CAPITAL MARKETS AND ECONOMIC GROWTH: LONG-TERM TRENDS AND POLICY CHALLENGES

RESEARCH REPORT

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Abstract

This paper scrutinizes the role of capital markets in Europe. Historically, these have been characterized by substantial heterogeneity in terms of financial market structure and depth, as well as differences in issuers' ability to access those markets. We identify a significant and long-term trend of capital markets growth and convergence between market-based and bank-based financial systems. To some extent this is due to technological progress and to regulation. For instance, we provide evidence that the regulation of retirement savings has a significant impact on the size of capital markets.

More fundamentally, we provide new evidence that increased capital market size positively impacts economic growth. Differentiating between debt and equity markets, we find equity markets to be of prime importance for economic development. From a microeconomic perspective, we argue that the positive impact of stock markets is related to two major channels: (i) availability of funds for long-term risky investments; and (ii) incentives for improving corporate governance. We provide new evidence for both effects, highlighting the importance of stock markets for financing of innovations and for attracting independent institutional investors. We argue that a long-term capital markets policy programme might be useful to ensure sustainable economic development.

JEL Codes: G10, G18, G38

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Content

1 EXECUTIVE SUMMARY 5

2 INTRODUCTION 8

3 GROWTH AND CONVERGENCE IN FINANCIAL MARKETS 14

3.1 PRELIMINARY REMARKS 14

3.2 SOME STYLIZED MACRO FACTS 16

3.3 SOME STYLIZED MICRO FACTS 22

3.3.1 Financing decisions of firms 22

3.3.2 Ownership structures of firms 26

4 THE ECONOMIC ROLE OF CAPITAL MARKET DEPTH AND ITS DRIVERS 31

4.1 FINANCIAL STRUCTURE AND ECONOMIC GROWTH 31

4.2 THE ROLE OF THE PENSION SYSTEM 33

4.3 OTHER DRIVERS 40

4.3.1 Securitization and financial regulation 40

4.3.2 Technological progress and financial innovation 42

5 THE ECONOMIC ROLE OF THE FINANCIAL STRUCTURE 45

5.1 FINANCIAL MARKET STRUCTURE AND ECONOMIC DEVELOPMENT 45

5.2 GROWTH, INNOVATION AND CORPORATE FINANCING DECISIONS 52

6 FINANCIAL MARKET REGULATION AND THE CASE FOR POLICY ACTION 60

6.1 PRELIMINARY REMARKS 60

6.2 TRENDS IN EU FINANCIAL MARKET REGULATION 60

6.2.1 Soft regulation: The case of corporate governance codes 60

6.2.2 Harmonizing accounting frameworks 64

6.2.3 Convergence in investor protection rules 65

6.2.4 Shareholder protection and institutional investors 68

6.3 THE CASE FOR A CAPITAL MARKET POLICY PROGRAMME 72

7 APPENDIX A: FINANCING OF NON-LISTED FIRMS IN EUROPE 74

8 APPENDIX B: DATA 75

8.1 MACRO DATA 75

8.2 MICRO DATA 75

8.3 PENSION FUND DATA 80

8.4 CLASSIFICATION OF COUNTRIES 80

9 REFERENCES 82

ABOUT 88

List of Figures

Figure 1: Financial Markets and their Segments 14
Figure 2: Average financial market depth in percent of GDP 16
Figure 3: Capital market depth (incl. Government bonds) in percent of GDP 18
Figure 4: Capital market and stock market depth in Continental Europe relative to countries with common law legal systems 19
Figure 5: Capital market and stock market depth in market-based vs. bank-based economies 20
Figure 6: Outstanding notional amounts in Billions US-Dollar of OTC and exchange-traded derivatives and ratio of outstanding derivatives notional amounts to worldwide GDP 21
Figure 7: Assets managed by institutional investors in percent of GDP 22
Figure 8: Equity financing of listed non-financial firms in Europe and the US, 1992-2011 23
Figure 9: Net leverage of non-financial listed firms in Europe and the US, 1992-2011 24
Figure 10: Leverage decision of non-financial listed firms in various European areas, 1992-2011 26
Figure 11: Ownership concentration in Europe, 1992-1994 27
Figure 12: Illustrating the time trend in convergence in ownership concentration 30
Figure 13: Scatter plot of stock market depth and capital market depth to size (in % of GDP) of domestic pension funds 37
Figure 14: Ratio of securitizations to outstanding debt securities in Europe and the US 41
Figure 15: Ratio of stock market trading volume to market cap 43
Figure 16: Ratio of bonds issued by financial corporations in Europe and the US 44
Figure 17: GDP per capita and capital market depth 45
Figure 18: Illustrating the results of the analysis of economic growth 50
Figure 19: Stock market depth throughout Europe 51
Figure 20: Post-IPO development of European firms 53
Figure 21: R&D intensity and equity ratios, 1992-2011 54
Figure 22: Sales volume risk for European and US firms over time 56
Figure 23: Financial flexibility and leverage decision, 1998-2008 57
Figure 24: Code compliance, ownership structure and firm valuation 64
Figure 25: Accounting standards followed by European listed non-financial firms 65
Figure 26: Development of shareholder protection (anti-director index) 67
Figure 27: Development of minority shareholder protection 68
Figure 28: Equity financing of European non-financial enterprises, 2000-2011 74
Figure 29: Illustration of micro-data data set with firm-level information for European listed non-financial firms (European sample) 77
Figure 30: Illustration of micro-data data set with firm-level information for listed non-financial firms from European and the US (Extended sample) 78

List of Tables

Table 1: Regression analysis examining the time trend in ownership concentration 29
Table 2: Regression results regarding the impact of pension fund size on capital market depth 39
Table 3: Economic development, private credit and capital market depth, 1960-2012 47
Table 4: Economic development, equity and debt market depth, 1990-2012 48
Table 5: Excess capital access and economic growth 49
Table 6: Equity financing and R&D intensity, 1992-2011 55
Table 7: Financial flexibility, leverage and firm location, 1998-2008 58
Table 8: Ownership concentration and compliance with codes of best practice, 2007-2011 62
Table 9: Firm valuation, ownership concentration and compliance with codes of best practice, 2007-2012 63
Table 10: Institutional investors and minority shareholder rights, 1999-2008 70
Table 11: Grey institutional investors and minority shareholder rights, 1999-2008 71
Table 12: Definition and sources of variables for country level analysis 75
Table 13: Definition and sources of most important variables for firm-level analysis 80

1 Executive summary

This study scrutinizes the development of capital markets in the European Union. Capital markets are an important source of financing for the corporate sector and thus are vital for economic development. Historically, however, there has been substantial heterogeneity in terms of the size of capital markets across Europe, as well as issuers' ability to access those markets.

In its EUROPE 2020 agenda, the European Commission acknowledges that long-term financing is a major issue from the point of view of enhancing the competitiveness of the European Union. With bank-based lending less able to fulfil long-term financing needs due to the regulatory changes that have been put in place in the aftermath of the financial crisis (e.g. Capital Requirements Regulation (CRR) for banks and the Solvency II regulation for insurance companies[1]), the ability to raise capital through capital markets is likely to become increasingly important. This assertion is true regardless of the role that market finance (sometimes referred to as the 'shadow banking' system) might play in this context.

Therefore, an in-depth analysis of the economic role of capital markets is warranted. With this study we aim to contribute to this debate. Our key results can be summarized as follows:

1. Examining the European experience, we provide evidence that capital market size is positively correlated with economic development. Moreover, we estimate that growing combined stock and bond markets by one-third would increase the long-term real growth rate in per capita GDP by about one fifth, as stock and bond market liquidity allows for cost-efficient reallocation of capital across industries. Considering stock markets only, the relationship is estimated to be 1-to-1, i.e. a stock market growing by one-third is estimated to raise real economic growth by one-third. We argue that the positive impact of stock markets is related to two major channels: (1) the availability of funds for long-term risky investments; and (2) the incentives for improving corporate governance.

[1] It should be noted that the Solvency II project was started long before the outbreak of the financial crisis in 2008. However, the most critical phase of this legislation project happened to take place after the financial crisis.

2. On a macro level, there is a well-established, significant trend of capital market growth. By way of illustration, average stock market capitalization in European economies with bank-based financial systems, historically known to be much lower than in economies with market-based financial systems, was 35 percent of GDP during the nineties, but increased to 58 percent over the period 2000 to 2012. Over the same period stock market capitalization in market-based European economies only increased from 110 to 117 percent. Hence, in relative terms stock market growth was much more pronounced in bank-based European economies. Simultaneously, *financial structure*, i.e. the relative size of debt and equity markets of bank-based economies has converged towards the financial structure of market-based economies.[2]
3. Convergence is also evident at the micro level. Today European firms tend to rely much more on equity financing than in the nineties. Also, differences in capital structures between different European countries have become less pronounced in recent years. Similarly, the level of ownership concentration in listed firms, historically known to be higher in bank-based economies, has become more balanced over time as ownership has become more dispersed in firms located in bank-based economies.
4. We identify the regulatory environment for funded pension schemes as being an extremely important driver for capital market size. We estimate that increasing the size of pension funds by 10 percentage points of GDP would lead to an increase in stock market size of 7 percentage points of GDP. Similarly, the broader spectrum of asset managers – from passive and long-only investors through to active investors such as hedge funds – further complements the effectiveness of capital markets, both in terms of enhancing market liquidity, improving corporate control and in terms of providing capital for potentially riskier business investments.

[2] Throughout our empirical analysis, we adopt the market-based vs. bank-based classification proposed by Demirgüç-Kunt & Levine (1999) based on their country-level financial structure index. Following this approach Denmark, Netherlands, Sweden and the United Kingdom (as well as Switzerland and the United States) are considered to be market-based. For details see Appendix B, Section 8.

5. Examining the financing decisions of firms, we document that firms' R&D intensity is positively correlated with the level of equity financing, a pattern that is more pronounced in bank-based economies. We provide evidence that this might be related to the fact that firms in bank-based economies have less flexibility in their financing decisions and therefore follow a more conservative financing strategy. This might lead to underinvestment.
6. Examining corporate governance, we illustrate that substantial progress has been made in Continental European countries over the last 20 years. However, minority shareholder protection rules still differ substantially across Europe with many bank-based European economies still lagging behind the market-based economies. Simultaneously, we provide evidence that institutional investors are more reluctant to invest in firms that are based in countries with weak shareholder protection. This is especially true for independent institutional investors. These investors play an important role in corporate governance, complementing the positive contribution of capital markets to the economy at large. In particular, activist shareholders, such as private equity and hedge funds, are able to effect positive governance changes in the firms in which they invest, by virtue of their expertise and willingness to engage with a firm's management.
7. We conclude by demonstrating that capital markets could make an important contribution to the EUROPE 2020 growth strategy, as set out by the political leaders of EU member states. Taking the changing regulatory environment into account, capital markets will become an important component in satisfying the long-term financing needs of European economies. Capital markets could be strengthened by improving the quality of minority shareholder protection rights, just as the role of independent institutional investors could be enhanced by increasing transparency. Retirement savings rules and tax laws should be designed in a way that encourages a larger part of national savings to be invested via capital markets, which would also help funded pension schemes to cope with the challenges associated with increasing longevity. And, finally, it is worth considering how tax rules could enhance the role played by stock markets.

2 Introduction

This paper takes as its starting point four simple, yet strongly substantiated, empirical observations: First, there is a long-term global trend of growth in capital markets. During the nineties the ratio of the market value of outstanding domestic stocks and bonds to GDP was slightly above 3:1 for the largest countries; by the first decade of the twenty-first century this ratio had increased to 4.3:1. Second, over the last twenty years we have seen ongoing and substantial deleveraging in European firms, with the net debt ratio of the median firm halving over that period. Third, the ownership structure of Continental European firms has become significantly more dispersed since the end of the nineties.

In our view, these observations all point to convergence between what is called a *market-based financial system*, associated with countries like the UK and USA, and a *bank-based financial system*, which has traditionally been associated with many Continental European countries. Historically, the market-based financial system was characterized by large capital markets allowing firms to have higher equity ratios and more dispersed stock ownership. In contrast, the closely held firm, financed by (bank) loans, was considered the archetype firm in countries described as having a bank-based financial system. It will be shown here that these differences are disappearing with time.

A fourth observation in the context of this convergence trend is that institutional investors, such as mutual funds and hedge funds, have steadily gained in importance globally. While in 1995 the assets managed by institutional investors in the OECD countries were equal to 110 percent of GDP, this ratio had increased to 163 percent by the year 2005. More detail on these observations is presented in Section 3.

These observations raise some fundamental questions, which we aim to address in this paper. First, what are the driving forces behind this growth in capital markets? At the most basic level, one could argue that this is simply the by-product of the strong growth in financial markets observed over the last two decades, something which has itself been caused by the significant worldwide economic growth experienced over the same period.[3]

[3] It should be noted that according to World Bank data worldwide real per capita GDP has roughly doubled since the end of the sixties. Over the same time, however, world population has doubled as well.

However, this does not explain why capital market growth was substantially stronger than overall financial market growth. In this paper we argue that capital market growth is driven by fundamental economic forces; at the same time, however, it is strongly influenced by a country's institutional and political framework.

As an example of the way in which the institutional framework impacts on capital market growth, we look at population ageing in industrialized countries. Increasing longevity has forced many countries that traditionally relied heavily on public pension schemes to strengthen private retirement savings. Given that this leads to a larger share of private savings being allocated via the capital market, one would expect this policy shift to have an impact on capital market growth. Indeed, we show in Section 4 that a more favourable institutional environment for private retirement savings has a significant influence on the size of capital markets. It also encourages the diversity of participants in capital markets, as institutional pension providers increasingly diversify their investment allocation across a range of different strategies (including direct investment and investment in other vehicles like private equity or hedge funds).

Taking a more fundamental view, it could be argued that capital markets are more effective in allocating scarce resources in an economy. If this is the case, capital market growth would be driven by fundamental economic forces. From this we derive our second fundamental question. What is the economic impact of growing capital markets? There is consensus among financial economists that access to capital, as measured by financial market depth, is an important determinant of a country's economic development. It should be noted here that from an empirical perspective it is difficult to test for causality, i.e. to infer whether economic development leads to more financial development or whether financial development is a prerequisite for economic development. However, overall it could be said that there is increasing consensus among researchers that financial development in fact causes economic development, even though reverse causality might also be present.[4]

In order to test this assertion, it is worth looking at the microeconomic reasons why capital markets might spur economic development. Looking at the academic literature, several

[4] Cf. Calderón/Liu (2003), Christopoulos/Tsionas (2004) and Guiso/Sapienza/Zingales (2004). For a more general discussion cf. as a starting point Levine (1997).

arguments are put forward in order to explain why a transformation of the financial structure of an economy towards larger capital markets should have a positive impact on economic growth. First, liquid stock markets could enhance economic prosperity as they reduce the disincentive to invest in long-term projects.[5] Indeed, a stockholder will only be able to transfer the substantial idiosyncratic risk associated with long-term projects if liquid stock markets exist. Second, stock and bond market liquidity allows for cost-efficient reallocation of capital across industries.[6] Third, access to equity financing may spur innovation, given the limited availability of debt-based financing for high-risk projects.[7] As private equity markets tend to be relatively small, the availability of risk capital is positively influenced by the size of public equity markets. Fourth, because of the fact that shareholders are residual claimants, they have a much stronger incentive to exert control over the investment decisions of a firm than debt holders. Moreover, the effectiveness of the oversight exercised by debt holders is often limited because of conflicts of interest. In this context, the existence of active investors, including hedge funds, is an important component of corporate control, particularly on account of the overall tendency towards passive investment strategies.

We analyse these arguments in Section 5. First, following an idea put forward by Demirgüçüç-Kunt/Feyen/Levine (2013), we show that, for European countries, the importance of capital markets seems to increase in line with the level of economic development. Moreover, we present evidence that, for highly developed economies, the marginal growth impact of stock market depth is significantly stronger than that of the availability of debt financing. Therefore, those countries where capital markets – and especially stock markets – seem to be underdeveloped appear to pay a price in terms of below average growth rates. Second, we provide evidence that the demand for risk capital, i.e. equity, is more pronounced for those firms that have more innovative business models and that invest more in R&D. This relationship is especially pronounced in countries with a bank-based system of corporate finance, indicating that firms in these countries take a more conservative approach to financing, which potentially results in a problem of

[5] Cf. Levine/Zervos (1998).
[6] Cf. Eklund/Desai (2013).
[7] Cf. Hsu/Tian/Xu (2014).

underinvestment. Moreover, it should be noted that globalization exerts pressure on European corporations to increase innovation and at the same time raises product market uncertainty. Hence, European firms may be in a better position to face these challenges if markets for risk capital work smoothly, i.e. if capital markets are more developed.

Third, because ownership structures still differ substantially between bank-based and market-based economies, it is worth considering what implications this has for corporate governance. The more concentrated ownership structure that still prevails in many European countries is to some extent paralleled by reluctance on the part of investors to invest in European firms. We present evidence that this might be related to less developed investor and minority shareholder protection rights in Continental European countries. At the same time, however, it is worth noting that the monitoring effectiveness in a system with dispersed ownership depends heavily on the incentives governing the behaviour of institutional investors. In light of our finding that institutional investors are much more important than they were 20 years ago, these incentive mechanisms are even more important today. We present evidence that independent institutional investors' incentives are better aligned with dispersed shareholders than is the case for grey institutional investors. The latter may suffer from conflicts of interest, as by definition they are a part of a larger network of business relationships including those companies which they are supposed to control.[8]

What are the policy conclusions that can be drawn from this? While it is difficult to arrive at an answer to this question, we set out some thoughts in this paper. First, European Union lawmakers have made great efforts to harmonize the laws that apply to capital markets, which has contributed to larger and more liquid European capital markets. Harmonization of capital market regulation and financial accounting standards are the most prominent examples in this regard, as we show in Section 6 of this study. We also point out that some European countries have opted for particular market-based solutions by implementing soft regulations, as typified by the comply-or-explain-based corporate governance codes that exist in many European countries. We show that, to a certain extent, soft regulation (e.g. codes of best practices) of this type can lead to efficient outcomes. While such a regulatory

[8] Cf. Zingales (2009) and Wenger/Kaserer (1998).

regime allows firms to maintain their entrepreneurial freedom, some commentators consider it to be a weaker tool than formal rules. We therefore examine: (i) which firms comply with such codes of best practice; and (ii) whether code compliance is associated with a firm's market valuation. We find two main results. First, firms with greater ownership dispersion (and thus limited monitoring) voluntarily opt for higher levels of compliance. Second, there is a systematic link between firm valuation and code compliance, where firms with greater ownership dispersion benefit from code compliance, and firms with concentrated ownership suffer from high compliance levels. Overall, this suggests that soft regulation may actually provide an intelligent approach to regulate selected aspects of corporate governance.

Nevertheless, in other respects European countries still diverge significantly in terms of their characteristics. First, while we show that pension regulation has an important impact on capital market depth, there is not yet a consistent commitment across European states to creating sizeable funded pension schemes. Second, company law is fragmented in Europe, especially as far as corporate governance is concerned. This might create a cost for any cross-border corporate governance activity. In fact, institutional investors hold portfolios which are diversified over different European economies. However, building up sufficient intelligence and execution knowledge with respect to all the different corporate governance systems is associated with a huge fixed-cost. To some extent this problem is mitigated by the creation of a market for corporate governance services and through creating an environment in which a range of investment strategies (whether they benefit from upside or downside share price performance) can be executed. Nevertheless, underinvestment in governance activities will remain an issue.

It follows from this that, even though things are moving in the right direction, a clear commitment on the part of European Union policy-makers to enhancing the role of capital markets is still missing. We explain in this study that this omission might come at a cost to the European economy in terms of reduced growth. Moreover, a policy programme aimed at enhancing capital market growth is also a necessary response to financial market regulations that have been implemented recently, given widespread agreement that reforms in banking and insurance regulation will negatively impact the availability of long-term capital via bank-

based financing. Therefore, capital markets must be put into a position where they can take over this role to a larger extent.

3 Growth and Convergence in Financial Markets

3.1 Preliminary remarks

In this paper, we define the *financial market* to be the generic term for all markets where financial instruments are traded or negotiated. Typically, this financial market can be sub-divided into: a credit market, i.e. the loan market; a money market, i.e. the market for short-term debt; a capital market, i.e. the market for long-term debt or equity securities; and a risk transfer market, i.e. the derivatives market. This structure is depicted in Figure 1. This paper focuses on the capital market segment.

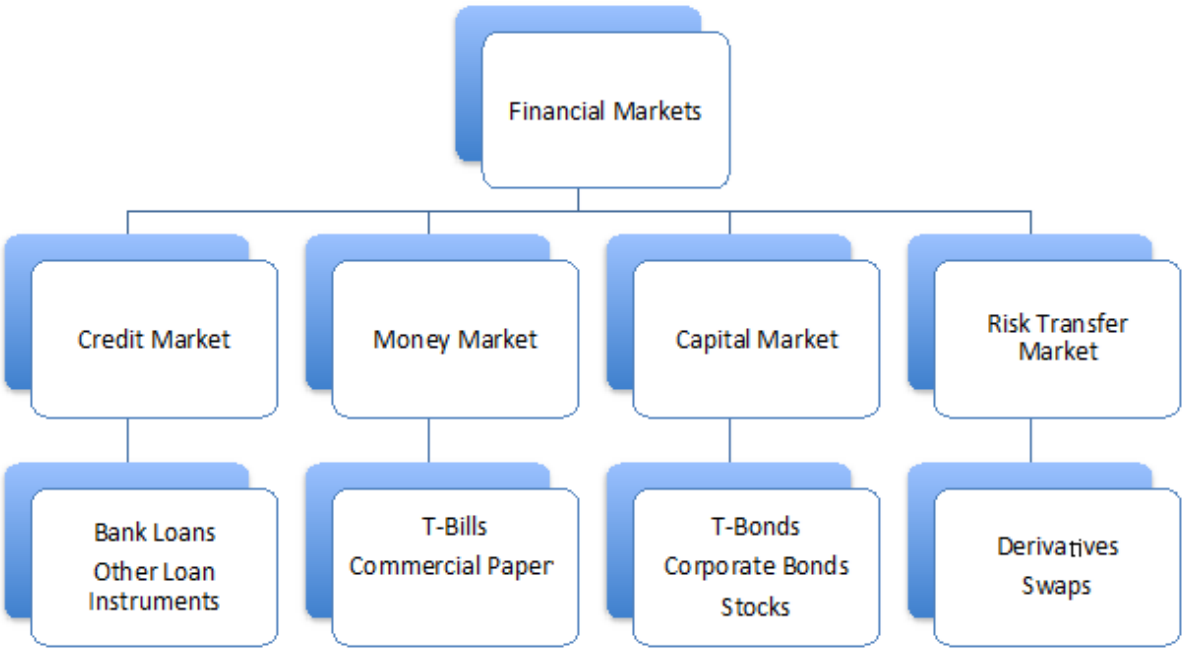


Figure 1: Financial Markets and their Segments

An important measure for the state of development of financial markets is financial market depth.[9] This is the outstanding volume of domestic financial instruments expressed as a percentage of domestic GDP. Because of shortcomings in available data, the volume of outstanding financial instruments is typically approximated by taking the sum of the

[9] The term ”financial depth“ has been used in a part of the literature as a synonym for the size of the financial market; cf. e.g. Levine/Zervos (1998). We stick to this convention and, consequently, use the term “capital market depth” or “stock market depth” as a synonym for the size of securities or stock markets. It should be pointed out, however, that in the market microstructure literature “depth” is used as a synonym for the liquidity of a market.

following three components: First, the volume of loans provided both to the domestic private sector and the public sector; second, the volume of outstanding domestic debt securities (including those issued by public sector entities); and third, the market value of outstanding shares issued by domestic companies. Therefore, the size of the derivatives markets is excluded from this measurement of financial depth. There are several reasons for this. First, it is an issue of data availability. Even though the Bank for International Settlements (BIS) offers a comprehensive data set regarding the OTC derivatives markets, no meaningful statistics exist about the outstanding volume of derivative instruments issued by residents of specific countries. Moreover, even if such data existed, it is questionable whether it would make sense to attribute derivatives volumes to specific countries as these markets are global by their very nature. And, finally, accounting issues must also be taken into account, given the diverse ways of measuring the size of the OTC derivatives market (e.g. on the basis of market or notional values). As a consequence, we follow the approach taken in the literature and do not take into account derivatives markets when measuring a country's financial depth.

