006), the cost of this development happens to be well beyond its utility in the long and medium run. Yet, assuming a linear relation between finance and growth might be misleading. Further research could identify a threshold for the optimal size of the financial sector. However, re-regulation and increased control may not be the ultimate answer to stabilize financial markets. As recent policy statements by the ECB and BIS suggest (see for example Galati and Moessner 2011, Moreno 2011 or BIS 2011), a macroprudential approach which aims at reducing financial fragility might be a first step into the right direction. The focus should be to break self-reinforcing cycles of leverage, asset prices and contagion, and to control monopolistic tendencies (i.e. institutions “too big to fail”). Eventually, this simply implies to make use of the defining implications of a market economy, considering the limitations to the theory of efficient markets, as suggested by Kay (2009). Anyway, we should start now to prepare for the next crash. It will be crucial to depart from market “radicalism” and be aware of the obvious fallacies in the theoretical assumptions in favour of liberalization and growth in scale and complexity of financial markets (Stiglitz 2000; Turner 2010). There have been sufficient examples of market deficiencies within the last 30 years, which have also fuelled research in the field. Yet, it will be crucial that decisions correspond to the challenges imposed by the changed financial environment.

References:


http://www.diw.de/documents/publikationen/73/diw_01.c.342404.de/dp940.pdf


http://www.fsa.gov.uk/pubs/other/turner_review.pdf


http://www.oecdilibrary.org/oecd/content/workingpaper/226123651438


## Appendix:

### Table 1: Summary statistics, annual data 1990/96-2008

<table>
<thead>
<tr>
<th>Variable</th>
<th>growth</th>
<th>GDP p.c. (USD)</th>
<th>EDU</th>
<th>DC</th>
<th>PRC</th>
<th>Bonds</th>
<th>MCAP</th>
<th>LL</th>
<th>TFI_I</th>
<th>TFI_II</th>
<th>GFCE</th>
<th>INV</th>
<th>TRADE</th>
<th>banking</th>
<th>currency</th>
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<tr>
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<td>515</td>
<td>503</td>
<td>509</td>
<td>501</td>
<td>501</td>
<td>497</td>
<td>475</td>
<td>445</td>
<td>505</td>
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<td>520</td>
<td>520</td>
<td>517</td>
<td>519</td>
<td>520</td>
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<tr>
<td>Mean</td>
<td>1.80</td>
<td>15001.37</td>
<td>101.54</td>
<td>92.18</td>
<td>77.43</td>
<td>87.44</td>
<td>50.85</td>
<td>67.88</td>
<td>20.70</td>
<td>212.34</td>
<td>19.39</td>
<td>21.70</td>
<td>90.20</td>
<td>0.04</td>
<td>0.02</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>4.79</td>
<td>9988.83</td>
<td>15.69</td>
<td>48.57</td>
<td>48.16</td>
<td>75.51</td>
<td>52.44</td>
<td>14.10</td>
<td>144.51</td>
<td>145.35</td>
<td>4.30</td>
<td>4.12</td>
<td>37.34</td>
<td>0.20</td>
<td>0.14</td>
</tr>
<tr>
<td>Min</td>
<td>-31.34</td>
<td>1379.22</td>
<td>46.38</td>
<td>10.15</td>
<td>7.17</td>
<td>0.99</td>
<td>0.02</td>
<td>16.57</td>
<td>7.52</td>
<td>7.52</td>
<td>8.57</td>
<td>6.17</td>
<td>30.48</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Max</td>
<td>12.85</td>
<td>39918.42</td>
<td>160.35</td>
<td>226.90</td>
<td>231.63</td>
<td>691.79</td>
<td>317.03</td>
<td>177.71</td>
<td>935.26</td>
<td>924.73</td>
<td>36.26</td>
<td>35.76</td>
<td>233.20</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