Following this approach, the size of capital markets is typically measured by capital market depth. This is the ratio of the volume of outstanding domestic debt securities combined with the market value of outstanding shares issued by domestic companies relative to domestic GDP. It should be noted that within this definition, two alternative classifications for measuring capital market depth exist.[10] For clarity, we use the following convention in the paper. Capital market depth refers to the ratio of the volume of outstanding domestic debt securities issued by private entities combined with the market value of outstanding shares issued by domestic companies relative to domestic GDP. Where we also include the bonds issued by the public sector, we label this as capital market depth including government

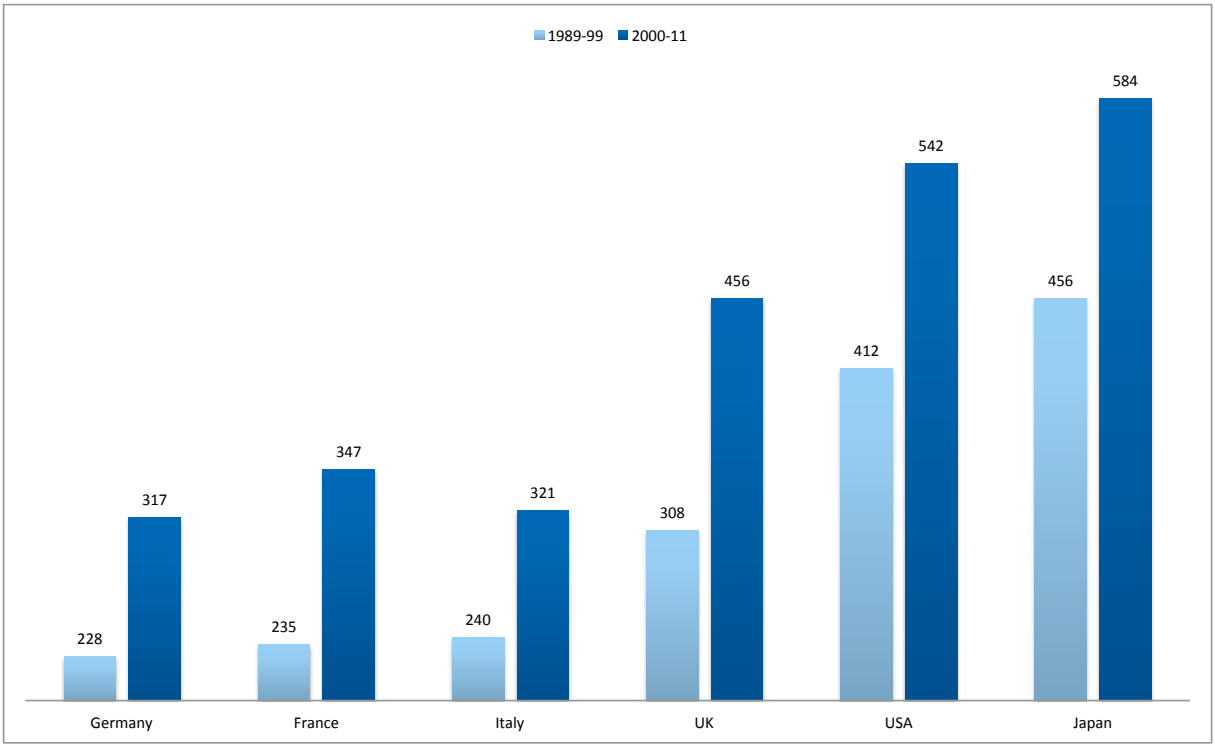
[10] If *all* outstanding domestic debt securities are taken into account, then the measure by definition also includes public debt securities. This might be appropriate if one is interested in measuring the overall development of the capital market, as the ability of the Government to raise debt on the capital market clearly depends on the existence of an appropriate technical infrastructure and a sizeable investor audience. However, as far as the economic impact of the capital market is concerned, we are interested in its ability to provide funds for private investments. Therefore, it is important to know to what extent the capital market is suitable as a corporate finance vehicle. From this perspective it makes sense to modify the definition for capital market depth, in order to measure its role in providing funds for private investments. As this latter issue is at the focus of this paper, in most cases we use a second, alternative measure for capital market depth where we exclude government bonds.

bonds. A more specific concept is stock market depth, where domestic stock market capitalization is expressed as a percentage of domestic GDP.

Finally, we define *financial structure* to be the relative balance between loan and securities markets.

3.2 Some stylized macro facts

Worldwide financial markets are undergoing a fundamental change. This change is apparent in five long-term trends. First, financial market depth (i.e. the outstanding volume of financial instruments approximated by the volume of domestic loans, domestic bonds and shares issued by domestic companies), is steadily increasing. In fact, as is shown in Figure 2, in countries like Germany, France or Italy, financial market depth increased in the range of 80 to 110 GDP percentage points from the nineties to the first decade of the twenty-first century. It should be noted that we are comparing the averages over two different decades, so the impact of stock market price fluctuations does not drive this result. Moreover, a similar trend also applies to emerging countries, even though we do not analyse it here.

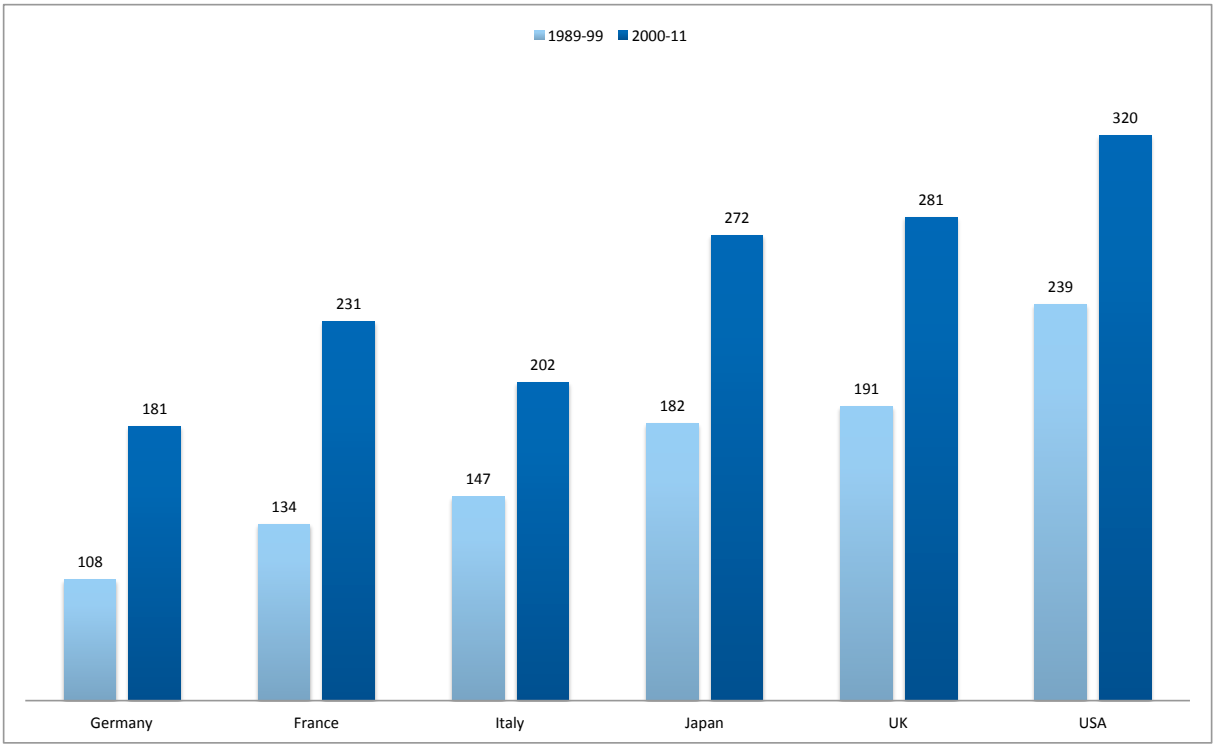


Notes: This figure illustrates financial depth in different countries. Averages over the years 1989 to 1999 and 2000 to 2011 are reported.
Source: Own analysis based on data from World Bank and BIS.
Figure 2: Average financial market depth in percent of GDP

Second, the financial structure is changing as well. Even though the growth apparent in Figure 2 applies to all segments of financial markets, it is quite clear that most of the growth can be attributed to capital markets. Focusing on capital market depth, i.e. the market capitalization of domestic stock and bond markets, it can be seen from Figure 3 that a substantial part of the increase in financial market depth is driven by the growth of capital markets.

Third, even though the growth in capital market depth is ubiquitous, in relative terms it is more pronounced in those countries that used to have a smaller capital market. In other words, the growth is less pronounced in market-based economies, such as the UK and USA, where capital market-based financing has for many years played an important role, while in bank-based economies, like those in Continental Europe, the growth is much more pronounced. We provide two pieces of evidence for this.

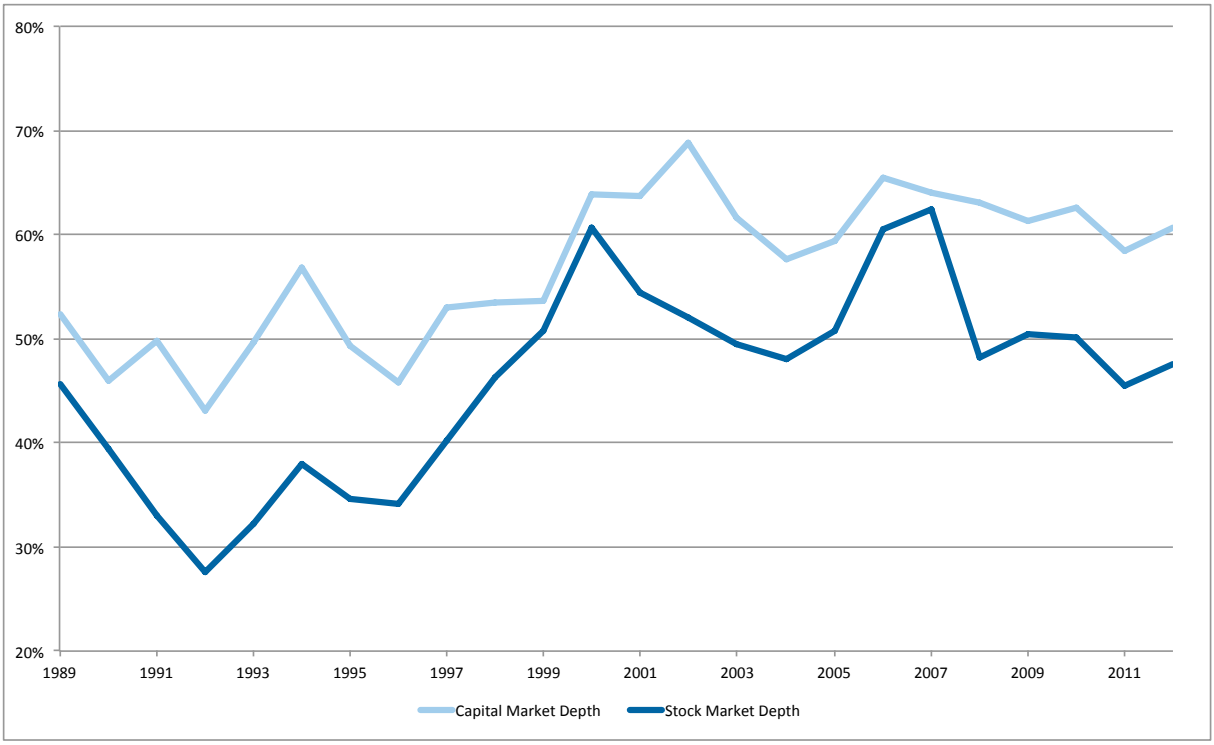
By way of initial analysis, in Figure 4 we display GDP-weighted capital market depth (including government bonds) in Continental Europe as a percentage of GDP-weighted capital market depth (including government bonds) in countries with a common law legal system (which is mostly found in countries with a market based system of corporate finance). While by the beginning of the nineties capital market depth (including government bonds) in Continental European economies was one third of that of the countries with common law legal systems, it now stands at 70 percent of the figure. Hence, capital markets in Continental Europe have more than doubled their size relative to the size of their their more market-based counterparts.



Notes: This figure illustrates capital market depth in different countries. Averages over the years 1989 to 1999 and 2000 to 2011 are reported.
Source: Own analysis based on data from World Bank and BIS.

Figure 3: Capital market depth (incl. Government bonds) in percent of GDP

It is noteworthy that this increase in capital market depth was for a long time driven by stock market growth. In fact, from Figure 4 it can be seen that stock market depth increased at a higher pace than overall capital market depth starting from the nineties and continuing – with some interruptions – up to the financial crisis. However, since then the size of Continental European stock markets relative to the size of stock markets in countries with more market-based financing systems has been depressed. This trend might in part reflect the economic recession in Southern Europe. Given that relative capital market depth has stayed pretty constant since the financial crisis, it can be concluded that in recent times the growth of capital markets in Continental Europe has been driven primarily by bond markets.



Notes: This figure illustrates capital market (including government bonds) or stock market depth of Continental European Countries as a percentage of the respective market depth in countries with common law legal systems. Depth for both groups is calculated on a GDP-weighted basis.
Source: Own analysis based on data from World Bank and BIS.

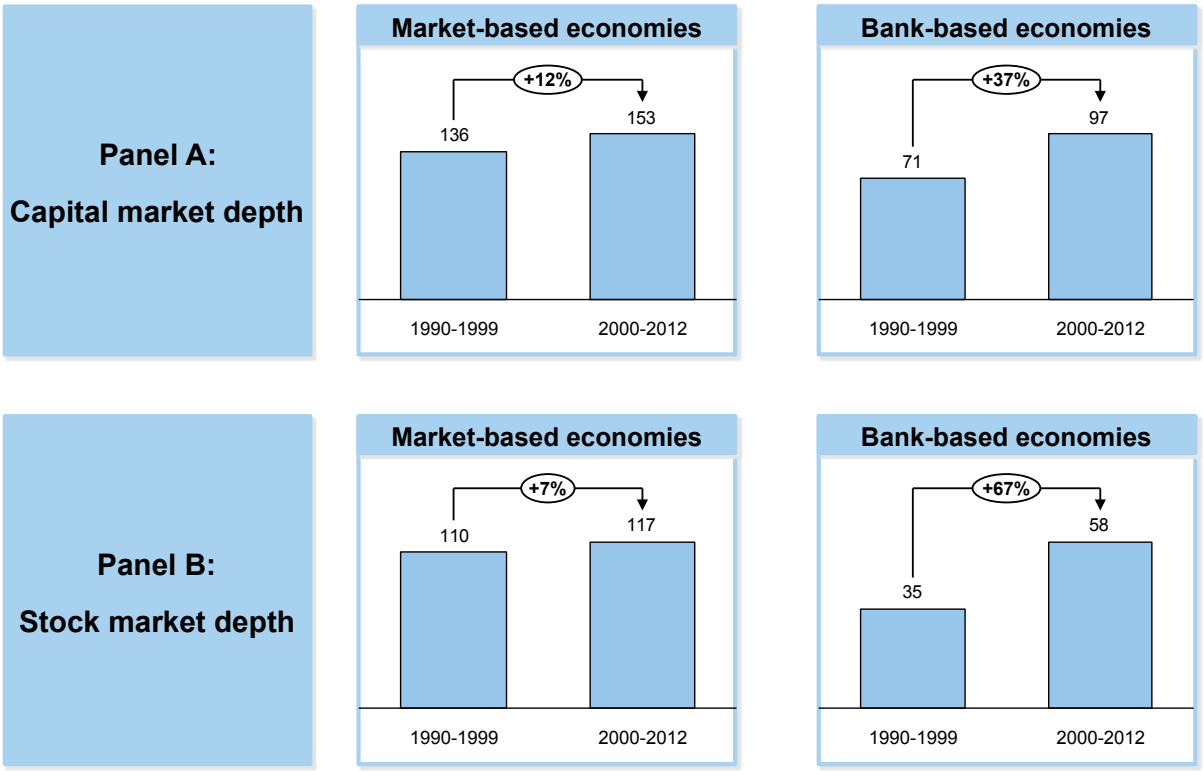
Figure 4: Capital market and stock market depth in Continental Europe relative to countries with common law legal systems

As a second approach, we divide European countries into those that have market-based financial systems and compare them to those that have bank-based financial systems.[11] This corresponds to the more fundamental distinction we use in this paper. By comparing the average stock market depth of bank-based European economies over the years 1990-1999 with the period 2000-2012 Panel B in Figure 5 we find an increase of 67 percentage points. Over the same period stock market depth in market-based European economies increased only by 7%. Hence, similar to the findings in Figure 4, stock market depth of bank-based European economies was about 32 percent of stock market depth in market-based European economies during the nineties. However, since the year 2000 this ratio increased to 58 percent.

A similar result can be found if capital market depth instead of stock market depth is considered. In order to rule out any impact coming from the Government bond market we do not take into account Government bonds when calculating capital market depth in Panel A of Figure 5. However, the results are quite similar to what we have found in Figure 4.

[11] For a detailed description regarding this definition cf. Section 3.3.2.

Capital market depth in bank-based European economies grew by 37 percent when comparing the average of the years 1990-1999 to the years 2000-2012; at the same time capital market depth in market-based European economies only grew by 12 percent.

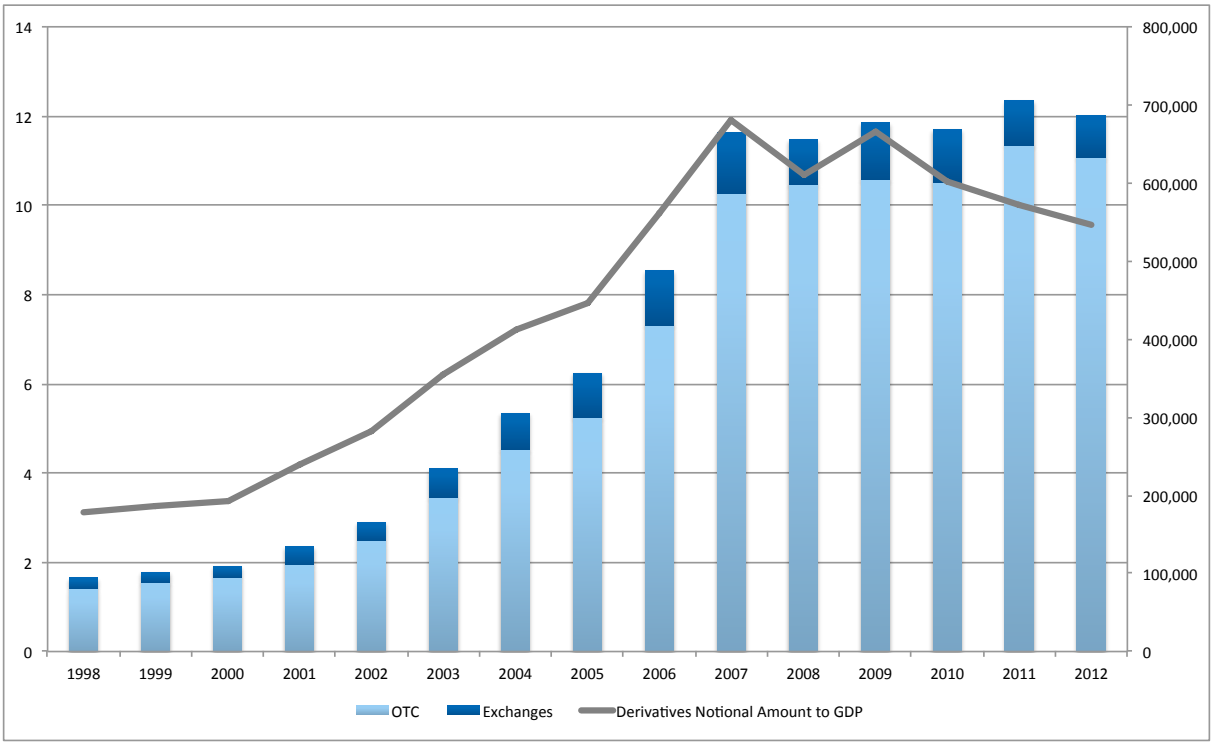


Notes: This figure illustrates the heterogeneity in ownership concentration across Europe in the early nineties of the last century, when classifying countries in market-based and bank-based economies. Country classification follows Demirgüç-Kunt & Maksimovic (2002) and Demirgüç-Kunt & Levine (1999), with Denmark, the Netherlands, Sweden and the UK qualifying as market-based. Ownership concentration is the percentage of closely held shares as reported by Thomson/Reuters Worldscope, which is defined to represent the fraction of shares held by insiders, e.g. shares held by officers, directors and their immediate families, shares held in trust, shares of the company held by any other corporation, pension/benefit plans, and shares held by individuals who hold 5% or more of the outstanding shares. Since numbers have to be treated with some caution (transparency levels, likely to produce a selection bias, also varied between the areas), median values are reported. The analysis covers the universe of listed non-financial firms in Europe over the period 1992-1994 as described in the data appendix (data permitting). Overall 7,609 individual firm-year observations are analyzed.
Source: Own analysis based on data from Thomson/Reuters.

Figure 5: Capital market and stock market depth in market-based vs. bank-based economies

Fourth, risk transfer markets, also known as derivatives and swap markets, have increased tremendously in size over the last 15 years. According to statistics provided by the BIS, the outstanding notional volume of all OTC or exchange-traded derivatives and swaps was slightly below 100 trillion US Dollars in 1998. At that time this corresponded roughly to three times worldwide GDP. In 2012, outstanding notional volume was slightly below 700 trillion US Dollars or about 9.5 times worldwide GDP. As one can see from Figure 5, the growth of these markets was especially pronounced over the years 2000 to 2007. Since the financial crisis, however, growth in OTC derivatives markets has been stagnant, with the size of the market relative to GDP even decreasing. This might be related to the deficiencies that became evident during the financial crisis. To some extent it might also be caused by

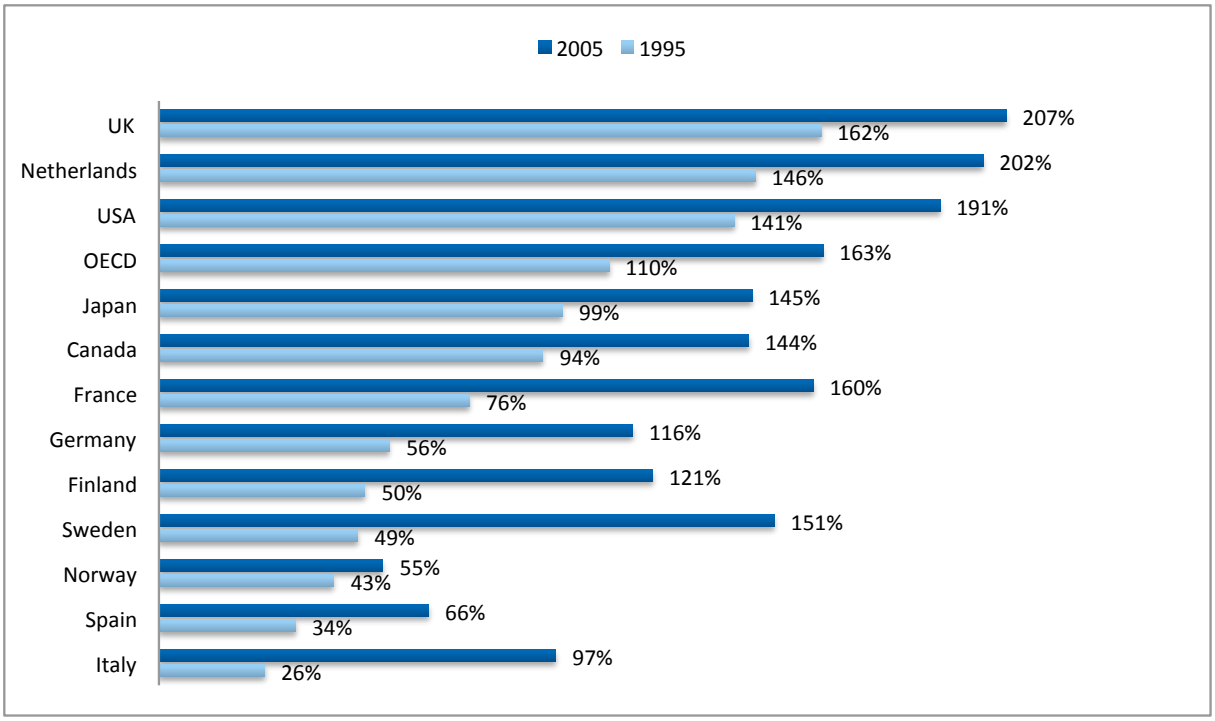
regulatory intervention in these markets after the financial crisis. Moreover, is noteworthy that the data used here suggests that there has been only a limited transfer of OTC derivatives activity into exchange-traded derivatives markets to-date.



Notes: This figure illustrates outstanding notional volume of all OTC or exchange-traded derivatives and swaps. The grey line gives this volume as a proportion of worldwide GDP.
Source: Own analysis based on data from World Bank and BIS.
Figure 6: Outstanding notional amounts in billions US-Dollar of OTC and exchange-traded derivatives and ratio of outstanding derivatives notional amounts to worldwide GDP

Fifth, the growth in financial markets was accompanied by strong growth in the assets managed by institutional investors. As can be seen in Figure 7, in the OECD countries institutional investors managed funds equal to 110% of GDP in 1995. A decade later this ratio had increased to 163%. While this trend was more pronounced in some countries than others, it was especially strong in many Continental European countries.

While a more in-depth analysis of the economic drivers of these trends is not straightforward, Section 4 looks at some of the possible drivers. In any case, there is no doubt that this development will have a lasting impact on the financial systems in the European Union. Moreover, due to the regulatory response to the financial crisis, it is likely that the observed trend towards a more capital market-oriented financial system will continue.



Notes: This figure illustrates assets under management by domestic institutional investors relative to domestic GDP.
Source: Own analysis based on data from OECD.
Figure 7: Assets managed by institutional investors in percent of GDP

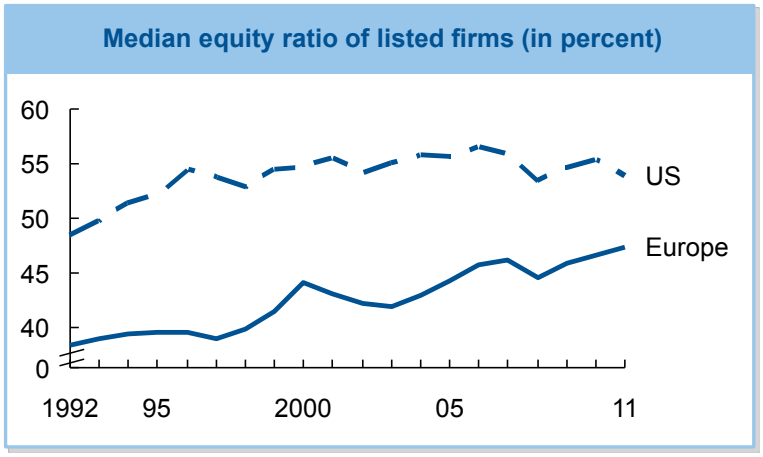
3.3 Some stylized micro facts

This Section provides some evidence suggesting that the convergence of financial systems is not only observed on a macro-level, but also when examining corporate financial policies on a firm-level basis.

3.3.1 Financing decisions of firms

One of the key features of the convergence trend is that equity financing has become increasingly important over the recent years. In fact, when examining country-level aggregated firm behaviour, we find substantial deleveraging in the corporate sector. A detailed description of this finding can be found in Appendix A in Section 7. To illustrate this pattern of deleveraging, Figure 8 reports the fraction of assets financed by equity for the median non-financial firm in Europe and the US. Evidently, while equity financing was (and still is) more important in the US, the gap between European and US firms has narrowed. Aggregating over the 1992-1996 period, the average equity ratio of the median European firm was 39 percent, compared to 44 percent for US firms. Until the 2007-2011 period this

value increased by 18 percent (to 46 percent) for the European firms and by only 12 percent (to 50 percent) for the US firms.[12]



Notes: This figure illustrates the median equity ratio of listed firms over time. Equity ratio is the fraction of total assets financed by equity, where equity is common equity plus preferred stock. The analysis covers the universe of listed non-financial firms in Europe (incl. Switzerland) and the US over the period 1992-2011 as described in the data appendix (Sample 2, data permitting). Overall 181,378 individual firm-year observations are analysedanalysed.
Source: Own analysis based on data from Thomson/Reuters.

Figure 8: Equity financing of listed non-financial firms in Europe and the US, 1992-2011

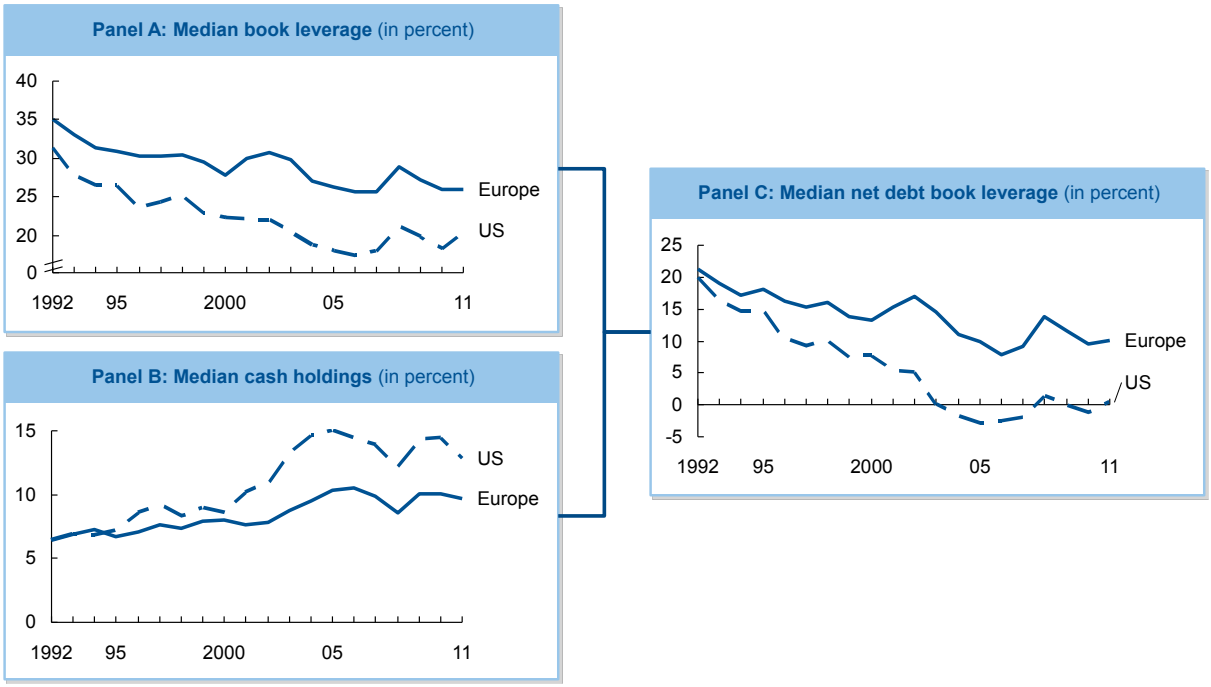
This increasing reliance on equity financing suggests that there is a trend towards deleveraging.[13] Figure 9 examines this hypothesis in greater detail. Specifically, while Panel A studies firms' use of debt as a source of financing, Panel B illustrates firms' liquidity situation, and Panel C aggregates the two dimensions. All three panels support the view of a trend toward deleveraging.

Indeed, as Panel A of Figure 9 suggest, the median listed firm in Europe had a leverage ratio - defined as total debt to the sum of total debt, common equity and preferred stocks - of about 35 percent at the beginning of the nineties. In recent years, this ratio has fallen below 30 percent. This trend is not only observed for European firms, but for US firms as well.

When scrutinizing the (de)leveraging decisions of firms, it is important to simultaneously analyse the liquidity position of these firms, since by changing its liquidity profile (cash and short term investments) a firm can offset any leverage decision taken on the liability side of the balance sheet. It is evident in Panel B of Figure 9 that firms have significantly increased their liquidity positions, especially since the year 2000. Contrary to the popular perception, building up liquidity buffers is not just a consequence of the financial crisis, but had started

[12] Examining the various European countries in detail, it is only Greece and Portugal where we observe a decreasing equity ratio for the median listed firm.
[13] In Appendix A, Section 7, we provide some evidence that this also applies to non-listed firms.

long before. While European firms have steadily been increasing their cash positions over the last 20 years, US firms seem to have increased their cash positions substantially during the early half of the last decade, i.e. in the aftermath of the Dot-Com crisis.



Notes: This figure illustrates leverage (Panel A) and liquidity (Panel B) and net leverage (Panel C) of listed firms in Europe and the US over time Specifically, Panel A plots the median book leverage defined as total debt to total debt plus common equity and preferred stock. Panel B plots the median liquidity ratio defined by cash and short-term investments deflated by total assets. Panel C plots net book leverage defined according to Brav (2009) as total debt less cash and short-term investments deflated by the sum of total debt plus common equity and preferred stock. The analysis covers the universe of listed non-financial firms in Europe and the US over the period 1992-2011 as described in the data appendix (data permitting). Overall 181,378 (180,568) individual firm-year observations are analysed to determine median book leverage (median cash holdings and median net debt book leverage).
Source: Own analysis based on data from Thomson/Reuters.

Figure 9: Net leverage of non-financial listed firms in Europe and the US, 1992-2011

By simultaneously looking at Panels A and B of Figure 9 an interesting picture emerges. The observed reduction in the gross book leverage, as shown in Panel A, is just part of the overall reduction in leverage. The effect is more pronounced if one takes into account the increase in cash holdings that can be seen in Panel B, i.e. firms have further reduced their net financial leverage by increasing their liquidity positions. Combining this data, Panel C of Figure 9 illustrates that the net book leverage of the median European listed firm has halved over the last 20 years. While the ratio of net debt to the sum of net debt, common equity and preferred stock was above 20 percent for the median firm at the beginning of the nineties, immediately before the financial crisis it was close to 10 percent. While net debt increased during the crisis, by 2011 it was again close to 10 percent.

As far as convergence is concerned, there are two points to make here. First, it is evident that European and US firms display reasonably similar behaviour. Based on Figure 9, one can

immediately see that the median US firm substantially decreased its (gross) book leverage over the last two decades, while increasing its cash holdings over the same period. The combined effect, however, is even stronger for the median US firm in the sense that net book leverage, which was about 20 percent at the beginning of the nineties, has been close to zero since 2004. This result is remarkable as it shows that the median US firm is essentially unleveraged.[14]

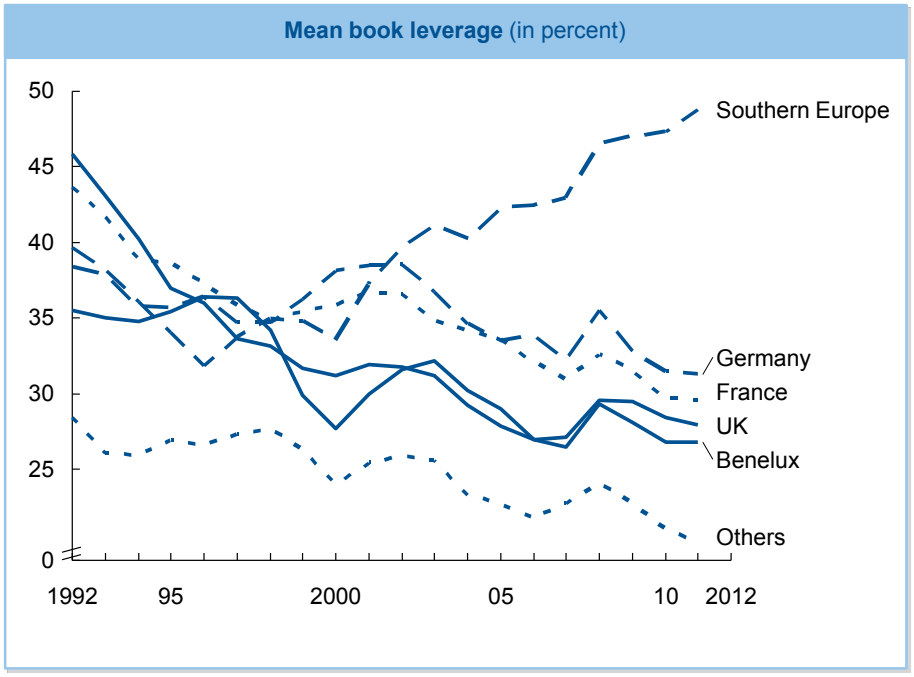
Second, a closer look at European firms reveals that there is country-specific variation. Indeed, before the introduction of the Euro, reduction in leverage can be observed fairly consistently throughout Europe. However, since 1999 it can be seen that in the Southern European countries the trend has inverted, i.e. leverage increased substantially in these countries. In Western and Northern Europe, however, deleveraging continued, as is shown in Figure 10. In 2011, mean book leverage in Southern European countries (Italy, Spain, Portugal, Greece) was about 50 percent, up from about 35 percent in the year 2000. The European average in 2011, however, was about 30 percent. This is an economically substantial difference.

To summarize, our analysis documents deleveraging as a common trend among listed firms in many European countries as well as in the US. There is no doubt that equity financing has become more important over the last 20 years, something that is especially true for Continental European firms (with the exception of the Southern European countries). Compared to this long-term trend, the deleveraging that has followed the financial crisis is modest in scale.

Of course, it cannot be directly concluded from this that bank-based financing has lost importance. However, bearing in mind that increased equity financing is accompanied by an increase in the size of debt securities markets, as shown in Figure 4 of the preceding Section, the stylized facts presented here corroborate the view that bank-based corporate financing has lost importance over the last 20 years. Hence, especially for Continental European firms, where the relative importance of bank-based debt financing was undoubtedly stronger than

[14] This phenomenon has already gained some attention in the literature; cf. Bates/Kahle/Stulz (2009) and Bessler et al. (2013).

for UK-based firms, the corporate finance environment has changed substantially over the last 20 years.



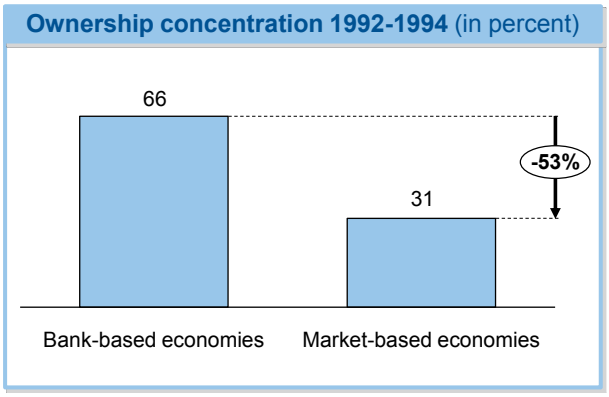
Notes: This figure illustrates the book leverage decision of the mean listed firms in various parts of Europe over time. Book leverage is total debt also deflated by the sum of total debt plus common equity and preferred stock. The geographic areas are: Benelux (Belgium, Netherlands, Luxembourg), France, Germany, South Europe (Italy, Spain, Portugal, Greece), UK, and Others (Austria, Sweden, Finland, Denmark, Ireland). The analysis covers the universe of listed non-financial firms in Europe over the period 1992-2011 as described in the data appendix (data permitting). Overall 80,862 individual firm-year observations are analysed.
Source: Own analysis based on data from Thomson/Reuters.
Figure 10: Leverage decision of non-financial listed firms in various European areas, 1992-2011

As an additional fact, we have shown that listed firms have significantly increased their cash holdings. This is also a long-term trend, even though it was reinforced by the internet bubble crash starting in 2001 and again by the financial crisis in 2008. Hence, deleveraging is even more pronounced if we look at the net book leverage, with the median listed US firm having zero leverage from the year 2004 onwards. For European firms, the change is not as pronounced, but even in Europe the net leverage of the median firm has fallen to about 10% in recent years.

3.3.2 Ownership structures of firms

In the context of convergence between market-based and bank-based financial systems, a second trend emerges. Traditionally firms in market-based economies used to have rather dispersed ownership structures, while firms in bank-based economies are considered to be dominated by block holders. Indeed, Figure 11 illustrates that in the early nineties,

ownership concentration was substantially higher in bank-based economies.[15] Over the period 1992 to 1994 for listed firms in these bank-based economies 66 percent of outstanding shares were closely held, while for firms in market-based economies only 30 percent of shares were closely held. Indeed, countries like Germany were well known for their substantial cross-holdings among listed firms, leading corporate Germany to be labelled as "Deutschland AG". At the heart of this network of cross-holdings were the two largest German financial institutions, which together held substantial stakes in dozens of listed German companies. According to Wenger/Kaserer (1998b) these two companies in 1994 directly or indirectly held shares in other listed firms equal to about 8 percent of the German gross market capitalization. However, since 2001 these cross-holdings have been reduced substantially.



Notes: This figure illustrates the heterogeneity in ownership concentration across Europe in the early nineties of the last century, when classifying countries in market-based and bank-based economies. Country classification follows Demirgüç-Kunt & Maksimovic (2002) and Demirgüç-Kunt & Levine (1999), with Denmark, the Netherlands, Sweden and the UK qualifying as market-based. Ownership concentration is the percentage of closely held shares as reported by Thomson/Reuters Worldscope, which is defined to represent the fraction of shares held by insiders, e.g. shares held by officers, directors and their immediate families, shares held in trust, shares of the company held by any other corporation, pension/benefit plans, and shares held by individuals who hold 5% or more of the outstanding shares. Since numbers have to be treated with some caution (transparency levels, likely to produce a selection bias, also varied between the areas), median values are reported. The analysis covers the universe of listed non-financial firms in Europe over the period 1992-1994 as described in the data appendix (data permitting). Overall 7,609 individual firm-year observations are analysed.
Source: Own analysis based on data from Thomson/Reuters.

Figure 11: Ownership concentration in Europe, 1992-1994

As firms increase their reliance on equity financing, they are likely to face the challenge of broadening their shareholder base. However, they face a potential trade-off in doing this. While broadening the shareholder base will enhance financing opportunities, the increased agency costs associated with dispersed ownership concentration need to be taken into

[15] Throughout our empirical analysis, we adopt the market-based vs. bank-based classification proposed by Demirgüç-Kunt & Levine (1999) based on their country-level financial structure index. Following this approach Denmark, Netherlands, Sweden and the United Kingdom (as well as Switzerland and the United States) are considered to be market-based. For details see Appendix B, Section 8.

account.[16] Since equity financing has a long tradition in countries such as the UK and USA, this suggests that the deleveraging trend reported in the preceding Section might have a greater impact on the ownership structures of firms in bank-based economies as compared to those in market-based economies. And in fact, ownership structures in bank-based economies today are much closer to those in market-based economies.

However, such a comparison might be misleading as it could well be that the change in the ownership structure of firms in bank-based economies is due to a change in the corporate landscape. Indeed, it is well known that ownership structure is related to firm-specific characteristics, such as the firm's size, its risk or its growth opportunities. Therefore, we are interested in isolating that part of the change in the ownership structure that is not due to changes in firm characteristics. For that purpose we use a pooled cross-sectional regression analysis taking into account firm characteristics and industry effects. In this way we can isolate a time trend that is independent of any changes in firm or industry characteristics.

Table 1 reports the results of this detailed analysis of ownership concentration in European listed firms. We use free float, i.e. the fraction of shares in the hands of shareholders owning less than 5 percent, as the dependent variable.[17] Since reliable ownership figures are scarce, the analysis is restricted to the period 1999-2008.[18]

First, the results for model (1) in Table 1 clearly corroborate the view that ownership is less concentrated in those European countries with market-based financial systems. Even when controlling for factors affecting ownership concentration – for example, a firm's risk, growth and size – being based in a country with a market-oriented financial system still affects ownership concentration in an economically and statistically significant way. In fact, the coefficient in model (1) implies that after controlling for all other factors, free float is still

[16] Clearly, this trade-off is shaped by the contracting environment in which the firms operate. See Section 6. Edmans (2013) provides a detailed discussion of blockholders and their corporate governance engagement.

[17] Admittedly, transparency levels for ownership structures have increased over time. However, to ensure consistent data quality over a long time-series, it seems advisable to rely on a 5 percent threshold. This threshold is also consistent with much of the academic literature and the definition used by several data vendors (e.g. Thomson/Reuters Datastream and Worldscope, when they define "percentage of closely held shares").

[18] We use a similar data set as in Rapp/Trinchera (2013). There, the authors also discuss the reliability of the data.

about 10 percentage points higher in market-based economies.[19] Simultaneously, however, model (2) and (3) clearly suggest that over time the difference in ownership concentration decreases. In fact, the coefficient for the time trend in both regressions is negative and statistically highly significant. Panel A in Figure 12 gives a graphical illustration of this result. While the average unexplained difference in free float between European firms in market-based and bank-based economies was about 12 percentage points in 1999, this difference came down to about 3 percentage points in 2008.

Model	(1)	(2)	(3)	(4)	(5)
Dep. Variable			Free Float		
Sample period		1999 -- 2008		1999-2003	2004-2008
SE estimation			robust, clustered on firm level		
Market-based economy	7.411***	11.371***	12.306***	9.195***	5.997***
	(7.967)	(7.025)	(7.591)	(7.709)	(6.566)
Market-based economy x Time		-0.684***	-1.002***		
		(-3.914)	(-5.569)		
Firm size	2.211***	2.218***	2.458***	2.683***	1.860***
	(12.096)	(12.127)	(14.224)	(11.140)	(10.563)
Sales growth	0.803***	0.815***	0.650***	0.372	1.193***
	(3.832)	(3.885)	(3.142)	(1.154)	(4.564)
Leverage	-2.612	-2.673	0.430	-3.378	-1.962
	(-1.284)	(-1.314)	(0.221)	(-1.203)	(-1.006)
Firm risk	26.494***	26.624***	27.973***	35.489***	17.980***
	(7.249)	(7.292)	(8.023)	(8.007)	(3.696)
Stock Market Liquidity			-2.924***		
			(-6.371)		
Stock Market Size			18.271***		
			(20.335)		
Industry effects	yes	yes	yes	yes	yes
Year effects	yes	yes	yes	yes	yes
# Observations	25,668	25,668	25,668	11,710	13,958
Adj. R^2	0.273	0.273	0.311	0.0553	0.408

Notes: This table reports firm-level pooled linear regression estimates to examine the difference in ownership concentration between market-based and bank-based economies in Europe over the period 1999-2008. Free Float, the dependent variable, is the fraction of shares in the hand of small shareholders (owning less than 5 percent) as reported by the Ownership Module of Thomson One Banker and cleaned manually. It is the (inverse) measure of ownership concentration. Market-based economy is a dummy variable indicating firms from Denmark, the Netherlands, Sweden and the UK following Demirgüç-Kunt & Maksimovic (2002) and Demirgüç-Kunt & Levine (1999). Model (1) is a simple linear regression over the full sample period. Model (2) and (3) allow for time-varying effects of our variable of interest, Market-based economy, by interacting the dummy variable with a year count variable (with 1999=0). Model (4)-(5) report results from two sub-periods. All models control for selected firm characteristics, industry and year fixed effects. Standard errors allow for heteroscedasticity and clustering on firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.
Source: Own analysis based on data from Thomson/Reuters as described in Rapp/Trinchera (2013).

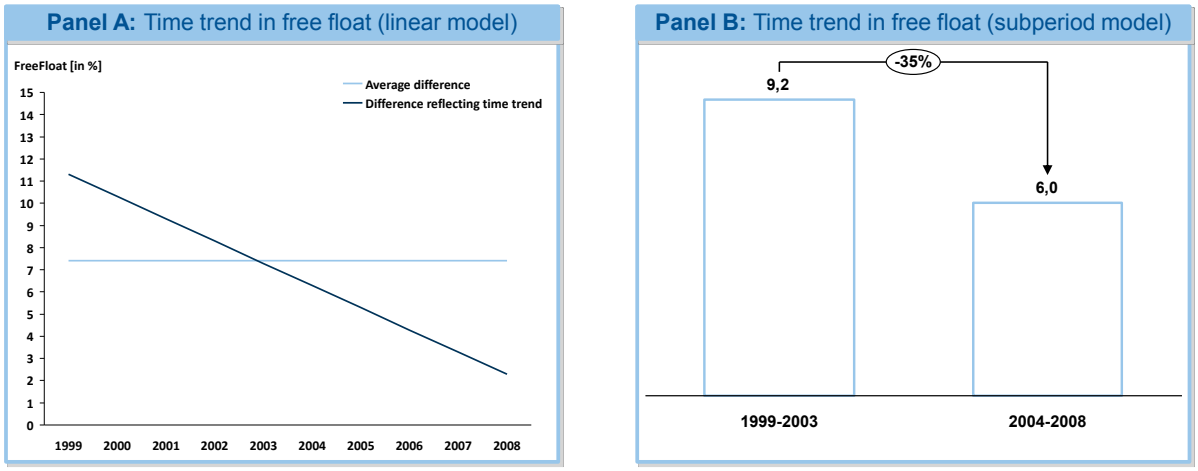
Table 1: Regression analysis examining the time trend in ownership concentration

We obtain similar results when splitting our sample period into two sup-periods and examining the separately as in models (4) and (5). The results are illustrated in Panel B in

[19] For ease of coefficient interepretation we use linear regression models here.

Figure 12. The coefficient for the market-based economies dummy variable was 9.2 in the first sub-period and 6.0 in the second.

In sum, comparing firms from bank-based and market-based economies our results strongly suggests that there is a convergence in the ownership concentration of European firms.



Notes: The figure illustrates the results of the cross-country firm-level regression analysis reported in Table 1, where Free Float is regressed on a dummy variable indicating market-based economies (Model (1), (4) , and (5)) as well as the interaction with a year count variable. Country classification follows Demirgüç-Kunt & Maksimovic (2002) and Demirgüç-Kunt & Levine (1999), with Denmark, the Netherlands, Sweden and the UK qualifying as market-based. Free Float, the dependent variable, is the fraction of shares in the hand of small shareholders (owning less than 5 percent) as reported by the Ownership Module of Thomson One Banker and cleaned manually. The sample refers to all listed non-financial European firm covered by Thomson/Reuters over the period 1999-2008 (data permitting), where ownership information is available. Overall 25,668 individual firm-year observations are analysed.
Source: Own analysis based on data from Thomson/Reuters as described in Rapp/Trinchera (2013).

Figure 12: Illustrating the time trend in convergence in ownership concentration

4 The Economic Role of Capital Market Depth and its Drivers

4.1 Financial structure and economic growth

There is consensus among financial economists that access to capital, as measured by financial market depth, is an important determinant of a country's economic development. As has been pointed out by Levine (1997), the ability of the financial system to improve economic welfare derives from the following five factors: (i) it allows for cost-efficient risk transfers among economic agents (e.g. via trading or hedging); (ii) banks and capital markets strongly influence resource allocation; (iii) financial claimholders exert monitoring and control activities over corporate decision makers; (iv) it mobilizes savings; and (v) by providing payment services, the exchange of goods and services is facilitated.[20]

Even though these economic functions are not in doubt, their effective impact on economic development is hard to establish. Or to put it even more directly: the causal impact of financial development on economic development is hard to infer. However, overall it could be said that there is increasing consensus among researchers that financial development in fact causes economic development, even though reverse causality might also exist.[21] For instance, in a broad study over the period 1960-1989, King/Levine (1993) show that current financial depth is a good predictor for economic growth over the next 30 years.

While a certain degree of consensus regarding the positive role of the overall financial system has emerged, little is known about the role of financial structure. In other words, does it make a difference in terms of economic development whether the financial system is more bank-based, like it used to be in Continental Europe, or more capital market-based, like it used to be in countries like the USA and UK? The literature suggests that both banks and securities markets provide important, although different, services that facilitate economic development. Abundant empirical support for both effects is available.[22]

[20] For an extensive discussion of this topic cf. also Allen/Gale (2000).
[21] Cf. Calderón/Liu (2003), Christopoulos/Tsionas (2004) and Guiso/Sapienza/Zingales (2004). For a more general discussion cf. as a starting point Levine (1997).
[22] Cf. among others Levine/Zervos (1998), Demirguç-Kunt/Maksimovic (1998), Allen/Gale (2000), Demirguç-Kunt/Levine (2001), and Levine (2002).