For the mature economies:

| Obs      | 200    | 200            | 200 | 200 | 200 | 200 | 200 | 200 | 200   | 200   | 200 | 200 | 200    | 200      | 200      |
| Mean     | 1.39   | 25026.19       | 111.92 | 125.33| 108.97| 129.19| 82.97| 85.46| 321.13| 337.70 | 21.45| 20.10| 82.87  | 0.04     | 0.01     |
| Std. Dev.| 2.25   | 4782.89        | 15.55 | 37.96| 40.44| 56.71 | 62.93| 32.89| 102.56| 99.87  | 4.27 | 2.43 | 29.98  | 0.20     | 0.10     |
| Min      | -8.45  | 17705.93       | 83.85 | 48.61| 30.77| 47.68 | 4.47 | 41.01| 162.42| 188.83 | 10.78 | 14.63| 41.14  | 0        | 0        |
| Max      | 5.90   | 39918.42       | 160.35 | 226.90| 231.63| 691.79| 317.03| 177.71| 649.49| 688.64 | 29.90 | 28.81| 170.53 | 1        | 1        |

For the NMS+AC:

| Obs      | 215    | 203            | 209 | 201 | 201 | 197 | 180 | 202 | 205   | 205   | 220 | 220 | 217    | 220      | 220      |
| Mean     | 2.05   | 4816.53        | 91.67 | 49.52| 39.03| 27.19| 18.08| 46.12| 90.27 | 90.56  | 18.34| 23.00| 105.19 | 0.05     | 0.04     |
| Std. Dev.| 6.80   | 2290.68        | 10.39 | 25.00| 21.91| 20.24| 14.57| 16.66| 36.21 | 42.69  | 4.37 | 5.06 | 36.67  | 0.23     | 0.19     |
| Min      | -31.34 | 1379.22        | 46.38 | 10.15| 7.17 | 0.59  | 0.02 | 16.57| 7.52  | 7.52  | 8.57 | 6.17 | 30.48  | 0        | 0        |
| Max      | 12.85  | 39918.42       | 160.35 | 226.90| 231.63| 691.79| 317.03| 177.71| 649.49| 688.64 | 29.90 | 28.81| 170.53 | 1        | 1        |

For the PIIGS cohesion countries:

| Obs      | 100    | 100            | 100 | 100 | 100 | 95 | 71 | 100 | 100   | 100   | 100 | 100 | 100    | 100      | 100      |
| Mean     | 2.07   | 15626.93       | 101.41 | 111.23| 91.54| 122.65| 45.30| 87.21| 257.22| 276.91 | 17.58| 22.06| 72.33  | 0.01     | 0        |
| Std. Dev.| 2.94   | 5755.77        | 11.24 | 38.05| 47.49| 96.40| 28.19| 24.32| 141.86| 133.92 | 1.92 | 3.39 | 40.02  | 0.1      | 0        |
| Min      | -7.61  | 8416.69        | 58.95 | 48.79| 27.68| 41.61| 8.49 | 39.76| 97.85 | 123.38 | 13.60 | 15.10| 35.39  | 0        | 0        |
| Max      | 10.38  | 32546.93       | 122.72 | 226.39| 230.31| 691.79| 151.94| 173.81| 935.26| 924.73 | 21.55| 30.71| 184.74 | 1        | 0        |

Source: authors’ own calculations.

Notes: mean values of annual indicators excluding LX, CY, MT and RO; growth = annual percentage change of real GDP per capita; EDU = secondary school enrolment, gross (%); GFCE (% of GDP) = government final consumption expenditure; INV (% of GDP) = gross fixed capital formation; TRADE (% of GDP) = trade ratio; PRC (% of GDP) = domestic credit to the private sector; DC (% of GDP) = domestic credit provided by banks; LL (% of GDP) = liquid liabilities; TFI_I = Total financial intermediation (% of GDP) = sum of private credit, stock market capitalization and bonds outstanding; TFI_II = Total financial intermediation II (% of GDP) = sum of domestic credit, stock market capitalization and bonds outstanding; MCAP (% of GDP) = stock market capitalization; Bonds (% of GDP) = outstanding bond values; banking = systemic banking crisis dummy; currency = currency crisis dummy. The mature sample comprises the mature economies Austria (AT), Belgium (BE), Denmark (DK), Finland (FI), France (FR), Germany (DE), Netherlands (NL), Sweden (SE), United Kingdom (UK) and Switzerland (CH). The new member states and accession countries (MNS+AC) comprise: Bulgaria (BG), Czech Republic (CZ), Estonia (EE), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Slovak Republic (SK) and Slovenia (SI) as well as Croatia (HR) and Turkey (TR). The cohesion sample ("PIIGS") comprises: Greece (GR), Ireland (IE), Italy (IT), Portugal (PT) and Spain (ES).
Table 2: Crisis episodes EU 27+2, 1990-2009.