Interestingly, Demirgüç-Kunt/Levine (2001) show that in more developed economies securities markets tend to develop more rapidly than banks, which implies that the financial system becomes more market-based as an economy becomes more developed. Nevertheless, Demirgüç-Kunt/Maksimovic (1998) do not find any evidence that firms' access to external funding depends on the financial structure, i.e. whether corporate financing is more bank- or more market-based. However, in a recently published paper, Demirgüç-Kunt/Feyen/Levine (2013) find that the impact of capital market depth on economic development seems to become stronger for countries with more developed capital markets. In other words, it seems that capital markets do provide financial services which are especially important for economic growth in those countries that have already reached a relatively high level of development. Law/Singh (2013) to some extent confirm this result. However, they also find that the relationship is not monotonic; i.e., it could well be that at some point financial markets become so large that they cease to have a positive impact on growth.

In order to test the robustness of this assertion, it is of crucial importance to offer some microeconomic reasons why capital markets should spur economic development. As already pointed out in Section 2, several arguments are put forward in the academic literature in order to explain why a transformation of the financial structure of an economy towards larger capital markets should have a positive impact on economic growth. First, liquid stock markets could enhance economic prosperity as they reduce the disincentive to invest in long-term projects.[23] In fact, a stockholder will only be able to transfer the substantial idiosyncratic risk associated with long-term projects, if liquid stock markets exist. Second, liquid stock and bond markets allow for cost-efficient reallocation of capital across industries.[24] In fact, investors are able to vote with their feet, exerting pressure on the firm's management in this way.

Third, access to equity may spur innovation as – given obvious risk-sharing considerations – debt is only available to a limited extent in high-risk projects. As private equity markets tend to be relatively small, the availability of risk capital is positively influenced by the size of

[23] Cf. Levine/Zervos (1998).
[24] Cf. Eklund/Desai (2013).

public equity markets. Fourth, because of the fact that shareholders are residual claimants they have a much larger incentive to exert control over the investment decisions of a firm than debt-holders have. This is illustrated most directly through the example of activist investors, including private equity funds and hedge funds, who use their expertise to push for corporate change that will lead to enhanced performance and stock price growth. Moreover, the effectiveness of the control activities of debt holders are often limited because of conflicts of interest. And, finally, one should not forget that stocks are information sensitive securities, while debt in many cases is not. Hence, equity financing creates more information gathering incentives by outside investors than debt financing does. This is an important prerequisite for effective corporate control.

We will come back to this economic impact of capital market depth in Section 5. In this Section we look at a more policy-related question: namely, what drives capital market depth? Of course, if capital markets enhance economic development, as is suggested by the literature, this creates a strong economic case for further developing these markets. In Section 6 we consider in greater detail whether this underlying assumption is valid. However, even if this is the case, the regulatory framework, as well as technological progress, will exert an influence on the development of capital markets that is largely independent of these underlying economic forces. Therefore, we will take a closer look at the policy and technological drivers of capital market growth.

4.2 The role of the pension system

In this Section we provide evidence that the regulatory and tax systems governing retirement savings in an economy play an important role in capital market development.

As a starting point, it should be noted that in almost all OECD countries public and private pension schemes exist alongside one another.[25] *Public pension plans* are often designed in such a way that redistribution, savings and insurance objectives are combined. While there might be some tax-financed subsidies to these systems, they are typically set up as pay-as-you-go-schemes (PAYG), which means that current employees pay for the pensions distributed to current pensioners. In this structure, there is no capital stock that guarantees

[25] For a detailed description of country specific pension systems cf. Withehouse (2007).

the funding of the future pension claims of current contributors. Basically, these claims are covered by a political and/or government guarantee. Depending on the size of the pension payments covered by such PAYG schemes, a given fraction of national savings bypass the capital market, which might negatively impact its size.

Private pension plans are administered by private institutions. In almost all cases these are funded pension plans, which means that dedicated assets cover the plan's liabilities.[26] However, there are some exceptions. Some countries allow the plan sponsor to fund the plans directly out of its balance sheet, which implies that plan assets are not separate from the employer's assets. Such a system still exists in Germany. Also, in several countries there are rules allowing the sponsor to underfund the plan to some extent, which means that the fair value of the plan assets is smaller than the fair value of the plan's liabilities. In any case, to the extent that these liabilities are covered by dedicated and legally separated assets, the underlying savings are allocated via the capital market. This in turn tends to support the diversity of participants in capital markets, particularly given the propensity of pension funds to allocate capital to a range of investment strategies, including hedge funds and other alternative investments.

Hence, it is fair to say that the existence of funded pension plans should have a positive impact on the size of the capital market. However, this statement has to be qualified in several respects. First, while funded pension plans may exist in many countries, we would expect them to have a significant impact on the size of the capital market only where a substantial part of retirement income is in fact covered by these plans. Second, it should be noted that retirement income can come from multiple sources. Pension payments, regardless of whether they are paid out by funded pension plans or by PAYG schemes are only one source. Employees may decide during their working life to use other saving alternatives, like life insurance contracts, real estate or mutual fund investments, other private savings, etc. Therefore, it could well be that even though funded pension schemes in a given country are small, a substantial portion of retirement savings is allocated via the capital market because of these alternatives.

[26] A detailed description of private pension schemes can be found in OECD (2005).

Third, the saving propensity in an economy is likely to be influenced by the overall tax treatment of retirement savings. Of course, to the extent that pension plans are mandatory, as is the case for most public plans, but also to some extent for private plans, tax treatment is less relevant. However, voluntary retirement savings will be strongly influenced by the tax framework. It is worth noting in this regard that because of the pressure exerted by increasing longevity on public pension schemes, several countries have introduced favourable tax treatment of retirement savings. One example in this regard is deferred income taxation. This might apply to occupational pension plans only, or to personal retirement savings as well.

This is an important starting point in our analysis. As already mentioned, it is not surprising that the size of pension funds or the size of any other part of the asset management industry, such as mutual funds or hedge funds, is positively correlated with the size of the capital market. From a policy perspective, the salient question is whether a favourable institutional environment for capital market-based savings allocations *causes* the domestic capital market depth to increase. Hence, we are interested in identifying a causal relationship between some specific economic policy measures, such as retirement savings policies, and capital market depth.

Hence, our hypothesis is that a tax and regulatory framework which is favourable to any kind of funded retirement savings will have a positive impact on the size of the capital market. As we assume that capital market size does not directly influence the probability and the design of such policy measures, we claim that reverse causality should be a minor issue here. Nevertheless, given the qualifications we have made above, the challenges associated with testing this hypothesis are obvious. This is because the tax and regulatory framework is influenced by many different factors, with precise data series on these factors being impossible to obtain. We have, therefore, chosen a different approach, using the size of pension funds in a country as a proxy for the tax and regulatory framework of retirement savings in the country, given that more favourable treatment should be associated with larger pension funds. Moreover, it is very likely that in those countries where there is favourable tax and regulatory treatment of pension funds, other forms of private retirement savings will also be subject to similarly favourable treatment. Moreover, the size of pension

funds also gives an indication of the maturity and the importance of privately funded pensions.

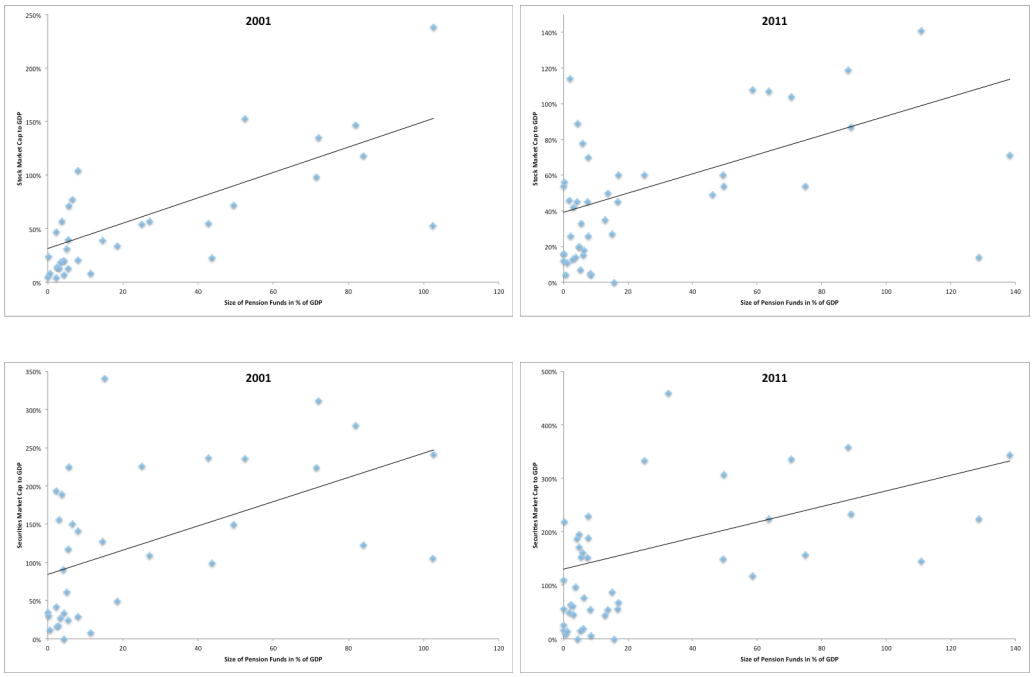
Starting from this assumption, we collect data on pension funds' assets under management, collected from the OECD pension statistics.[27] We define the size of pension funds to be the ratio of their assets under management to the country's GDP. We find a first corroboration of our hypothesis in Figure 13. There we look at the cross-sectional relationship between capital market depth, as measured by the ratio of the market capitalization of outstanding domestic stocks and bonds to GDP, and the size of pension funds. This relationship is positive – and statistically significant – regardless of whether we look at the year 2001 or 2011. The same applies if we only look at the cross-sectional relationship between stock market depth, i.e. the ratio of stock market capitalization to GDP, and the size of pension funds. Again, there is a clear positive relationship as can be seen from Figure 13.

In order to scrutinize this relationship in a more sophisticated way, we test a linear model where capital market depth is a function of different independent variables, pension fund size being one of them. For that purpose we combine data provided by the World Bank, the Bank for International Settlements (BIS), the OECD as well as other sources. A description of the data is found in Appendix B in Section 8. As data about pension fund size has only been available since 2001, our analysis is restricted to the period 2001 to 2012.

In this linear model we use the independent variables as indicated in Table 2. The selection of these variables was based on the following rationale. First, as already explained, we use the assets managed by domestic pension funds relative to domestic GDP (*Pension fund size*) as a proxy for measuring how favourable the tax and regulatory framework is for retirement savings. As a second independent variable we use *Government consumption*, hypothesizing that government consumption might adversely impact capital market size. A simple reason why this should be the case is the fact that higher Government consumption is associated with higher tax quotas; which negatively impact the savings propensity in an economy. However, there might also be an indirect effect related to our hypothesis. Government

[27] A more detailed description of these data is given in Appendix B, Section 8.3.

consumption is likely to be positively related to the propensity of the Government to set up public pension schemes – at the expense of privately funded schemes.



Notes: The figure illustrates the relationship of pension fund size in percent of domestic GDP to capital market or stock market depth. Pension fund data is taken from OECD and it covers up to 43 countries. A more detailed description of the data set can be found in Appendix B, Section 8.3.
Source: Own analysis based on data from World Bank, BIS and OECD.

Figure 13: Scatter plot of stock market depth and capital market depth to size (in % of GDP) of domestic pension funds

Second, following arguments presented in the literature, capital market size might be positively related to domestic income and cross-border market integration. For these reasons we use the per capita GDP (*GDP per capita*) as well as the trade openness (*Openness of trade*) of a country as independent variables. Third, it is also argued that the ageing of a society leads to larger capital market size. To account for this we use the percentage of the population that is older than 65 as an independent variable (*Age above 65*). Fourth, following the law and finance literature we would expect stronger rule of law (including better shareholder and debt holder rights and better law enforcementment) to be associated with larger capital markets. As a simple proxy for all these different considerations discussed in the literature, we use the legal origin of a country. According to

the literature, we would expect that countries with an English (common law) or Scandinavian legal origin should have larger capital markets.

In the first instance we use stock market depth as the dependent variable and run a simple pooled OLS regression model with the results presented in model (1) of Table 2. As expected, there is a statistically significant relationship between stock market depth and pension fund size. Moreover, this relationship is also economically significant, as an increase in the size of pension funds by 10 percentage points is associated with an increase in stock market depth of around 7 percentage points. It should also be noted that government consumption has a significant negative impact on stock market size, corroborating our argument that government consumption crowds out private retirement savings. Moreover, per capita income is positively associated with capital market depth, while we do not find any statistically significant relationship with population age and cross-border market integration. Finally, we find that countries with an English legal origin have significantly larger capital markets. One potential criticism of our approach is that collinearity, driven by a correlation between the population age and per capita income, could be an issue in model (1). It should be noted in this regard that the maximum Variance Inflation Factor (VIF) for the independent variables used in model (1) is 4.28, so still below the critical level of 5. Nevertheless, we use model (2) as an alternative approach. In this model, maximum VIF goes down to 2.87, such that the results are unchanged.

Of course, it could be argued that by using a pooled regression approach we are not able to infer anything about causality. Indeed, in the specification chosen here, endogeneity issues cannot be ruled out. They might either be driven by an omitted variable problem or by reverse causality. We have already pointed out that, for economic reasons, we do not think that reverse causality is a major issue here, as retirement savings policies should not be directly affected by the size of the capital market. However, an omitted variable issue could still exist. A common way to address this kind of endogeneity is to exploit the panel structure of our data set by estimating a fixed-effect regression model. This is also done here and results are presented in model (3) in Table 2. Of course, as our panel variables are the single countries we can no longer use any time-invariant country variables. Therefore, we have to omit all the variables related to a country's legal origin.

Model No.	(1)	(2)	(3)	(4)	(5)
Dependent Variable	Stock market depth			Capital market depth (without Government bonds)	
Model specification	Pooled OLS	Pooled OLS	Fixed Effects Panel	Pooled OLS	Fixed Effects Panel
Pension fund size	0.6886***	0.6838***	1.0310**	0.6579**	0.9329**
	[0.20]	[0.21]	[0.44]	[0.23]	[0.51]
GDP per capita	0.1727*	0.2057**	0.7977***	0.0022	0.8859**
	[0.09]	[0.09]	[0.29]	[0.15]	[0.43]
Openness of trade	0.3446	0.3364	-0.0235	0.3771	0.0215
	[0.24]	[0.23]	[0.33]	[0.26]	[0.45]
Government consumption	-5.8499*	-5.6485*	-3.1877**	-4.5724	-3.1120
	[3.16]	[2.96]	[1.58]	[3.54]	[2.30]
Law_British	0.6307**	0.5726**		1.1684***	
	[0.31]	[0.27]		[0.38]	
Law_French	0.1534	0.1045		0.7526***	
	[0.18]	[0.16]		[0.23]	
Law_German	0.1804	0.1551		0.7142	
	[0.24]	[0.24]		[0.44]	
Law_Scandinavian	0.3457	0.2864		0.5978*	
	[0.28]	[0.22]		[0.32]	
Antidirector index	-1.0113	-0.0142		0.0431	
	[0.05]	[0.05]		[0.06]	
Age above 65	0.0113		-0,0692	0.0866***	-0.007
	[0.02]		[0.04]	[0.03]	[0.08]
Year effects	Yes	Yes	No	Yes	No
Country effects	No	No	Yes	No	Yes
Observations	535	535	535	430	430
R2	0.503	0.502	0.27	0.492	0.237

Notes: This table reports the regression estimates for the impact of the retirement savings' regulatory and tax framework on the size of capital markets. We use country specific data over the period 2001 to 2012 as provided by the Worldbank, the OECD and the BIS; for more information on the data see the Appendix. As dependent variable we use stock market depth, which is the ratio of the domestic stock market capitalization to the GDP, or capital market depth excluding Government bonds, which is the ratio of the domestic stock and bond market (not taking into account Government bonds) capitalization to GDP. Pension fund size is the ratio of the assets managed by domestic pension funds to GDP. GDP per capita is the natural logarithm of the per capita GDP in each country. Openness of trade is the ratio of the sum of exports and imports to GDP. Government consumption is the government consumption expenditure in percent of GDP. Law_x is a static indicator variable set to one, if the legal system of the respective country has a British, French, German or Scandinavian origin, or zero otherwise. Data is taken from Rafael LaPorta's website. The same is true for the antidirector index, which is an index taking values between 0 and 6 depending specific shareholder rights. Age above 65 gives the percentage of population which is older than 65. Columns 1, 2 and 4 give the results for a pooled OLS regression. Columns 3 and 5 give the results for a country fixed effect panel regression. Robust standard errors are clustered by country. Standard errors are given in brackets. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 2: Regression results regarding the impact of pension fund size on capital market depth

However, as far as the remaining variables are concerned, the results are quite robust, indicating that a more favourable tax and regulatory framework for retirement savings does indeed cause domestic stock markets to be larger. The marginal impact of an increase in pension fund size on stock market depth is even higher in this specification than in models (1) and (2). Overall, our results regarding the relationship between pension fund size and stock market depth can be considered to be quite robust.

Hitherto we have looked at the relationship between stock markets and the retirement savings framework. Of course, one would expect that the same relationship should hold if capital markets at large were considered. However, this conclusion might be too far-reaching. It should be noted that capital market depth is the ratio of domestic stock and bond market capitalization to GDP. In many countries, domestic bond markets are heavily dominated by government bonds, something that is particularly pronounced where government consumption is greater. Bearing in mind the negative impact of government consumption on stock market depth, we would expect the relationship between capital market depth and the retirement savings framework to be less apparent because of this. Therefore, we opt for an alternative approach and use a narrower definition of capital market depth for the purpose of this analysis. In order to correct for the ambiguous impact of government bonds, we define capital market depth for the purpose of the analysis presented in Table 2 as the ratio of domestic stock and non-government bond market capitalization to GDP.

Using this independent variable we find similar results in models (4) and (5) compared with models (1) to (3). Again, the impact of pension fund size on capital market depth is statistically and economically significant. Also, the impact of government consumption is similarly negative, although without the previous level of statistical significance. Nevertheless, all these results corroborate our hypothesis that a tax and regulatory framework which is favourable to funded retirement savings is likely to exert a positive influence on capital market depth.

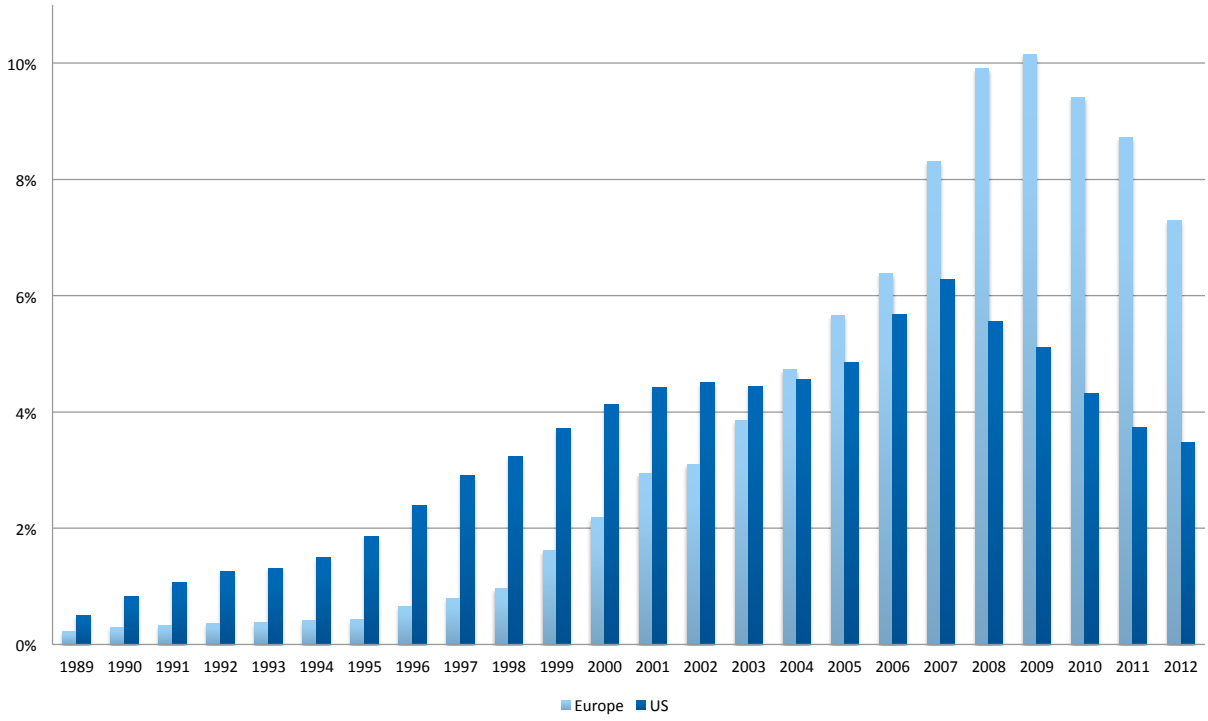
4.3 Other drivers

Obviously, the retirement savings framework is an important, but certainly not the only regulatory driver that has an impact on capital market depth, and we would also expect technological progress to have an impact. Therefore, additional drivers are discussed in the following section.

4.3.1 Securitization and financial regulation

By analysing the time pattern of capital market depth in greater detail it becomes apparent that the tremendous growth of securitized loans (asset-backed securities) has had a large

impact on the overall growth in the size of capital markets.[28] While by the beginning of the nineties asset-backed securities accounted for less than 1 percent of the overall outstanding debt securities in the US and for less than 0.5 percent in Europe, these percentages had increased to 6 percent for the US and 10 percent for Europe by the year 2008, as can be seen from Figure 14. From this it can be seen that these securities contributed to the strong growth in capital markets. However, since the financial crisis, the issuance of asset-backed securities has been substantially reduced. As a consequence, the volume of outstanding securitizations has been declining since the year 2008.



Notes: This figure reports the ratio of the outstanding volume of securitizations to the outstanding volume of overall debt securities.
Source: Own analysis based on data from BIS, the Securities Industry and Financial Markets Association (SIFMA) and the Association of Financial Markets in Europe (AFME).

Figure 14: Ratio of securitizations to outstanding debt securities in Europe and the US

Of course, analysing the drivers of securitization is a challenging issue and far beyond the scope of this study. However, a few points are worth a brief mention here. First, there is no doubt that the fundamental economic drivers explaining the growth in capital markets to some extent also apply to securitization. In principle, securitization is a risk transfer mechanism that, at least under ideal conditions, allows for an efficient risk allocation,

[28] A similar result is also reported in McKinsey Global Institute (2013), p 2.

thereby improving access to capital.[29] However, in recent research papers, evidence is presented that securitization and other financial innovations were driven to a significant extent by regulatory arbitrage and incomplete risk perception during the first decade of the twenty-first century.[30] Reducing regulatory capital requirements seemed to be an important motivation for securitizations. Moreover, rating agencies with flawed incentive mechanisms in all likelihood fuelled this trend in securitizations.[31]

4.3.2 Technological progress and financial innovation

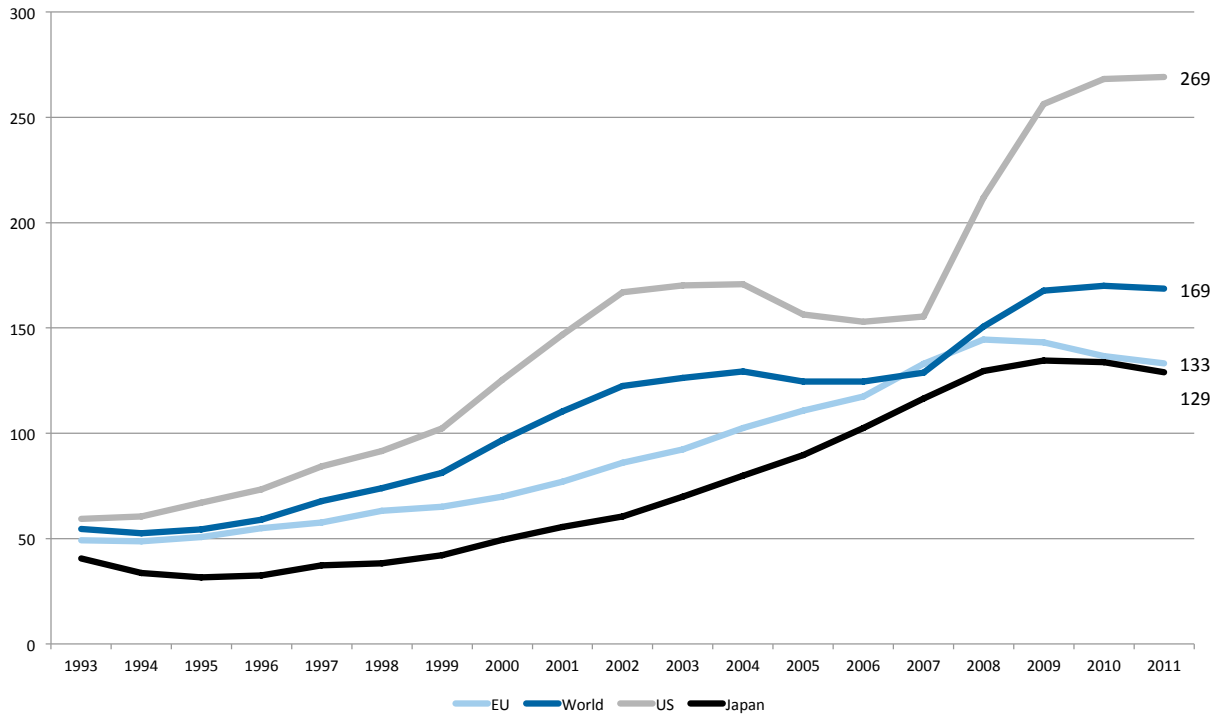
It should also be pointed out that the strong growth in capital markets is to some extent related to technological progress. Improvements in information processing and telecommunications due to the progress in digitalization affected the financial system in several ways. First, transaction costs have been significantly reduced over the last 20 years. Jones (2002) reports that overall one-way transaction costs (half the bid-ask-spread plus commissions) for NYSE stocks had decreased from 1.2 percent in the middle of the seventies to about 0.2 percent by the first decade of the twenty-first century. Because of the positive impact of reduced transaction costs on market liquidity, the latter has substantially increased over time. For instance, Rösch/Kaserer (2013) report that price impact costs, which are directly related to market liquidity, on the German stock market have on average been halved between the years 2003 and 2007.

As a direct result of this development, we can indeed observe a significant increase in worldwide stock market trading, with Figure 15 depicting the development of stock market trading as a percentage of market capitalization. On the stock markets of the European Union this ratio has roughly doubled since the end of the nineties, while in the US it has almost tripled. Overall, one might expect that decreasing transaction costs should have had a clear positive impact on capital market depth.

Second, technological progress has also substantially changed the business models of financial intermediaries. This is especially true for banks.[32] One aspect of this change is

[29] As an early paper analysing the economics of securitization cf. Greenbaum/Thakor (1987).
[30] Cf. among others Acharya/Schnabl/Suarez (2013), Shin (2009) and Gennaioli/Shleifer/Vishny (2012).
[31] Cf. among others Griffin/Nickerson/Tang (2013).
[32] For an analysis of the impact of technological change on the business models of banks cf. among others Berger/Mester (2003).

related to increased concentration in the banking sector in general and, specifically, in the market for bank deposits. This might be the consequence of increased economies of scale, which have been caused by the spread of information technology. A second aspect is financial innovation, including the use of risk transfer markets. There is some evidence that financial innovation supports concentration in the banking sector.[33] Moreover, there is a common understanding that financial innovation has been one driver for the substantial increase in the interconnectedness of the financial sector.[34]



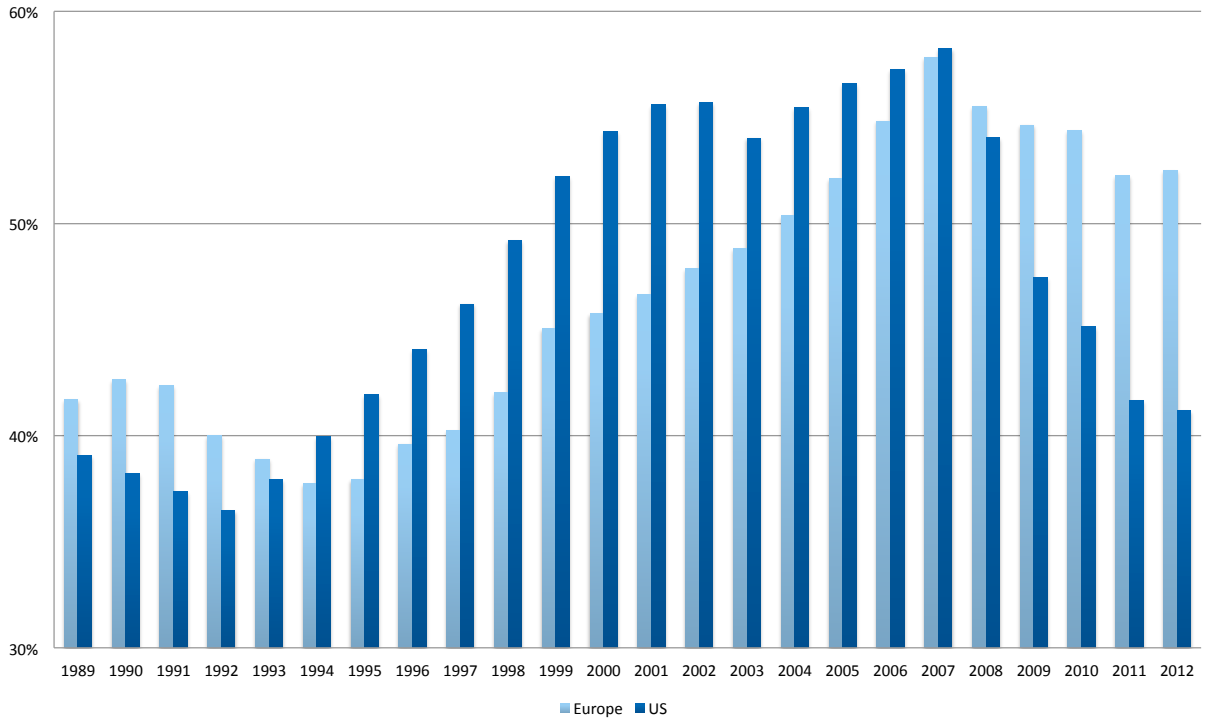
Notes: This figure reports the ratio of the trading volume to stock market capitalization in the respective regions expressed in percentages. 5 year rolling averages are reported.
Source: Own analysis based on data from World Bank.
Figure 15: Ratio of stock market trading volume to market cap

One direct consequence of this increase in concentration and connectedness is increased refinancing activities by banks and other financial institutions on the interbank market. Risk transfer, as has already been shown in Section 4.3.1, is associated with increased securitization activity. At the same time, concentration in the deposit market creates a need

[33] Cf. Frame/White (2004).
[34] For overwhelming pertinent econometric evidence cf. Billio/Getmansky/Lo/Pelizzon (2012).

to make these funds available to the overall financial sector. Issuance of debt securities by financial institutions is a means to achieving this goal.

Overall, we presume that technological progress is a driver for increased securities issuance by banks, something that is apparent in the data. Figure 16 reports the market share of debt securities issued by financial corporations. While in the mid-nineties less than 40 percent of the outstanding debt in Europe and the US was issued by banks or other financial corporations, this ratio had increased to almost 60 percent by the year 2007. Moreover, there was a broadly similar development in the US as well as in Europe, as can be seen from Figure 16. Since the financial crisis, however, financial corporations' share of the debt market has been declining significantly in the US, while the reduction has been smaller in Europe.



Notes: This figure reports the ratio of outstanding debt securities issued by financial corporations to the outstanding volume of overall debt securities.
Source: Own analysis based on data from BIS.

Figure 16: Ratio of bonds issued by financial corporations in Europe and the US

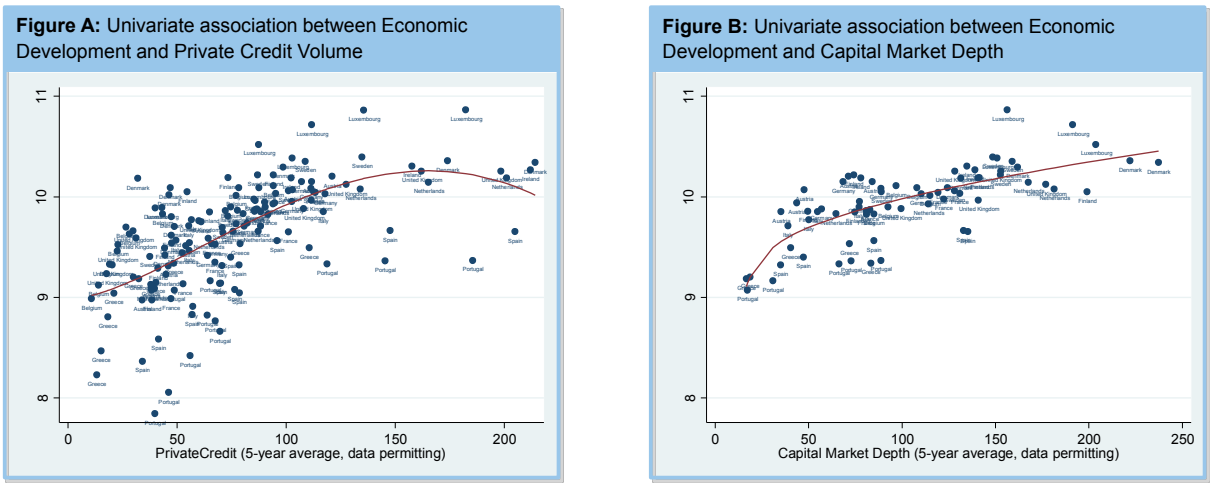
5 The Economic Role of the Financial Structure

This section examines the economic role of financial markets. Special emphasis is put on the impact of capital market size on economic development. Moreover, some of the microeconomic-based arguments why capital markets are supposed to be beneficial for economic development are analysed in further detail.

5.1 Financial market structure and economic development

As explained in detail in Section 4.1, access to capital is argued to be beneficial for economic growth. Below, we examine this hypothesis for European countries using data from the last 20 to 50 years. We proceed in five steps.

First, in Figure 17 we plot the univariate association between access to capital and economic development measured by GDP per capita, measuring access to capital along two dimensions: access to private credit and capital market depth. Following Demirgüç-Kunt/Feyen/Levine (2013) we examine 5-year averages (data permitting), in order to smooth temporary effects, in particular fluctuations in stock market valuation.



Notes: Figure A plots 5-year country averages (and fractional-polynomial prediction plot) of Economic Development (as measured by log of real GDP in 2000-US$ per capita) to Private Credit Volume (as measured by domestic credit to private sector deflated by GDP) for European countries. Figure B plots 5-year country averages (and fractional-polynomial prediction plot) of Economic Development to Capital Market Depth (as measured by stock market capitalization plus domestic bond market capitalization, both deflated by GDP). The analysis considers European countries over the period 1960-2012 as described in the data appendix (data permitting). Capital market depth is only available since 1990.
Source: Own analysis based on data from World Bank, BIS the Financial Development and Structure Dataset (Version: November 2013), and the academic literature.

Figure 17: GDP per capita and capital market depth

The figure indicates that on average economic growth is positively associated with both channels, re-establishing the finding that access to capital is beneficial for economic development. However, in accordance with a recent finding by Demirgüç-Kunt/Feyen/Levine (2013), Panel A in Figure 17 also reveals that once economic development has reached a

certain threshold, the association with private credit becomes weaker. This pattern is not observed for capital market depth in Panel B of Figure 17.

Second, we have to bear in mind that the illustration in Figure 17 is likely to entail an omitted-variable bias. Thus, we examine the association between economic development, the size of private credit markets and capital market depth in a multivariate regression setting. This allows us to extend the univariate analysis of Figure 17 and to take into account other socio-economic drivers associated with economic development. More precisely, following Demirgüç-Kunt/Feyen/Levine (2013) we control for the initial level of GDP per capita, government size, openness to trade, inflation, average years of schooling, and time-fixed effects.

The results of the multivariate regression analysis, which are reported in Table 3, corroborate the findings presented in Figure 17. First, in a univariate setting both channels, i.e. access to capital via credit markets as well as via capital markets, are positively correlated with economic development as can be seen from models (1) and (3) in Table 3.[35] However, when we account for the initial GDP level, as a proxy for the economic development of a country at the beginning of our observation period, and for year fixed effects, i.e. a time trend, as has been done in models (2) and (4) in Table 3, the coefficients for both channels are still positive, but only in the case of capital markets statistically significantly different from zero. If we account for the effects of both channels simultaneously (model (5)) and if we add standard control variables (model (6)), the association between economic development and private credit becomes negative although not in a statistically significant way. By contrast, the association between capital market depth and economic development is still positive and at a statistically significant level. This suggests that in Europe it is actually the capital market, providing access to debt and equity financing, which determines economic development.

[35] These results are in accordance with what has been found in the literature; cf. among others Levine/Zervos (1998), Levine/Beck (2004), and Demirgüç-Kunt/Feyen/Levine (2013).

Model	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Variable	Economic development (log GDP, 5yr average) x 100					
Geographic sample	Europe					
Sample period	1960 -2012 (5 yr averages)					
SE estimation	robust, clustered on country level					
Private credit (in % of GDP, 5yr average)	0.7338***	0.3114			-0.1113	-0.0304
	(6.678)	(1.267)			(-0.617)	(-0.216)
Capital market depth (in % of GDP, 5yr average)			0.5111***	0.5211***	0.5600***	0.3191**
			(4.607)	(3.746)	(3.324)	(2.732)
GDP starting level	no	yes	no	yes	yes	yes
Standard controls	no	no	no	no	no	yes
Year fixed effects	no	yes	no	yes	yes	yes
No. of observations	151	151	72	72	72	72
Adj. R^2	0.352	0.527	0.503	0.493	0.493	0.667

Notes: The table reports results from regression analysis explaining economic development in European economies by Private credit and Capital market depth (both scaled by GDP) plus a set of standard controls following Demirgüç-Kunt/Feyen/Levine (2013). The analysis considers European countries over the period 1960-2012 as described in the data appendix (data permitting). Capital market depth is only available since 1990. Capital market depth is only available since 1990. Standard errors allow for heteroscedasticity and clustering on country level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.
Source: Own analysis based on data from World Bank, BIS, the Financial Development and Structure Dataset (Version: November 2013), and the academic literature.

Table 3: Economic development, private credit and capital market depth, 1960-2012

Third, we examine the importance of access to debt and equity markets for economic development separately. For that purpose, we split capital market depth into stock market and bond market depth and aggregate the private credit and the private bond market to calculate debt market depth. Again, we run a "horse race". The results reported in models (1) and (2) in Table 4 suggest that both sources of financing are important and contribute to economic development. However, once we focus on more developed economies by estimating quantile regressions as in models (3) and (4), we only find robust evidence for stock market depth. Coefficients remain economically and statistically significant. For debt market depth this does not hold true, as the coefficient in one case is only weakly significant and in the other not significant at all. Moreover, the size of the coefficients is about half the size of the coefficients for stock market depth, indicating that the economic effect is markedly stronger for stock markets as compared to debt markets.

Model	(1)	(2)	(3)	(4)
Dep. Variable	Economic development (log GDP, 5yr average) x 100			
Geographic sample	Europe			
Sample period	1960 -2012 (5 yr averages)			
SE estimation	robust, clustered on country level			
Method	OLS	OLS	66%-Quantile	75%-Quantile
Stock market depth (in % of GDP, 5yr average)	0.3723***	0.2303**	0.1878**	0.2343***
	(3.166)	(2.289)	(2.427)	(2.760)
Aggregate debt capital (in % of GDP, 5yr average)	0.2738***	0.1514**	0.1057	0.0992*
	(3.360)	(2.340)	(1.272)	(1.759)
GDP starting level	yes	yes	yes	yes
Standard controls	no	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
# Observations	71	71	71	71
Adj. R^2	0.468	0.681	n.a.	n.a.

Notes: The table reports results from regression analysis explaining economic development in European economies by Stock market depth and Aggregate debt capital (private credit plus private bond market, deflated by GDP) plus a set of standard controls following Demirgüç-Kunt/Feyen/Levine (2013). While Model (1) and (2) use OLS methods, Model (3) and (4) apply quantile regression analysis as in Demirgüç-Kunt/Feyen/Levine (2013). The sample period is 1960-2012 (data permitting). Bond market depth is only available since 1990. Standard errors allow for heteroscedasticity and clustering on country level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.
Source: Own analysis based on data from Worldbank (World Bank Open Data), the Bank for International Settlements (BIS statistics), the Financial Development and Structure Dataset (Version: November 2013), and the academic literature.

Table 4: Economic development, equity and debt market depth, 1990-2012

Fourth, it should be noted that the results presented so far suffer from endogeneity issues. Therefore, we were not able to make any inference about causality, i.e. whether capital market development really drives economic development or vice versa. Therefore, to gain more insights into the drivers of economic growth we examine the association between current *excess capital access* and future economic growth.[36] Therefore, we define excess capital access as the residual of a multivariate regression analysis explaining capital access by the current economic development, a set of standard controls following Demirgüç-Kunt/Feyen/Levine (2013) and year fixed effects, where capital access is either capital market depth, stock market depth, private debt volume, or stock market liquidity. Stock market liquidity, which combines stock market depth and trading activities, is sometimes considered to be another measure of stock market development. Economic growth is measured as the average growth rate of the log of real GDP per capita over the subsequent 5 year period.

The results of this analysis are reported in Table 5 and they provide a rather homogeneous picture: While all three measures for current excess access to bond and/or equity markets

[36] This idea is related to King/Levine (1993) who find that the current level of financial development predicts long-run economic growth.

are positively associated with future economic growth, excess access to debt markets is negatively associated with future economic growth.

Model	(1)	(2)	(3)	(4)
Dep. Variable	Economic growth (5yr average)			
Geographic sample	Europe			
SE estimation	robust, clustered on country level			
Excess Capital Market Depth	0.0035*			
	(1.872)			
Excess Stock Market Depth		0.0046**		
		(2.928)		
Excess Private Debt			-0.0035***	
			(-3.103)	
Excess Stock Market Liquidity				0.0038**
				(2.671)
GDP level	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
# Observations	57	58	57	58
Adj. R^2	0.602	0.651	0.615	0.633

Notes: The table reports results from regression analysis explaining economic growth in European economies by Excess capital access, the level of GDP and year fixed effects. Excess capital access is the residual of a multivariate regression analysis explaining capital access (Capital market depth, Stock market depth, Private debt volume, or Stock market liquidity) by the current economic development, a set of standard controls following Demirgüç-Kunt/Feyen/Levine (2013) and year fixed effects. The sample period is 1990-2012 (data permitting). Standard errors allow for heteroscedasticity and clustering on country level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.
Source: Own analysis based on data from World Bank, BIS, the Financial Development and Structure Dataset (Version: November 2013), and the academic literature.

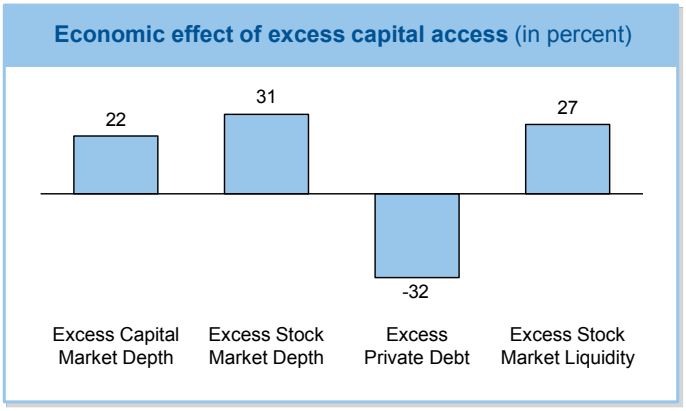
Table 5: Excess capital access and economic growth

Note that the analysis presented in Table 5 is designed to address the problem of causality that is mentioned earlier. The question is whether access to capital markets determines economic development, or whether economic development drives depth of financial and capital markets. Again, note that our analysis is based on 5-year averages. Accordingly, we examine whether the current 5-year average access to capital determines the economic growth over the next 5-year period. Thereby, we control twice for the current level of economic development. First, we use it as an explanatory variable in estimating excess capital access. Second, we control for the level of economic development in the second stage regression.[37] Overall, we expect this analysis to provide evidence with respect to the causality issue, since it seems unlikely that economic development over the next five years would determine current levels of financial market depth. Hence, the results presented in

[37] We acknowledge that such a two-step procedure may raise some econometric issues. However, in combination with the results presented earlier, we do not expect our results to be seriously distorted by endogeneity issues.

Table 5 provide strong evidence in favour of the presumption that capital markets positively impact economic development.

Finally, in order to elucidate the economic effects emerging from Table 5, we illustrate the results of this regression analysis in Figure 18. For that purpose we proceed in two steps. First, we multiply regression coefficients from model (1)-(4) in Table 5 with the standard deviation of the explanatory variables. The standard deviation of excess access to capital markets is 31 percent, for excess access to stock markets 33 percent, for excess access to private debt markets 45 percent and for excess stock market liquidity 35%. Second, we note that the dependent variable in Table 5 is economic growth. Thus, we standardize the product of the regression coefficient and standard deviation by the mean of the dependent variable. As a result we obtain the relative effect of a one-standard deviation increase in excess access to capital for future economic growth. These figures are illustrated in Figure 18 below.[38]



Notes: The figure illustrates the results of from the regression analysis presented in Table 5. Economic effects are determined by multiplying the regression coefficients with the standard deviation of the explanatory variable deflated by the mean of the dependent variable. The dependent variable is future economic growth as measured by growth in real economic development (log of real GDP per capita in 2000 USD). For the observations entering our regression Model (1) of Table 5 the mean economic growth rate is 0.78 percent, which is equivalent to an annual growth rate in real GDP of 1.46%.
Source: Own analysis based on data from World Bank, BIS, the Financial Development and Structure Dataset (Version: November 2013), and the academic literature.

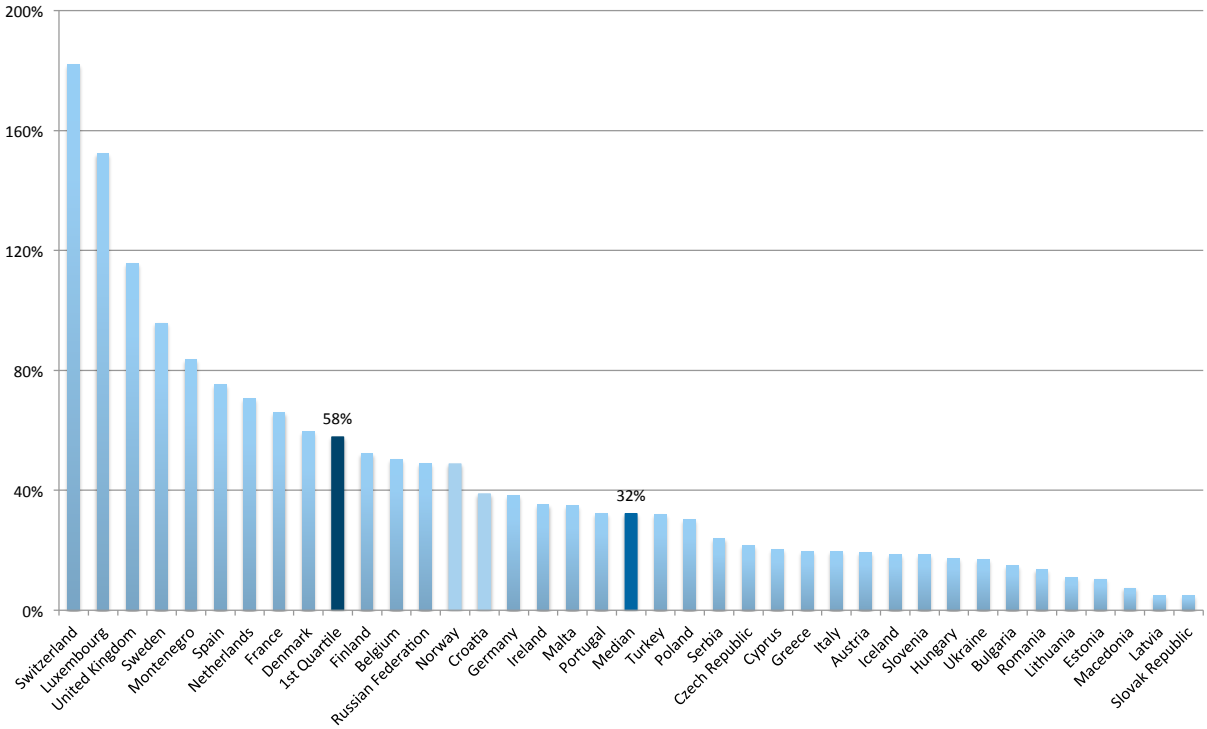
Figure 18: Illustrating the results of the analysis of economic growth

Accordingly, a one standard deviation increase in stock market depth is associated with a 31 percent increase in economic growth. To put this into perspective, consider a country with a

[38] For the observations entering our regression analysis in Model (1) of Table 5 the mean economic growth rate is 0.78 percent, or 1.46 percent in terms of nominal GDP per capita.

capital market depth of 50 percent and a long-term real growth rate in per capita GDP of 1.5 percent. Our results suggest that increasing the capital market depth to 83 percent (a one-standard deviation increase around the mean) could increase the country's long-term real growth rate to 2 percent.

Interestingly, stock market liquidity has a broadly similar impact on economic growth. The impact of debt market depth is also positive, although not as strong as for stock market depth. An increase in the size of stock and bond markets by one standard deviation is estimated to cause an increase in the long-term real growth rate of per capita GDP of 22 percent. So, for a country with a long-term real growth rate of per capita GDP of 1.5 percent, an increase of capital market depth from say 80 to 111 percent (which corresponds again to a one standard deviation change around the mean), would cause the growth rate to increase to about 1.8 percent.



Notes: The figure illustrates stock market depth, i.e. domestic stock market capitalization deflated by GDP, throughout Europe. Stock market depth is measured as a 5-year average over the period 2008-2012.
Source: Own analysis based on data from World Bank.

Figure 19: Stock market depth throughout Europe

In order to get a sense of the growth potential concealed by underdeveloped capital markets, we draw average stock market depth throughout Europe over the period 2008 to 2012 in Figure 19. As one can see, there is substantial cross-country variation. 25 percent of

the European countries have a stock market depth that is higher than 58 percent. Only three countries, i.e. Switzerland, Luxembourg and the United Kingdom, are above 100 percent. Median stock market depth is 32 percent. Interestingly, a highly economically developed country like Germany is not among the first quartile countries. Also, even large countries like Poland, Turkey or Italy are below the median. Therefore, a long-term increase in stock market depth in the range of 10 to 20 percentage points is certainly not an unrealistic goal for many European countries. According to our analysis, we would expect growth rates to increase by a factor of about 1.1 to 1.2.