<table>
<thead>
<tr>
<th>EU-15</th>
<th>systemic banking crises (starting date)</th>
<th>currency crises (starting date)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>1991</td>
<td>1993</td>
</tr>
<tr>
<td>France</td>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>Greece</td>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>Ireland</td>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>Luxembourg</td>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>Portugal</td>
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<td></td>
</tr>
<tr>
<td>Spain</td>
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<td></td>
</tr>
<tr>
<td>Sweden</td>
<td>1991</td>
<td>1993</td>
</tr>
<tr>
<td>UK</td>
<td>2007</td>
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<tr>
<td>EU-27+2</td>
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</tr>
<tr>
<td>Bulgaria</td>
<td>1996</td>
<td>1996</td>
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<tr>
<td>Cyprus</td>
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<tr>
<td>Czech Republic</td>
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<tr>
<td>Hungary</td>
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<td>Latvia</td>
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<td>1992</td>
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<tr>
<td>Poland</td>
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</tr>
<tr>
<td>Romania</td>
<td>1990</td>
<td>1996</td>
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<td>Slovenia</td>
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<td>2001</td>
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<tr>
<td>Croatia</td>
<td>1998</td>
<td>1998</td>
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<td>Switzerland</td>
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<tr>
<td>Sum</td>
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<td>11</td>
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<td>Twin crises</td>
<td>3</td>
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<table>
<thead>
<tr>
<th>Variable</th>
<th>Financial variable: Private and domestic credit</th>
<th>1-year lag</th>
<th>2-year lag</th>
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<tr>
<td>initGDP</td>
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<td>0.342</td>
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<td>iniEDU</td>
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<td>-0.0038</td>
<td>0.2541</td>
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<td>PFC</td>
<td>-0.0188***</td>
<td>-0.0144***</td>
<td>-0.0135***</td>
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<tr>
<td>DC</td>
<td>-0.0167***</td>
<td>-0.0172***</td>
<td>-0.0169***</td>
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<td>GFCF</td>
<td>-0.0541</td>
<td>-0.0451</td>
<td>-0.0714</td>
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<td>INV</td>
<td>0.1139***</td>
<td>0.1026***</td>
<td>0.1201***</td>
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<tr>
<td>TRADE</td>
<td>0.0417***</td>
<td>0.0193***</td>
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<td>g09</td>
<td>-5.2375***</td>
<td>-5.6122***</td>
<td>-5.0820***</td>
</tr>
<tr>
<td>banking</td>
<td>-1.4171***</td>
<td>-1.3781***</td>
<td>-1.5086***</td>
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<td>currency</td>
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<tr>
<td>cons</td>
<td>-0.9751</td>
<td>0.9698</td>
<td>-3.1114</td>
</tr>
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N: 496 495 496 495 475 474 475 474 469 468 449 448 450 449 448

| Source: authors’ own calculations using STATA. Notes: Sample includes all countries as listed in the data and methodology section, except Cyprus (CY), Malta (MT), and Romania (RO), which had to be excluded due to data limitations and Luxembourg (LX), which was excluded because of its unproportionally large and mostly international financial market.

initGDP = log of initial GDP per capita; iniEDU = log of initial secondary school enrolment; GFCF (% of GDP) = government final consumption expenditure; INV (% of GDP) = gross fixed capital formation; TRADE (% of GDP) = trade ratio; PRC (% of GDP) = domestic credit to the private sector; DC (% of GDP) = domestic credit provided by banks; LL (% of GDP) = liquid liabilities; TFI_I = Total financial intermediation (% of GDP) = sum of domestic credit, stock market capitalization and bonds outstanding; TFI_II = Total financial intermediation II (% of GDP) = domestic credit provided by banks; MCAP (% of GDP) = stock market capitalization; Bonds (% of GDP) = outstanding bond values; banking = systemic banking crisis dummy; currency = currency crisis dummy; gr09 = global recession 2009 dummy. |