To sum up, although it is ultimately difficult to establish causality[39], our findings nevertheless suggest that: (i) access to capital markets is beneficial for economic development; (ii) for European countries access to capital market outweighs access to private credit; and (iii) the equity market is the dominant channel to promote economic well-being in developed economies.

5.2 Growth, innovation and corporate financing decisions

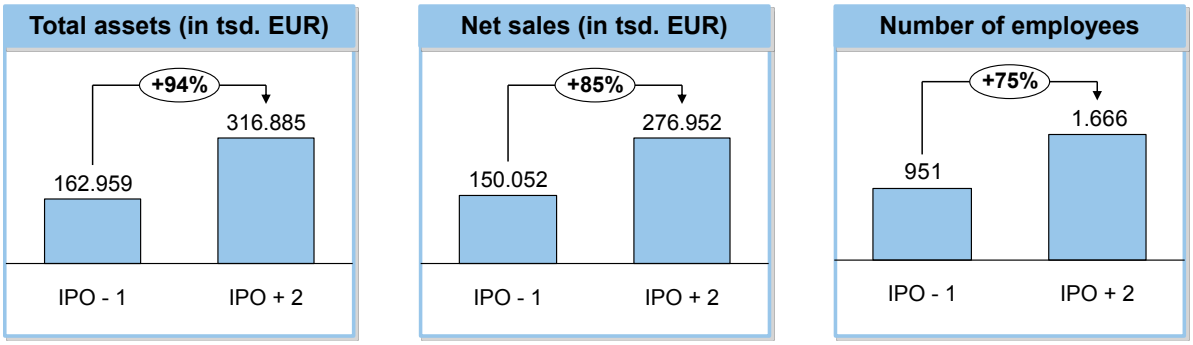
Having demonstrated that capital markets, and in particular stock markets, tend to be beneficial for economic growth, it is worth exploring the channels through which capital markets might affect economic growth. We argue that three channels are important.

First, by providing access to equity finance stock markets allow firms to realize growth options. In order to corroborate this hypothesis, we examine the median growth path of European IPOs along three dimensions: Balance sheet size, net sales or revenues, and the number of employees. We compare the position at the last fiscal year ending before the IPO with the position at the end of the second fiscal year following the IPO. For the purposes of this analysis we identified a list of 1,559 companies that went public on a European stock exchange since 1992. A more detailed description of the data set can be found in Appendix, Section 8.2. Results are reported in Figure 20. All three Panels reveal that firms undertaking an IPO display substantial growth rates in the three years after the IPO. This corroborates the view that an IPO allows firms to realize growth options. A prerequisite for a successful

[39] See the discussion in Demirgüç-Kunt/Feyen/Levine (2013).

IPO is strong secondary market liquidity, something that is enhanced when a range of investment views can be expressed by market participants.

Second, innovative business models are particularly relevant for growth in developed economies. Firms adopting these kinds of business models generally rely more on equity capital, since they face greater risk in the development process as well as in the product market. In order to corroborate this hypothesis we study the universe of listed European non-financial firms with positive research and development expenses, sort them into deciles and calculate the mean equity ratio for all firms in a given decile.



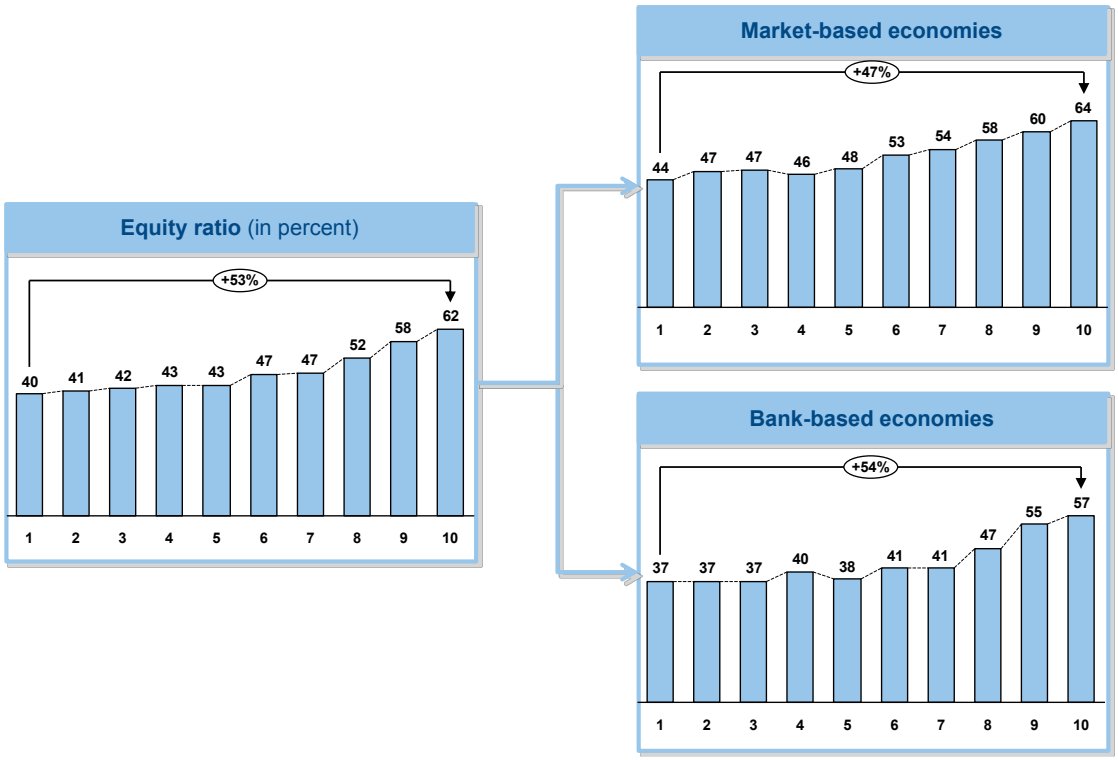
Notes: The figure illustrates the median growth path of the European IPOs along three dimensions: Total assets (constant 2005 EUR), net sales (constant 2005 EUR), and the number of employees. The IPO events are identified as described in the data appendix. Overall the analysis covers 1,559 European IPOs.
Source: Own analysis based on data from Thomson/Reuters.

Figure 20: Post-IPO development of European firms

Figure 21 reports the results. On the left-hand side we analyse all European firms simultaneously, while on the right hand side we examine firms from market-based and bank-based economies separately. Figure 21 suggests that high R&D intensity is related to the capital structure of the respective firm in an economically relevant way. Indeed, while the average equity ratio for the 10 percent of the firms with lowest R&D intensity is 40 percent, the equity ratio of the 10 percent of the firms with the highest R&D intensity is 62 percent. Moreover, the relationship is strongly monotonic, i.e. the equity ratio increases with increasing R&D intensity. This is a strong indication of an underlying fundamental economic relationship.

A second insight emerging from Figure 21 is related to the fact that the association between the equity ratio and (high) R&D intensity seems to be stronger in countries with a bank-based corporate financing system. One explanation for this result could be that in a bank-based system external funds for risky investment projects primarily have to be raised via the equity market. This is because banks would be very reluctant to provide loans for this kind of

risky activity. However, in a market-based system firms could also tap the bond market for that purpose. Or, to restate this in a different way: because of the more liquid stock market, firms in a market-based economy are willing to take more risk, i.e. to use more debt, when financing R&D projects. This is probably because they feel confident that in the case of financial problems they would be able to tap the stock market and raise external equity. Therefore, in these market-based systems, firms are more inclined to finance R&D projects by debt. It is worth emphasising that this is just an initial explanation of the findings presented in Figure 21. In order to figure out the actual drivers of these results a more in-depth analysis follows later.



Notes: The figure illustrates firms' equity ratio as a function of their R&D intensity for European listed non-financial firms. R&D intensity is measured as research and development expenses deflated by total assets. Countries are classified market-based or bank-based following Demirgüç-Kunt & Maksimovic (2002) and Demirgüç-Kunt & Levine (1999), with Denmark, the Netherlands, Sweden and the UK qualifying as market-based. The analysis covers the universe of listed non-financial European firms that report positive research and development expenses over the 1992-2011 period as described in the data appendix (data permitting). Overall 20,347 individual firm-year observations are analysed.
Source: Own analysis based on data from Thomson/Reuters.

Figure 21: R&D intensity and equity ratios, 1992-2011

Of course, one could again argue that the univariate relationship presented in Figure 21 might be driven by some unobserved variables. Therefore, we take a closer look at this relationship and scrutinize it in the context of a multivariate regression approach. For a very large data set of European firms with more than 24,000 firm year observations we find the following results, as one can see from Table 6. First, by applying a standard capital structure model following Frank/Goyal (2009) we find that R&D intensity has an economically strong

and statistically significant impact on equity ratios, as can be seen from the results of model (1) in Table 6. Again, one might question causality here, but addressing this objection is not our aim here. In any case, analysis reveals a strong association between equity ratios and R&D intensity. Hence, if equity markets are too small or illiquid, regardless of the direction of causality, one can expect to see less R&D activity.

Model	(1)	(2)	(3)
Dependent variable		Equity ratio	
Sample period		1992-2011	
Geographic area		Europe	
Sample restrictions		No restriction	
SE estimation		robust, clustering on firm level	
R&D intensity	0.403***	0.360***	0.350***
	[13.22]	[10.01]	[9.89]
R&D intensity x Bank-based economy		0.147**	0.171***
		[2.31]	[2.69]
Bank-based economy		-0.086***	
		[-21.20]	
Industry equity ratio (median)	0.313***	0.316***	0.311***
	[11.84]	[11.83]	[11.75]
Market to book	-0.008***	-0.008***	-0.008***
	[-30.39]	[-30.06]	[-30.39]
Tangibility	-0.036***	-0.025***	-0.035***
	[-3.94]	[-2.78]	[-3.82]
Profitability	0.038***	0.029***	0.036***
	[5.85]	[4.42]	[5.56]
Size	-0.032***	-0.031***	-0.032***
	[-33.15]	[-33.74]	[-33.18]
Year effects	yes	yes	yes
Country effects	yes	no	yes
No. of observations	71,057	70,898	70,898
Adj. R^2	0.244	0.232	0.244

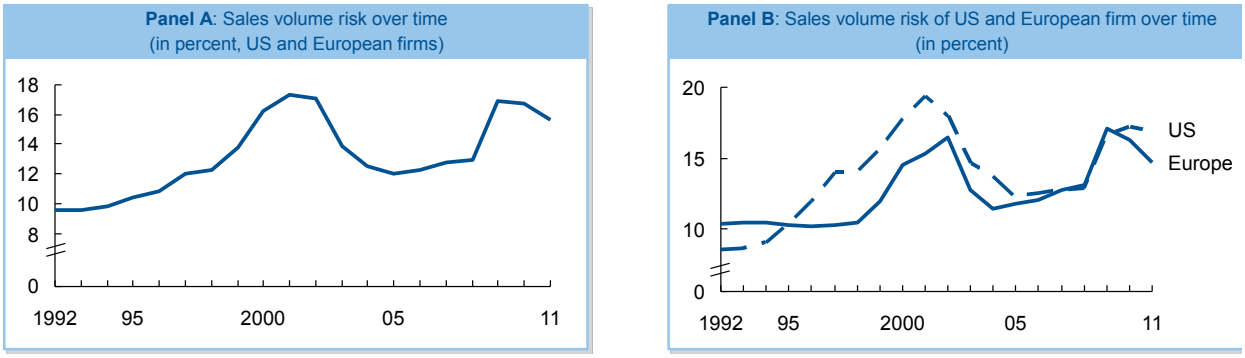
Notes: The table reports results of simple Frank/Goyal (2009) capital structure regressions extended for R&D intensity for listed non-financial European firms. The dependent variable is equity ratio defined as common equity plus preferred stock deflated by total assets. R&D intensity is research and development expenses to total assets. Bank-based economy is a dummy variable indicating bank-oriented European economies as coded by Demirgüç-Kunt & Maksimovic (2002) and Demirgüç-Kunt & Levine (1999). Industry equity ratio is the median equity ratio in the corresponding industry, which is based on the 12 industry classification scheme developed by Kenneth French and Eugene Fama. Market to book is the market-to-book ratio of equity. Tangibility is net property, plant and equipment to total assets. Profitability is earnings before interest, tax and depreciation to total assets. Size is the logarithm of total assets. Standard errors allow for heteroscedasticity and clustering on firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.
Source: Own analysis based on data from Thomson/Reuters.

Table 6: Equity financing and R&D intensity, 1992-2011

Second, as expected we find equity ratios to be lower in bank-based economies as can be seen from model (2) in Table 6. What is even more interesting, however, is the fact that the coefficient for R&D intensity becomes larger in a bank-based economy. This implies that the sensitivity between R&D intensity and equity financing becomes more pronounced in bank-

based economies, as has already been suggested by Figure 21. This latter finding corroborates the hypothesis stated above, namely that innovative firms in bank-based economies take a more conservative stance in their financing decisions: While the average firm generally relies less on equity financing, probably due to the limited availability of equity, the innovative firm relies to a greater degree on equity financing.

It should be noted that the findings related to R&D intensity might apply to other risky investments as well. As a general observation, the economic environment for the corporate sector in the developed world today is more risky than it used to be 20 years ago. In fact, Figure 22 shows that today revenue risk for European and US firms is markedly higher than it used to be during the nineties. This might be related to technological progress, to globalization or to changing consumer behaviour. In any case, it indicates that equity financing is now more important than it used to be in the past.

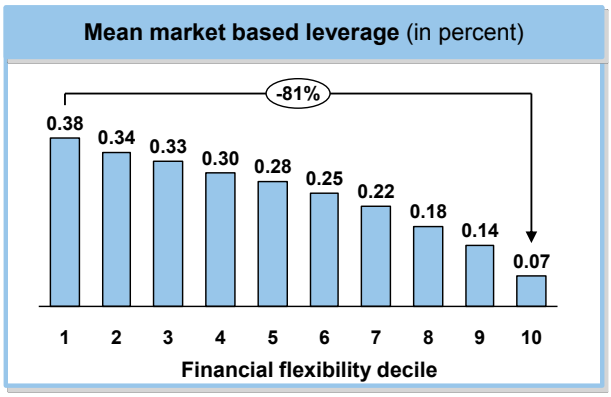


Notes: The figure illustrates sales volume risk of the median non-financial listed firm in Europe and the US over the period 1992-2011. Sales volume risk is the rolling 3-year standard deviation of changes in sales or net revenues. While Panel A aggregates firms from Europe and the US, Panel B reports results for the two groups separately. The analysis covers the universe of non-financial firms in Europe and the US that have been listed at least once during the 1992-2011 period as described in the data appendix (data permitting). Eventually, the median analysis is based on a number of 123,797 firm-year observations for the 3yr-rolling standard deviation.
Source: Own analysis based on data from Thomson/Reuters.

Figure 22: Sales volume risk for European and US firms over time

The findings presented above already indicate that there might be some deficiencies in corporate financing in bank-based economies. Taking a more general view, our explanation of why firms in bank-based economies might be more inclined to rely on equity rather than debt could be regarded as an argument that points to the importance of *financial flexibility*. While corporate managers have long claimed that financial flexibility is important for firms, the academic literature has only recently started to study financial flexibility as a

determinant of corporate financial policies.[40] This recently emerging literature strongly suggests that financial flexibility considerations strongly influence financing decisions of firms. Unfortunately, the *value* of financial flexibility is not directly observable for an individual firm. We thus borrow the measure from Killi/Rapp/Schmid (2012). There, the authors proceed in two steps. First, they conduct a long-run event study to gain an insight into how shareholders evaluate marginal financial flexibility measured by marginal changes in cash. Second, they use the results of the first step to calculate a firm-specific measure that they call *value of financial flexibility* (VOFF), which in effect measures – from the perspective of shareholders – the value of a marginal unit of financial flexibility. As illustrated in Figure 23, this measure inversely correlates with the leverage of European listed non-financial firms. In fact, leverage of firms in the lowest VOFF decile is about 5 times the leverage of firms in the highest VOFF decile.



Notes: The figure illustrates the leverage decision of European listed non-financial firms as a function of its value of financial flexibility. Therefore, we proceed in two steps. First, we compute the mean VOFF per firm and group each firm into deciles. Second, we calculate the mean market based leverage for each of the deciles, where market based leverage is total debt deflated by firm value. Firm value is the ´market value of common equity plus book value of preferred stock and total debt. We study market based leverage, since the value of financial flexibility is determined from the perspective of shareholders. The analysis covers the universe of listed non-financial firms in Europe over the period 1998-2008 as described in Killi/Rapp/Schmid (2012). Overall 29,359 individual firm-year observations are analysed.
Source: Own analysis based on data from Thomson/Reuters as described in Killi/Rapp/Schmid (2012).
Figure 23: Financial flexibility and leverage decision, 1998-2008

Again, the result illustrated in Figure 23 may be a univariate artefact. We thus again apply multivariate regression analysis. Moreover, we acknowledge that stock markets and their behaviour may differ across Europe. Thus, in contrast to Killi/Rapp/Schmid (2012) we conduct two long-run event studies, one for market-based economies and one for bank-

[40] Graham and Harvey (2001) and Brounen/de Jong/Koedijk (2006) provide survey evidence on the importance of financial flexibility considerations from the perspective of corporate managers. Gamba/Triantis (2008) propose a theoretical model to study financial flexibility. Empirical studies are found in Denis/McKeon (2012), Killi/Rapp/Schmid (2012), and Rapp/Schmid/Urban (2013).

based economies, in order to determine a firm's value of financial flexibility. The results of this analysis are reported in Table 7.

This negative association between a firm's VOFF and its leverage is also found in a multivariate regression analysis as reported in Table 7. As model (1) shows, even when controlling for the usual variables that affect the leverage decision, one can still see that firms with a higher VOFF tend to have less debt. Moreover, this relationship is statistically highly significant and economically strong.

Model	(1)	(2)	(3)
Dependent variable		Market leverage	
Sample period		1998-2008	
Geographic area		Europe	
SE estimation		robust, clustering on firm level	
VOFF	-0.113***	-0.094***	-0.089***
	[-7.68]	[-10.93]	[-10.54]
VOFF x		-0.048***	-0.050***
Bank-based economy		[-4.22]	[-4.42]
Bank-based economy		0.086***	
		[12.33]	
Industry market leverage (median)	0.366***	0.366***	0.361***
	[11.73]	[12.15]	[11.99]
Market to book	-0.003***	-0.002***	-0.002***
	[-3.51]	[-4.24]	[-4.46]
Tangibility	0.224***	0.220***	0.221***
	[16.06]	[16.24]	[15.86]
Profitability	-0.176***	-0.153***	-0.157***
	[-17.02]	[-15.52]	[-15.76]
Size	0.018***	0.018***	0.018***
	[12.97]	[13.51]	[13.19]
Year effects	yes	yes	yes
Country effects	yes	no	yes
No. of observations	26,885	26,768	26,768
Adj. R^2	0.289	0.295	0.305

Notes: The table reports results of simple capital structure regressions following Frank/Goyal (2009) extended for the value of financial flexibility measure (VOFF) developed in Rapp et al. (2012). The dependent variable is the market leverage defined as total debt by the market value of financial liabilities. VOFF is a firm-specific measure of the value shareholders assign to financial flexibility for the firm. Bank-based economy is a dummy variable indicating bank-oriented economies as coded by Demirgüç-Kunt & Levine (1999). Median industry leverage is the median leverage in the corresponding industry, which is based on the 12 industry classification scheme developed by Kenneth French and Eugene Fama. Market to book is the market-to-book ratio of equity. Tangibility is net property, plant and equipment to total assets. Profitability is earnings before interest, tax and depreciation to total assets. Size is the logarithm of total assets. While all models allow for year fixed effects, model (1) and model (3) also allow for country fixed effects. Standard errors allow for heteroscedasticity and clustering on firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.
Source: Own analysis based on data from Thomson/Reuters as described in Rapp et al. (2012).

Table 7: Financial flexibility, leverage and firm location, 1998-2008

Even more interesting is model (2), where the association between VOFF and leverage is allowed to vary depending on whether the firm is located in a market-based or bank-based economy. As one can see, as soon as financial flexibility becomes valuable, firms located in

bank-based economies use less debt. Again these results suggest that firms located in bank-based economies adopt more conservative financing strategies, probably at the expense of firm growth.

In sum, these analyses suggest that there are multiple channels through which stock markets may positively affect firm growth and thus ultimately economic development.

6 Financial Market Regulation and the Case for Policy Action

6.1 Preliminary remarks

The law and finance literature suggests that there is a close relationship between financial regulation - i.e. the regulation of financial markets - financing of firms and firm behaviour.[41] In this study we have presented new evidence that financing behaviour of firms operating in countries with market-based financial systems, such as the UK or USA, differs substantially to that of firms based outside such systems. Moreover, we have provided evidence corroborating the view that a system of corporate finance that is more capital market oriented most likely has a positive impact on economic development, especially for more developed countries. Therefore, the legal system and the framework of financial regulation have an important and measureable impact on the economic wellbeing of a society.

Therefore, in this final Section we touch on issues related to financial regulation, elaborating on three points. First, we show that substantial improvements have been made in terms of the regulation of European capital markets over the last 20 years, with a trend towards convergent regulation. Second, we scrutinize in more detail the role of institutional investors as they have become by far the most important group of shareholders. Therefore, the efficiency of corporate governance mechanisms in place depends to a large extent on the presence and behaviour of these investors. And, as a third and final point, we outline some guiding principles for a financial regulation policy programme.

6.2 Trends in EU financial market regulation

6.2.1 Soft regulation: The case of corporate governance codes

The Cadbury Report is widely considered the starting point for soft law initiatives of corporate governance regulation. Following the UK example, many countries adopted similar types of regulations.[42] For instance, in 2001 the German legislator established a commission, the so-called German Corporate Governance Commission, tasked with defining a code of best practice. This code, the German Corporate Governance Code (GCGC), was then initially released in early 2002. Adopting a comply-or-report and since 2009 a comply-or-explain

[41] E.g. La Porta et al. (1998); cf. Mayer/Sussman (2001) for a critical view.
[42] See Aguilera/Cuervo-Cazurra (2004, 2009).

principle, the GCGC is an example of soft corporate governance regulation. EU law to some extent has recognized this soft regulation approach. For instance, Directive 2006/46/EC requests companies to disclose whether the company complies, on a mandatory or voluntary basis, with any existing corporate governance code.

Soft regulation or, very similarly, self-regulation is an interesting regulatory approach, because it is an attempt to efficiently balance the benefit of restricting unintended behaviour with the costs of unintended consequences.[43] Hence, it can be regarded as an attempt to make regulation more efficient in economic terms. Of course, several objections are raised against self-regulation, because of obvious incentive and consistency problems. Therefore, we would like to contribute to this debate by scrutinizing in greater detail the German self-regulatory experiment regarding the GCGC. More specifically, we will explore: (i) which firms actually comply with the GCGC; and (ii) whether investors reward firms for code compliance.

Looking at these questions, we have to acknowledge that – by virtue of the GCGC's structure – there are some obstacles to an empirical analysis. First, the GCGC mixes soft regulations with hard law. Therefore, the overall level of code compliance is generally very high.[44] *Second*, firms only have to disclose their behaviour with respect to some soft regulations, so-called *recommendations*, and only report voluntarily about the remaining soft regulations, so-called *suggestions*. Therefore, any simple measure that does not differentiate between recommendations and suggestions may produce biased results. *Third*, the GCGC is revised quite frequently (often on an annual basis). Therefore, a simple compliance measure may capture time-series variation that is not due to changing firm behaviour but due to changes in the code structure. To circumvent these difficulties, we follow an approach well-established in the literature and only consider a fixed set of recommendations that are *controversial* in the sense that in every year at least 10% of our sample firms do not comply with these recommendations. These recommendations are sometimes called 'neuralgic' code recommendations.[45]

[43] For a fundamental paper on this idea cf. Romano (1998).
[44] See Rapp/Kohl (2013) or Rapp/Schmid/Wolff (2011).
[45] See v. Werder/Talaulicar/Kolat (2005), Rapp/Schmid/Wolff (2011), or Rapp/Kohl (2013) for a discussion.

Moreover, we note that the level of shareholder concentration should be of first order importance, since corporate governance aims to ensure that investors, and thus shareholders, earn their return on investment.[46] We thus proceed in two steps. First, we regress code compliance levels on ownership concentration, firm characteristics and further controls. Second, we examine whether code compliance is associated with higher firm valuation levels, taking into account the level of ownership concentration.[47]

Model	(1)	(2)	(3)	(4)
Method	OLS	OLS	TOBIT	TOBIT
Dep. Variable		Code Compliance		
Geographic sample		Germany		
Sample period		2007 -- 2011		
SE estimation		heteroscedasticity robust		
Free Float (in %)	0.150***	0.109***	0.174***	0.130***
	[6.609]	[5.546]	[7.035]	[6.183]
Firm Size (log)		4.639***		5.283***
		[17.866]		[17.311]
Firm growth (3years)		-0.786*		-1.065**
		[-1.790]		[-2.314]
Leverage		0.007		-0.006
		[0.176]		[-0.135]
Industry effects	yes	yes	yes	yes
Year effects	yes	yes	yes	yes
Observ.	1,103	1,093	1,103	1,093
Adj. R^2	0.11	0.33	n.a.	n.a.

Notes: The table reports results from regression analysis explaining code compliance of German firms by ownership concentration measured by Free Float as reported by Thomson/Reuters Datastream, firm characteristics, and industry and year effects. The sample period is 2007 – 2011 covering all German non-financial Prime Standard firms. Firm size is the logarithm of net sales, Firm growth is the 3-years sales growth, Leverage is total debt to total assets. Model (1) and (2) are estimated using OLS regression methods. Model (3) and (4) use TOBIT regression methods. Firm characteristics are lagged one period. All models control for industry and year fixed effects. Standard errors allow for heteroscedasticity. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Source: Own analysis based on data from Thomson/Reuters and hand-collected data from annual reports as described in Rapp/Kohl (2013).

Table 8: Ownership concentration and compliance with codes of best practice, 2007-2011

Table 8 shows the results from our first analysis, where we examine determinants of code compliance. Regardless of whether we use control variables or whether we use an OLS or a TOBIT approach, we get very robust results. Actually, free float, measuring the fraction of shares held by small investors, is significantly positively correlated to our measure of code compliance. This finding is in line with a substitution argument: Firms with limited monitoring by block holders voluntarily opt for higher compliance levels. Put differently, firms with strong block holders seem to consider code compliance of limited importance. To scrutinize this view in more detail, we then examine whether code compliance is associated

[46] See the definition of corporate governance in Shleifer/Vishny (1997).

[47] We acknowledge that it is tough to establish causality here, the empirical exercises in Arcot/Bruno (2013), Rapp/Schmid/Urban (2013), and Rapp/Kohl (2013) suggest that there is actually a causal relation between code compliance and firm performance.

with firm valuation, taking into account the level of ownership concentration. The results are presented in Table 9. Model (1) suggests that on average there is no correlation between firm valuation and code compliance. However, taking into account the level of ownership concentration reveals that there is indeed an association between code compliance and firm valuation. This association, however, is sensitive to the level of ownership concentration. This can be seen from model (2) where the interaction term is highly significant, but more obviously from a comparison of model (3) and (4), where the former (latter) is restricted to firms with high (low) ownership concentration.

Model	(1)	(2)	(3)	(4)
Dep. Variable		Form valuation (Tobin's Q)		
Geographic sample		Germany		
Sample period		2007 -- 2012		
SE estimation		heteroscedasticity robust		
Code compliance (in %)	-0.255	-0.982**	-1.229***	0.519**
	[-1.174]	[-2.380]	[-2.988]	[2.252]
Code compliance x Widely held firm		1.234***		
		[2.607]		
Widely held firm (dummy)	-1.447	-86.215**		
	[-0.190]	[-2.327]		
Firm Size (log)	-5.154**	-6.250***	-4.322	-7.432***
	[-2.375]	[-2.940]	[-1.114]	[-2.962]
Operating Firm Performance (RoA)	31.62	33.801	56.514	51.341
	[0.480]	[0.522]	[0.426]	[1.008]
Firm growth (3years)	4.722*	5.076*	5.786	5.425*
	[1.670]	[1.734]	[1.142]	[1.761]
Leverage	-1.630***	-1.563***	-1.032***	-1.800***
	[-6.679]	[-6.392]	[-2.616]	[-6.273]
Industry effects	yes	yes	yes	yes
Year effects	yes	yes	yes	yes
Observ.	1,058	1,058	425	633
Adj. R^2	0.143	0.151	0.087	0.299

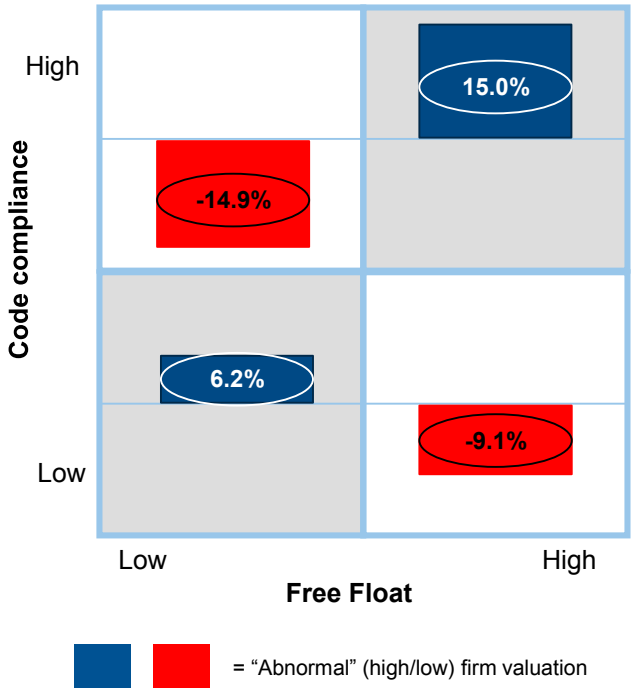
Notes: The table reports results from pooled OLS regression analysis explaining firm valuation by code compliance and ownership concentration. The initial sample covers all German non-financial Prime Standard firms. Model (3) (Model (4)) is restricted to firm-year observations with high (low) levels of ownership concentration. Firm valuation is measured by Tobin's Q for 2008 -- 2012. Widely held firm is a dummy variable indicating a firm with low ownership concentration, i.e. high level of Free Float as reported by Thomson/Reuters Datastream. Firm size is the logarithm of net sales, Operating performance is EBIT deflated by total assets, Firm growth is the 3-years sales growth, Leverage is total debt to total assets. Right hand side variables are lagged one period. All models control for industry and year fixed effects. Standard errors allow for heteroscedasticity. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Source: Own analysis based on data from Thomson/Reuters and hand-collected data from annual reports as described in Rapp/Kohl (2013).

Table 9: Firm valuation, ownership concentration and compliance with codes of best practice, 2007-2012

To re-emphasise the results of model (2) and (3), we re-estimate the specification of model (2) using two dummy variables (for code compliance and ownership concentration) and elucidate the results in a simple but intuitive illustration below in Figure 24.

The economic explanation for these results is straightforward: Regulation of corporate governance restricts entrepreneurial freedom. This might be valuable, particularly when there is limited outside monitoring. However, with efficient monitoring the restriction might actually cause costs that outweigh these benefits. It seems fair to argue that this seems particularly relevant in economies with substantial block ownership by families. Overall, our results suggest that soft corporate governance regulation may be beneficial to investors. Of course, one cannot argue based on this evidence that soft regulation might be beneficial in all cases. Most likely this will not be the case. However, under specific circumstances and for confined issues, soft regulation could be an alternative to government regulation.

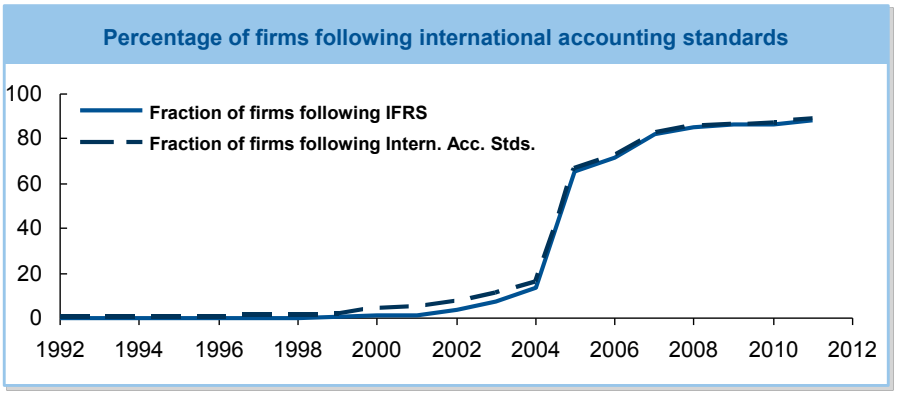


Notes: The figure illustrates the results of the regression analysis explaining firm valuation by code compliance, free float and the multiplicative interaction term, while controlling for firm characteristics as well as year and industry effects. Firm valuation is measured by Tobin's Q defined as the market value of the firm (market value of equity plus book value of preferred stock and total debt) deflated by the book value of common equity, preferred stock and total debt. Overall 1,058 firm year observations are analysed.
Source: Own analysis based on data from Thomson/Reuters and hand-collected data from annual reports as described in Rapp/Kohl (2013).
Figure 24: Code compliance, ownership structure and firm valuation

6.2.2 Harmonizing accounting frameworks

As far as convergence in financial market regulation is concerned, it is worth briefly emphasising that the most far-reaching convergence has taken place as far as accounting standards of listed firms are concerned. According to Regulation No 1606/2002, companies in the European Union that have issued securities which are listed on a regulated market have to prepare their consolidated financial statements in accordance with international

accounting standards (IAS/IFRS). Due to the fact that in most EU countries there are also non-EU-regulated stock or bond markets, there are still several publicly traded companies that are not legally obliged to comply with international accounting standards. However, as one can see from Figure 25, by 2011 more than 80 percent of listed companies in the EU published their consolidated financial statements according to international accounting standards. Therefore, an important prerequisite for an integrated capital market in the EU is fulfilled to a large extent.



Notes: This figure illustrates the time-series behaviour of accounting standards followed by European listed firms as reported by Thomson/Reuters. The analysis covers the universe of listed non-financial firms in Europe over the period 1992-2011 as described in the data appendix (data permitting). Overall 75,199 individual firm-year observations are analysed.
Source: Own analysis based on data from Thomson/Reuters.
Figure 25: Accounting standards followed by European listed non-financial firms

6.2.3 Convergence in investor protection rules

As already mentioned, corporate law plays an important role in shaping the governance of firms. In this context, two agency issues are of central interest: (i) the conflict between managers and shareholders, and (ii) the conflict between majority and minority shareholders. While the former is considered to be of prime interest in market-based economies (e.g. the US and the UK), the latter is often argued to be the major issue in bank-based or insider systems.

The recent academic law and finance literature, pioneered by La Porta et al. (1997, 1998), has developed indices that measure the strength of the legal system to mitigate these agency problems by enhancing the disciplinary power of shareholders. While the initial indices were static (by construction), the legal system is dynamic. Thus, it is interesting to examine how the legal system, and in particular the corporate law in the different countries,

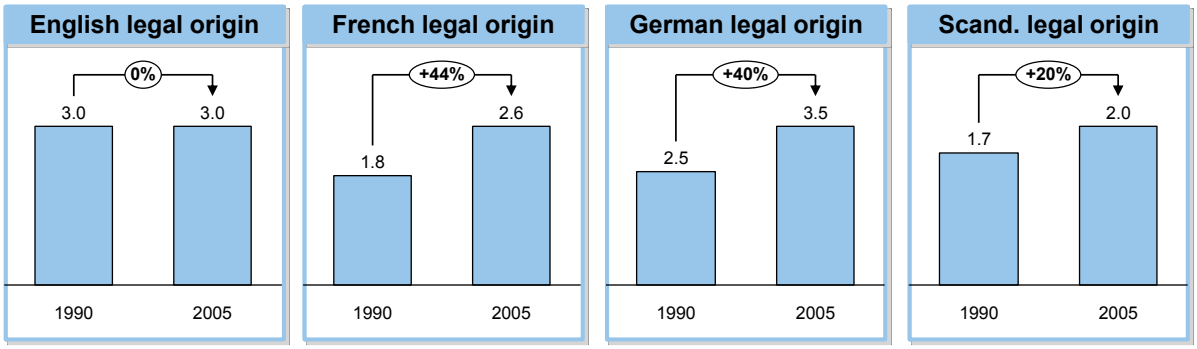
has developed over time and shaped the contracting environment for firms and shareholders.

Here it should be noted that over the last 20 years several initiatives at the EU-level, as well as at the level of individual member states, have sought to enhance and harmonize investor protection rules. An important milestone in this process was the publication in May 1999 of the Financial Services Action Plan, which aimed at creating a single financial market in the EU. A large number of individual regulatory measures have subsequently been put in place with this aim.[48] In particular, a high degree of integration has been achieved when it comes to securities markets access, trading, and infrastructure.

However, EU capital markets are far less integrated when it comes to investor protection rules. From a legal process perspective this to some extent is due to the fact that investor protection is a matter of company law, which is far less integrated than securities markets law. This was recognized in the Commission's 2003 Action Plan on Modernizing Company Law and Enhancing Corporate Governance. Because of the slow progress, the Commission published a new Action Plan on European Company Law and Corporate Governance in 2012, expressing the need for new rules at the EU level in order to enhance transparency and to get more engaged shareholders in European listed companies.

Of course, even though investor protection rules are less harmonized than, for instance, securities markets rules at the EU level, a large number of regulatory measures have been put in place in recent years. Rather than seeking to summarize all these measures, we instead raise the question of whether and how investor protection rules have changed since the beginning of the nineties. To study this development we use results presented by Martynova/Renneboog (2011), focusing on the two agency problems mentioned at the beginning, i.e. (i) the conflict between managers and shareholders, and (ii) the conflict between majority and minority shareholders.

[48] For an overview and an evaluation of these measures cf. CRA (2009).



Notes: The figure illustrates the development of (average) shareholder protection as measured by the anti-director index developed by LLSV in Europe over time. Countries are aggregated based on their legal origin: English (UK and Ireland), French (Belgium, France, Greece, Italy, Luxembourg, Netherlands, Portugal, Spain), German (Austrian, Germany) and Scandinavian (Denmark, Finland, Sweden).
Source: Own analysis based on data from Martynova/Renneboog (2011).

Figure 26: Development of shareholder protection (anti-director index)

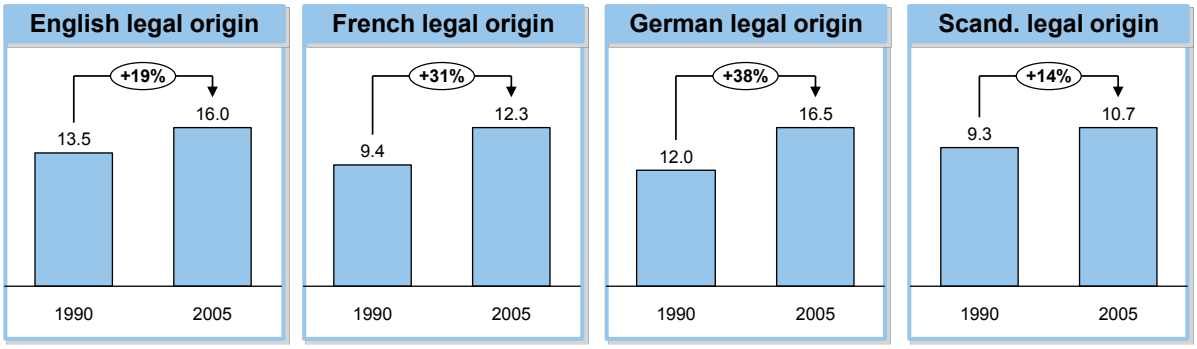
As far as the first agency problem is concerned, we focus on the anti-director rights index. This index quantifies legal protection of shareholders with an emphasis on the standard agency conflict between managers and shareholders. It was developed by La Porta et al. (1997, 1998) and was found to be associated with corporate governance of firms (e.g. shareholder concentration), development of (financial) markets, and economic development.

The standard agency conflict between managers and shareholders is considered to be of prime interest in market-based economies. Accordingly, as can be seen from the Figure 26, the level of shareholder protection as measured by the anti-director index was highest in countries with an English legal origin (UK and Ireland) by the beginning of the nineties. However, examining the data from 1990 – 2005 suggests that there have been (sometimes substantial) improvements in shareholder protection in all European countries. Splitting up the European countries into four legal systems, i.e. English, French, German, and Scandinavian legal origin, according to the data provided by Martynova/Renneboog (2011) two important developments can be noticed. First, the quality of shareholder protection has increased everywhere with the exception of the UK and Ireland. Second, the difference in the quality of shareholder protection rules between the UK and Ireland and the rest of Europe has substantially decreased between 1990 and 2005. According to the data provided by Martynova/Renneboog (2011) it seems that the quality of shareholder protection is now better in countries with German legal origin than in countries with an English legal origin.[49]

[49] Note that the results for German legal origin countries presented here, differ from the results in Martynova/ Renneboog (2011), since our analysis does not consider Switzerland, which scores relatively low.

While this result may be disputed, it is in any case true that the picture presented here indicates that substantial convergence has taken place in the EU as far as shareholder protection rules are concerned.

As far as the second agency problem is concerned, i.e. the conflict between majority and minority shareholders, it has been argued that this conflict is of special importance in bank-based economies, e.g. many Continental European countries, because of the more concentrated ownership structure.[50] Again, we measure the change in the pertinent legal environment by using an index. Specifically, we use the minority shareholder rights protection index developed by Martynova/Renneboog (2011), which quantifies legal protection of minority shareholders.



Notes: The figure illustrates the development of (average) minority shareholder protection as measured by minority shareholder rights protection index developed by Martynova/Renneboog (2011) in Europe over time. Countries are aggregated based on their legal origin: English (UK and Ireland), French (Belgium, France, Greece, Italy, Luxembourg, Netherlands, Portugal, Spain), German (Austrian, Germany) and Scandinavian (Denmark, Finland, Sweden).
Source: Own analysis based on data from Martynova/Renneboog (2011).

Figure 27: Development of minority shareholder protection

Results are presented in Figure 27. Again it can be seen that minority protection rights have improved almost universally across the countries under consideration. However, there is still substantial cross-country heterogeneity indicating that convergence with respect to minority shareholder protection rights has taken place to a lesser extent than for shareholder protection rights.

6.2.4 Shareholder protection and institutional investors

The quality of minority shareholder protection rights is an important issue because it has repercussions for the system of corporate governance as a whole. In order to see this, it is worth restating a fundamental finding in the law and finance literature that ownership

[50] Thus, some commentators even argue that these countries are characterized by insider systems (e.g. Franks/Mayer, 2001).

concentration varies inversely with the level of minority shareholder protection. While the results reported in Section 3.3.2 are fully in line with this hypothesis, there is still some debate about the reason for this relationship.[51]

In essence, there are two competing views: While the *substitution view* argues that limited shareholder protection increases the scope for moral hazard in firms and that large block holders are required to alleviate the problems, the *complementary view* suggests that under weak legal constraints block holders collude with the management in order to appropriate corporate resources. If this latter view is correct, this would be bad news for the quality of the corporate governance system in those countries where minority shareholder protection rights are less developed. This is because there is an important group of minority shareholders, i.e. institutional investors, that are generally considered to be: (i) monitoring champions; and (ii) mostly interested in financial returns. Thus, if these investors, whether investment advisors or mutual funds, underinvest in some companies, this might have a negative impact on the quality of corporate governance in these companies.

For that reason we scrutinize these two competing views in further detail by looking at the investment behaviour of institutional investors. While the substitution view suggests a negative correlation between minority shareholder protection rights and institutional block holdings, the complementary view suggests the opposite.

Table 10 shows the results of a simple regression analysis explaining the level of institutional block holdings.[52] In models (1) to (3) we consider all institutional investors (e.g. banks, insurance companies, mutual funds, etc.). In models (4) to (6) we only consider independent institutional investors. These are mostly money managers, i.e. investment advisors or mutual funds, presumably solely interested in financial returns. In contrast so-called grey institutional investors, which are banks, insurance firms and other similar institutions, might have manifold business relationships with companies that they are invested in. Accordingly, monitoring effectiveness might be limited. Therefore, we assume that corporate governance will be more effective when independent institutional investors play a more prominent role.

[51] See e.g. the discussion in Rapp/Trinchera (2013).
[52] Again, for ease of coefficient interepretation we use linear regression models here.

Model	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Variable	Institutional Investors			Independent Institutional Investors		
Geographic sample	Europe					
Sample period	1999 -- 2008					
SE estimation	robust, clustered on country level					
Continental Europe	-8.584***	-9.776***	-8.776***	-8.809***	-10.049***	-9.084***
	(-47.158)	(-24.000)	(-17.356)	(-49.333)	(-25.146)	(-18.300)
Continental Europe x Time		0.201***	0.531***		0.209***	0.508***
		(3.273)	(6.780)		(3.467)	(6.607)
Firm size	0.155***	0.150***	0.161***	0.187***	0.182***	0.192***
	(3.543)	(3.429)	(3.695)	(4.360)	(4.239)	(4.495)
Sales growth	-0.227**	-0.216**	-0.229**	-0.208**	-0.196**	-0.209**
	(-2.317)	(-2.200)	(-2.348)	(-2.163)	(-2.039)	(-2.178)
Leverage	0.105	0.098	0.550	0.203	0.194	0.612
	(0.203)	(0.188)	(1.061)	(0.397)	(0.381)	(1.204)
Firm risk	-7.439***	-7.314***	-7.144***	-6.778***	-6.649***	-6.493***
	(-7.024)	(-6.903)	(-6.777)	(-6.524)	(-6.396)	(-6.274)
Stock Market Liquidity			2.396***			2.193***
			(10.856)			(10.123)
Stock Market Size			1.472***			1.407***
			(4.293)			(4.179)
Industry effects	yes	yes	yes	yes	yes	yes
Year effects	yes	yes	yes	yes	yes	yes
# Observations	25,833	25,833	25,833	25,833	25,833	25,833
Adj. R^2	0.136	0.137	0.146	0.141	0.142	0.149

Notes: The table reports results from regression analysis explaining block holdings of institutional investors in European firms by a Continental Europe dummy, firm characteristics, macroeconomic variables, industry and year effects. Model (1)-(3) examines all institutional investors. Model (4)-(5) study independent institutional investors only, since they are generally considered to be interested in investment returns solely. Continental Europe is a dummy variable indicating that the firm's corporate headquarter is located on the continent. Time is a simple year count variable, Firm size is measured by (the logarithm of) total assets, sales growth is the 1-year growth in net sales, Leverage is total debt deflated by total assets, Firm risk is the 2-year stock monthly volatility, Stock Market Liquidity is annual turnover in the stock market deflated by GDP, and Stock Market Size is the market capitalization of domestic stock deflated by GDP. All models control for industry and year fixed effects. Standard errors allow for heteroscedasticity and clustering on country level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.
Source: Own analysis based on data Thomson/Reuters Datastream and from Thomson One Banker Ownership Module as described in Rapp/Trinchera (2013).

Table 10: Institutional investors and minority shareholder rights, 1999-2008

From Table 10 it can readily be seen that institutional block holdings are less common in Continental Europe, where minority shareholder protection rights are generally considered to be lower. However, in the last couple of years there have been several attempts to improve minority shareholder protection rights all over Europe, as has been shown in the preceding Section. This resulted in an increasingly balanced playing field.[53] Accordingly, in model (2) to (3) and (5) to (6) discrepancy is allowed to vary over time. And indeed, the

[53] See Martynova/Renneboog (2011).

difference in institutional investor block holdings between Continental Europe, where most countries have bank-based financial systems, and those countries with market-based financial systems, decreases over time. Overall, the results are in line with the complementary view of ownership concentration and minority shareholder protection rights.

We confirm this result by also examining grey institutional investors. Because of the different incentives that motivate these investors, we would expect them to behave in the exactly opposite way to independent investors. This is exactly the result that can be drawn from Table 11. Block holdings of grey institutional investors are more likely in Continental Europe. While the difference between Continental Europe and the UK and Ireland also decreases over time, as can be seen from a comparison of models (2) to (4), there is still a significant difference even in 2006-2008.

Model	(1)	(2)	(3)	(4)
Dep. Variable	Grey Institutional Investors			
Geographic sample	Europe			
Sample period	1999 -- 2008	1999-2001	2002-2005	2006-2008
SE estimation	robust, clustered on country level			
Continetal Europe	0.226***	0.256***	0.251***	0.176***
	(6.997)	(3.457)	(4.785)	(3.810)
Firm size	-0.032***	-0.052***	-0.035***	-0.013
	(-4.143)	(-2.909)	(-2.789)	(-1.125)
Sales growth	-0.019	-0.042	-0.010	-0.006
	(-1.100)	(-1.194)	(-0.318)	(-0.231)
Leverage	-0.097	0.022	-0.284*	0.002
	(-1.054)	(0.101)	(-1.919)	(0.016)
Firm risk	-0.660***	-0.784**	-0.710**	-0.451
	(-3.517)	(-2.203)	(-2.328)	(-1.291)
Industry effects	yes	yes	yes	yes
Year effects	yes	yes	yes	yes
# Observations	25,833	6,858	10,017	8,958

Notes: The table reports results from regression analysis explaining block holdings of grey institutional investors in European firms by a Continental Europe dummy, firm characteristics, industry and year effects. Model (1) examines the full sample period, Model (2)-(4)different sup-periods. Continental Europe is a dummy variable indicating that the firm's corporate headquarter is located on the continent. Firm size is measured by (the logarithm of) total assets, sales growth is the 1-year growth in net sales, Leverage is total debt deflated by total assets, Firm risk is the 2-year stock monthly volatility, Stock Market Liquidity is annual turnover in the stock market deflated by GDP, and Stock Market Size is the market capitalization of domestic stock deflated by GDP. All models control for industry and year fixed effects. Standard errors allow for heteroscedasticity and clustering on country level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.
Source: Own analysis based on data Thomson/Reuters Datastream and from Thomson One Banker Ownership Module as described in Rapp/Trinchera (2013).

Table 11: Grey institutional investors and minority shareholder rights, 1999-2008

Overall our results strongly support the case for improving minority shareholder protection rights, as this would attract more independent institutional investors who, because of their

specific incentives, can be presumed to be more effective in their corporate governance efforts. Moreover, the results also indicate that the role of institutional investors can be very different depending on their respective incentives.

6.3 The case for a capital market policy programme

Summarizing the results presented in this study, it is possible to make some tentative suggestions for a policy programme aimed at enhancing the role of capital markets. We have presented robust evidence that capital markets support economic development, such that capital markets could play an important role in pursuing the goals of the Europe 2020 growth strategy, as set out by the leaders of the EU member states. Accordingly, the following long-term measures are worth considering:

- European capital markets to some extent are still fragmented as far as corporate governance rules are concerned. In order to make listed companies in Europe even more attractive for institutional investors, minority shareholder protection rules should be improved and better harmonized. Moreover, the role of independent institutional investors could be enhanced by increased transparency and by a recognition of the importance of active, rather than passive, investment strategies.
- Retirement savings rules and tax laws should be designed in a way that encourages a larger part of national savings to be invested through the capital markets. This would not only give a boost to these markets, but because of the externalities discussed here, would also enhance economic development at large. Moreover, funded pension schemes will help societies to deal with the challenges associated with increasing longevity, as will the development of the wider asset management sector.
- We have argued in this study that the positive impact of capital markets on economic development is related to their superior capacity to finance long-term investments by sourcing capital from many sources, including asset managers (pension funds; mutual funds; hedge funds; private equity funds). The Commission itself has acknowledged that long-term financing is a major issue in enhancing the competitiveness of the EU.[54] This is even more true since credit markets will be less

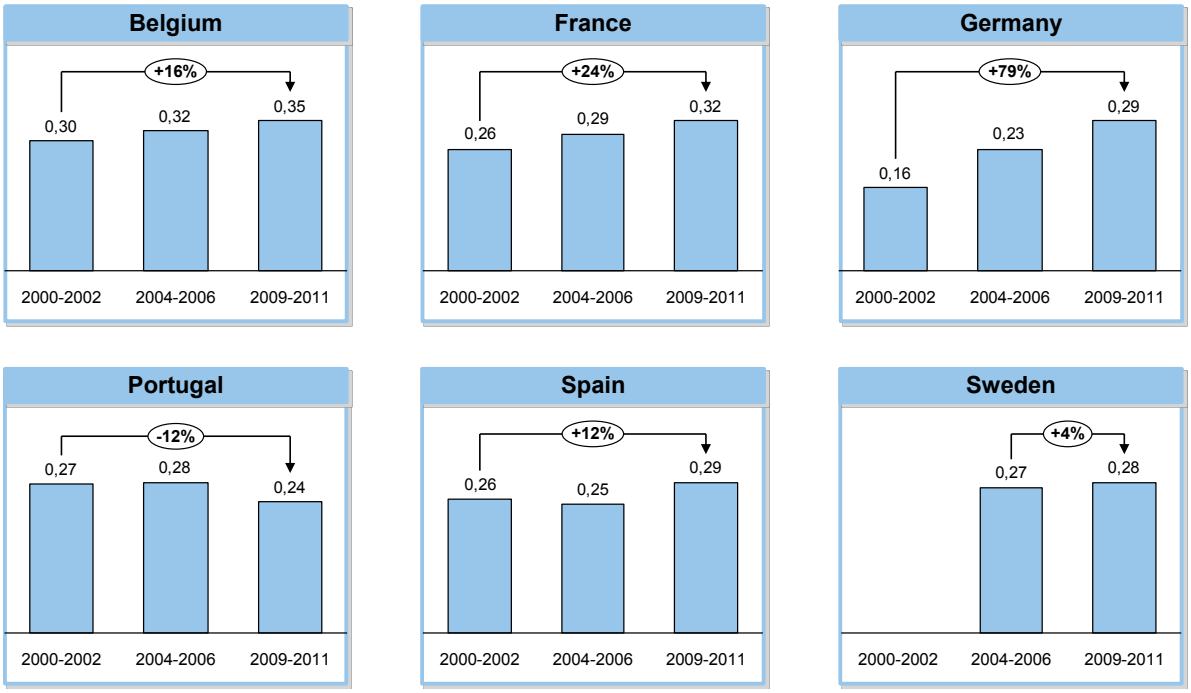
[54] Cf. the Commission's Green Paper on Long-Term Financing of the European Union released on March, 25, 2013.

able to fulfil this role in the future because of new regulations, such as the Capital Requirements Regulation (CRR) for banks and the Solvency II regulation for insurance companies. Therefore, the capacity for capital markets to provide long-term investment should be further enhanced by appropriate measures with respect to access to capital markets and tax laws.

7 Appendix A: Financing of non-listed firms in Europe

In this appendix we use data from the BACH (Bank for the Accounts of Companies Harmonized) database[55] to provide some insights into the increasing importance of equity financing outside listed firms, which are in the focus of much of our analysis.

Therefore, Figure 28 plots the fraction of total assets financed by equity for the population of companies in the Central European countries covered by the BACH database. Specifically, the figure illustrates the financing decision of the median firm, which most likely will be a private (non-listed) firm in these countries.



Notes: This figure illustrates the increasing importance of equity financing for European non-financial enterprises. Specifically, it plots the fraction of total assets financed by equity for the median firm covered for three different time periods and reports the relative increase from the 2000-2002 to the 2009-2011 period. Countries are organized in alphabetical order. The analysis reflects all enterprises from the six countries covered by the BACH database over the years 2000-2011.
Source: Own analysis based on data from BACH (Bank for the Accounts of Companies Harmonized) Data Base.
Figure 28: Equity financing of European non-financial enterprises, 2000-2011

One can easily see, that with the exception of some of the Southern European countries (here Portugal and Spain), firms have tended to rely more on equity financing over the period 2009 to 2011 than they did over the periods 2000 to 2002 or 2004 to 2006. While this

[55] The BACH database is one of the very few databases that provides broad harmonized cross-country accounting data for listed and unlisted firms. It is managed by the European Committee of Central Balance-Sheet Data Offices (ECCBSO), which is an informal body of experts from National Central Banks and National Statistical Institutes of the European Union (BACH, 2013). The database is maintained by the Banque de France. For details see: http://www.bach.banque-france.fr/index.php?page=telechargementFile&file=BACH_Brochure.pdf

trend is particularly pronounced for German firms, the median French firm has also increased its equity financing by 25 percent over the last decade.

8 Appendix B: Data

In this Section, we describe the data used in our analysis.

8.1 Macro Data

Country-level data is collected from the World Bank (World Bank Open Data), the Bank for International Settlements (BIS statistics), the Financial Development and Structure Dataset (Version: November 2013), and the academic literature. In our definitions, we mostly follow Demirgüç-Kunt/Feyen/Levine (2013) as illustrated in the following Table 12.

Variable	Desription	Source
GDP per capita (log)	Logarithm of real GDP per capita (constant 2000 USD)	World Bank Open Data
Private credit	Domestic credit provided to private sector (% of GDP)	World Bank Open Data
Capital market depth	Aggregate of Stock market depth and Bond market depth	World Bank Open Data
Stock market depth	Market capitalization of listed companies (% of GDP)	World Bank Open Data
Bond market depth	Private bond market capitalization (% of GDP)	Financial Development and Structure Dataset
Stock market liquidity	Value of stock market transactions per year (% of GDP)	World Bank Open Data
Openess of trade (log)	Logarithm of the sum of imports and exports (% of GDP)	World Bank Open Data
Inflation (in %)	Logarithm of (1+annual change in CPI) (in %)	World Bank Open Data
Government size (log)	Logarithm of government consumption (% of GDP)	World Bank Open Data
Years of schooling (log)	Logarithm of (1+average years of schooling (15 years))	Barro/Lee (2013)
Market-based economy	Dummy variable indicating a market-oriented economy	Demirgüç-Kunt & Maksimovic (2002) and Demirgüç-Kunt & Levine (1999)
Bank-based economy	Dummy variable indicating a bank-oriented economy (inverse of Market-based economy)	Demirgüç-Kunt & Maksimovic (2002) and Demirgüç-Kunt & Levine (1999)
ASD	Anti-self-dealing index measuring legal protection of minority shareholders	Djankov et al. (2008)
ADRI	Revised anti-director-rights-index measuring legal protection of outside shareholders	Djankov et al. (2008)
AngloSaxon	Dummy variable indicating AngloSaxon Countries (in Europe: UK and Ireland)	n.a.
Continental Europe	Dummy variable indicating continental European countries (inverse of Anglo Saxon)	n.a.

Notes: This table reports details about the country-level variables used in our analysis.

Table 12: Definition and sources of variables for country level analysis

8.2 Micro Data

We use two types of data to examine firm behaviour. First, we use aggregated data from the BACH (Bank for the Accounts of Companies Harmonized) database managed by the European Committee of Central Balance-Sheet Data Offices and hosted by the Banque de France. This database provides harmonized accounting data of non-financial European

enterprises aggregated at a country level. Second, we use actual firm-level data. This data is either from Thomson/Reuters or hand collected.

Specifically, firm-level accounting and capital market data are drawn from Thomson/Reuters Datastream and Thomson/Reuters Worldscope. Ownership data is from the ownership module of Thomson One Banker and from Thomson/Reuters Datastream. Data on code compliance is hand-collected from annual reports. For some analyses we complement the firm-level data with the macro-level data set described above. Details of our data generation process are described below.

Accounting and capital structure data: Initially, we identify all active or inactive securities reported in Thomson/Reuters Datastream and registered once in one of the following countries [Germany, Belgium, Denmark, Spain, Finland, France, Greece, Ireland, Italy, Luxembourg, Netherlands, Austria, Portugal, Sweden, United Kingdom, United States]. This provides us with two samples, which consist of more than 34,000 securities:

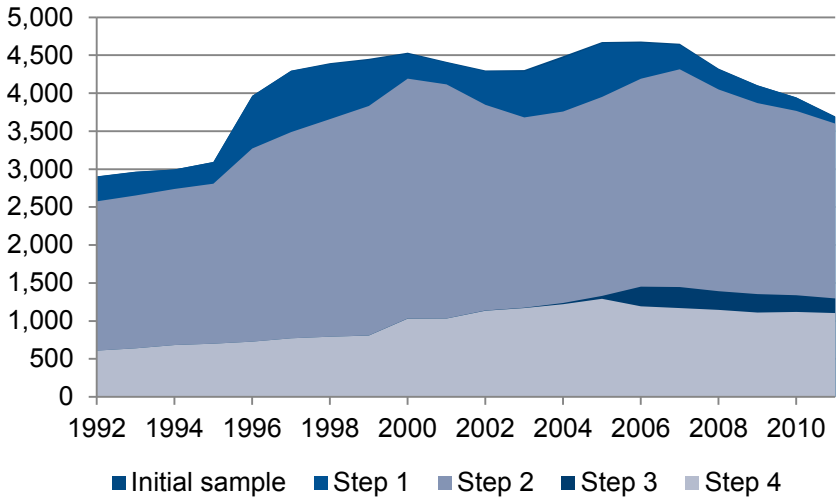
- ⇨ European sample: Germany, Belgium, Denmark, Spain, Finland, France, Greece, Ireland, Italy, Luxembourg, Netherlands, Austria, Portugal, Sweden, United Kingdom
- ⇨ Extended sample: European sample plus United States.

Next, we classify countries as market-based or bank-based economies following Demirgüç-Kunt & Maksimovic (2002) and Demirgüç-Kunt & Levine (1999), with Denmark, Netherlands, Sweden and the UK qualifying as market-based. Finally, we use a multi-step procedure to clean the data.

First, we restrict our sample to securities that relate to firms which are classified as primary listings, major share types and equity share types in order to avoid duplicates due to multiple listings. *Second*, we exclude all securities issues by firms with headquarter location outside the country of the (primary) exchange at which the security is listed. *Third*, we exclude all securities referring to financial firms (identified by SIC Codes ranging from 6,000 through 6,999, respectively).

For the remaining securities, we draw accounting data and capital market data from Thomson/Reuters Worldscope. Our sample only starts in 1992 to ensure reasonable data

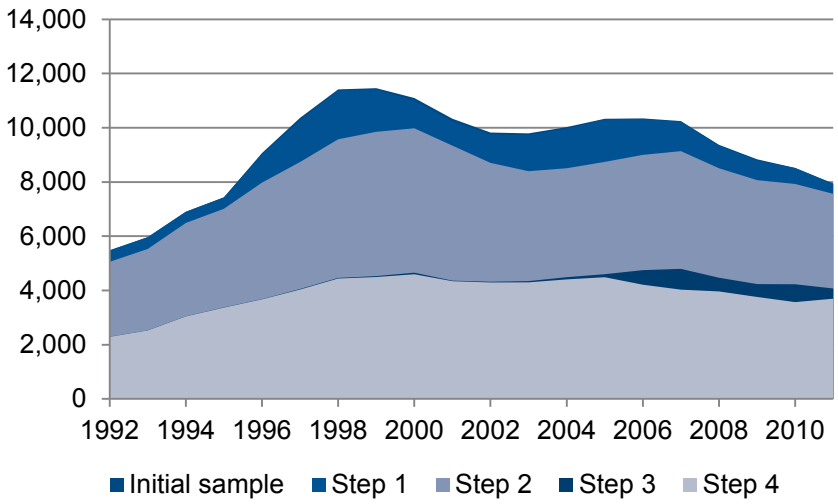
quality (cf. Brückner, 2013). Additionally, we exclude observations with data inconsistencies, e.g. observations with missing or negative values for total assets, net sales, total common equity and observations for which the value of cash dividends exceeds net sales. To ensure comparability, all absolute figures are converted into EURO based on annual (average) exchange rates.



Notes: This figure illustrates the sample selection process for our firm-level micro-data for European listed companies. Starting from our initial sample, in Step 1 (2, 3, and 4) observations with limited information on financing decisions and cash holdings (market capitalization, research and development expenses (R&D), and ownership concentration) are eliminated.
Source: Own analysis based on data from Thomson/Reuters.

Figure 29: Illustration of micro-data data set with firm-level information for European listed non-financial firms (European sample)

Overall, our final sample consists of 20,467 (8,552 excluding the US) firms with at least one valid firm year observation (i.e. at least reporting total assets). This yields 181,378 firm year observations for our main sample period (81,192 excluding the US). Thereof, 76,111 firm year observations have non-missing data for total assets, total liabilities (total debt and total common equity), cash and short term investments, market capitalization, research and development expense, and closely held shares (19,459 excluding the US).



Notes: This figure illustrates the sample selection process for our firm-level micro-data for European and US listed companies. Starting from our initial sample, in Step 1 (2, 3, and 4) observations with limited information on financing decisions and cash holdings (market capitalization, research and development expenses (R&D), and ownership concentration) are eliminated.
Source: Own analysis based on data from Thomson/Reuters.

Figure 30: Illustration of micro-data data set with firm-level information for listed non-financial firms from European and the US (Extended sample)

Data for IPO analysis: To study the effect of a listing at a public equity market, we carefully identify the IPO events for firms in our European sample (see above). Effectively, we restrict our European sample in several steps. *First*, we examine whether the year of the firm's initial listing falls within our sample period. Therefore, we analyse the time-series of the security's stock market data as provided by Thomson/Reuters Datastream. We then eliminate all firms with either initial listing date prior to 1992 or for which we cannot identify the year of the initial listing. *Second*, for the remaining firms we restrict the set of firm-year observations to four, starting one year before the year of the initial listing and ending two years after the initial listing. *Third*, to mitigate selection issues we only consider firms for which we obtained reasonable data (i.e. at least total assets) for all four consecutive years. *Fourth*, we re-labelled the firm-year observation (within the four consecutive years) such that the first year of the observations was labelled "IPO year - 1", the second year "IPO", and so on. Finally, since we aim to examine all IPOs simultaneously, we re-scale firms' accounting data to real values (constant 2005 EUR). Overall, we end up with identifying 1,559 IPOs with reasonable data.

Data for ownership analysis: We use two types of ownership data, block holdings and free float. Information on large shareholders (block holders) and their identities is extracted from the ownership module of Thomson One Banker. Data on free float is from Thomson/Reuters Datastream. Block holdings are defined to represent blocks of at least 5 percent. Since there

are some issues with ownership data from Thomson One Banker, we carefully screen the data and adjust it using various sources when necessary (see Rapp/Trinchera, 2011).

Data for code compliance analysis: To examine compliance behaviour of German firms we carefully read the 'declarations of conformity' reported in the annual report of all prime standard firms for 2006-2011. Since compliance levels are – by construction of the German Corporate Governance Code – generally very high, we restrict our analysis to 'neuralgic' code recommendations (e.g. v. Werder et al., 2005; Rapp et al., 2013; Rapp/Kohl, 2013). Overall, we examine compliance behaviour of 313 firms along with more than 1,500 firm-year observations.

Variables for firm-level analysis: The following table summarizes our main variables in for the firm-level analysis.

Variable	Description	Source
Book leverage	Total debt to funds provided by investors, i.e. total debt, preferred stock, and total common equity. Total debt is book value of current and long-term interest-bearing debt.	Thomson/Reuters Datastream Worldscope
Dividend paying firm	Dummy variable indicating whether a firm did pay dividend in a particular year	Thomson/Reuters Datastream Worldscope
Equity ratio	Shareholder equity to total assets. Shareholder equity is common equity and preferred stock.	Thomson/Reuters Datastream Worldscope
Liquidity	Cash and short-term investments to total assets	Thomson/Reuters Datastream Worldscope
Market leverage	Total debt deflated by the market value of the firm. Market value of the firm is market value of common equity plus book value of preferred stock and total debt.	Thomson/Reuters Datastream Worldscope
Net book leverage	Net debt to funds provided by investors, i.e. total debt, preferred stock, and total common equity. Net debt is total debt less cash and short-term investments.	Thomson/Reuters Datastream Worldscope
R&D intensity	Research and Development expenses deflated by total assets	Thomson/Reuters Datastream Worldscope
VOFF	Value of financial flexibility as described in Rapp et al. (2012)	Rapp et al. (2012) with data from Thomson/Reuters Datastream Worldscope

Code compliance	Compliance with 'neuralgic'' code recommendations as described in Kohl/Rapp (2013)	Kohl/Rapp (2013) with data hand collected from annual reports
Ownership concentration (Closely held shares)	Fraction of shares held by insiders, e.g. shares held by officers, directors and their immediate families, shares held in trust, shares of the company held by any other corporation, pension/benefit plans, and hares held by individuals who hold 5% or more of the outstanding shares.	Thomson/Reuters Datastream Worldscope

Notes: This table reports details about the firm-level variables used in our analysis.

Table 13: Definition and sources of most important variables for firm-level analysis

8.3 Pension Fund Data

We use pension fund data as provided by Global Pension Statistics' project compiled by the OECD. Starting from the year 2001 pension data is provided for up to 47 countries. Data can be downloaded from stats.oecd.org including detailed information on data generation. Additional description can also be found in OECD (2005).

For the purpose of our study we were interested in pension fund assets as a share of GDP. A pension fund is defined as a "pool of assets forming an independent legal entity that are bought with the contributions to a pension plan for the exclusive purpose of financing pension plan benefits. The plan/fund members have a legal or beneficial right or some other contractual claim against the assets of the pension fund. Pension funds take the form of either a special purpose entity with legal personality (such as a trust, foundation, or corporate entity) or a legally separated fund without legal personality managed by a dedicated provider (pension fund management company) or other financial institution on behalf of the plan/fund members."

8.4 Classification of Countries

For the empirical analysis, we classify European countries along two dimensions. *First*, we differentiate market-based and bank-based economies. Specifically, we adopt the classification proposed by Demirgüç-Kunt & Levine (1999). The authors develop a country-level index (*structure index*), which is a conglomerate construct based on (measures of) size, activity and efficiency of a country's financial structure. Thereby, measures of financial structure are defined as stock market development relative to banking sector development,[56] such that higher index values characterize market-based economies. Taking into account the overall development of the financial system in an economy, Demirgüç-Kunt

[56] See Section III.D and Table 11 in Demirgüç-Kunt & Levine (1999).

& Levine (1999) classify four (six) of our sample countries as market-based: Denmark, Netherlands, Sweden and the United Kingdom (as well as Switzerland and the United States).[57] *Second*, we differentiate between countries with a common law legal system on the one hand and Continental European countries on the other.

[57] We note that Demirgüç-Kunt & Maksimovic (2002) refer to the same logic when classifying their sample firms. However, there are small deviations between the initial classification in Demirgüç-Kunt & Levine (1999) and the later classification in Demirgüç-Kunt & Maksimovic (2002). For our sample this refers to Denmark (and Switzerland), which are considered market-based in Demirgüç-Kunt & Levine (1999), while Demirgüç-Kunt & Maksimovic (2002) classifies them as bank-based. In the analysis, we adopt the initial classification (i.e. we follow Demirgüç-Kunt & Levine, 1999). Our results, however, remain unaffected when we opt for the later classification.

9 References

Acharya, V. V., P. Schnabel and G. Suarez (2013): *Securitization without risk transfer*, Journal of Financial Economics, vol. 107, pp. 515-536.

Aguilera, R. V. and A. Cuervo-Cazurra (2004): *Codes of good governance worldwide: What is the trigger?*, Organization Studies, vol. 25, pp. 415–443.

Aguilera, R. V. and A. Cuervo-Cazurra (2009): *Codes of good governance*, Corporate Governance: An International Review, vol. 17, pp. 376–387.

Allen, F. and D. Gale (2000): *Comparing Financial Systems*, MIT Press, Cambridge.

Arcot, S. and V. Bruno (2013): *Board governance and dominant shareholders: Substitutes or complements?*, Working Paper.

BACH (2013): *BACH Brochure*, Available at: http://www.bachesd.banque-france.fr/ (Version November 2013).

Bates, T.W., K.M. Kahle and R.M. Stulz (2009): *Why do U.S. firms hold so much more cash than they used to?*, Journal of Finance, vol. LXIV, pp. 1985-2021.

Barro, R.J. and J.W. Lee (2013): *A new data set of educational attainment in the world, 1950–2010*, Journal of Development Economics, vol. 104, pp. 184-198.

Bessler, W., W. Drobetz, R. Haller and I. Meier (2013): *The international zero-leverage phenomenon*, Journal of Corporate Finance, vol. 24, pp. 1-57.

Berger, A. N. and L. J. Mester (2003): *Explaining the dramatic changes in performance of US banks: Technological change, deregulation, and dynamic changes in competition*, Journal of Financial Intermediation, vol. 12, pp. 57-95.

Billio, M., M. Getmansky, A. W. Lo and L. Pelizzon (2012): *Econometric measures of connectedness and systemic risk in the finance and insurance sectors*, Journal of Financial Economics, vol. 104, pp. 535-559.

Brav, O. (2009): *Access to capital, capital structure, and the funding of the firm*, Journal of Finance, vol. 64, pp. 263-308.

Brounen, D., A. de Jong, and K. Koedijk (2006): *Capital structure policies in Europe: Survey evidence*, Journal of Banking & Finance, vol. 30, pp. 1409–1442.

Brückner, R. (2013): *Important characteristics, weaknesses and errors in German equity data from Thomson Reuters Datastream and their implications for the size effect*, SSRN-Working Paper. Available at http://ssrn.com/abstract=2243816.

Calderón, C. and L. Liu (2003): *The direction of causality between financial development and economic growth*, Journal of Development Economics, vol. 72, pp. 321–334.

Christopoulos, D. K., and E. G. Tsionas (2004): *Financial development and economic growth: Evidence from panel unit root and cointegration tests*, Journal of Development Economics 73, pp. 55–74.

CRA (2009): *Evaluation of the economic of the Financial Services Action Plan*. Final report prepared for the European Commission, available at http://ec.europa.eu/internal_market/finances/docs/actionplan/index/090707_economic_impact_en.pdf.

Demirgüç-Kunt, A., E. Feyen and R. Levine (2013): *The evolving importance of banks and securities markets*, World Bank Economic Review, vol. 27, pp. 476-490.

Demirgüç-Kunt, A. and V. Maksimovic (2002): *Funding growth in bank-based and market-based financial systems: Evidence from firm-level data*, Journal of Financial Economics, vol. 65, pp. 337–363

Demirgüç-Kunt, A. and V. Maksimovic (1998): *Law, finance and firm growth*, Journal of Finance, vol. 53, pp. 2107-2137.

Demirgüç-Kunt, A., and R. Levine (1999): *Financial structures across countries: Stylized facts*, Mimeograph, World Bank, Washington, DC.

Demirgüç-Kunt, A., and R. Levine (2001): *Financial Structures and Economic Growth*, MIT Press, Cambridge.

Denis, D. J. and S. B. McKeon (2012): *Debt financing and financial flexibility – Evidence from proactive leverage increases*, Review of Financial Studies, vol. 25, pp. 1897-1929.

Djankov, S., R. La Porta, F. Lopez-de Silanes and A. Shleifer (2008): *The law and economics of self-dealing*, Journal of Financial Economics, vol. 88, pp. 430–465.

Edmans, A. (2013): *Blockholders and corporate governance*. ECGI - Finance Working No. 385.

Eklund, J. E. and S. Desai (2013): *Ownership and allocation of capital: Evidence from 44 countries*, Journal of Institutional and Theoretical Economics, forthcoming.

Fan, J.P.H, S. Titman, and G. Twite (2008): *An international comparison of capital structure and debt maturity choices*, Journal of Financial and Quantitative Analysis, vol. 47, pp. 23–56.

Frame, W. S. and L. J. White (2004): *Empirical studies of financial innovation: Lots of talk, little action?* Journal of Economic Literature, vol. 42, pp. 116-144.

Frank, M., and V. Goyal (2009): *Capital structure decisions: Which factors are reliably important?*, Financial Management, vol. 38, pp. 1–37.

Franks, J., and C. Mayer (2001): *Ownership and control of German corporations*, Review of Financial Studies, vol. 14, pp. 943-977.

Gennaioli, N., A. Shleifer and R. Vishny (2012): *Neglected risks, financial innovation and financial fragility*, Journal of Financial Economics, vol. 104, pp. 452-468.

Graham, J. R., and C. Harvey (2001): *The theory and practice of corporate finance: Evidence from the field*. Journal of Financial Economics, vol. 60, pp. 187–243.

Greenbaum, S. I. and A. V. Thakor (1987): *Bank funding modes: Securitization versus deposits*, Journal of Banking and Finance, vol. 11, pp. 379-401.

Griffin, J. M., J. Nickerson and D. Y. Tang (2013): *Rating shopping or catering? An examination of the response to competitive pressure for CDO credit ratings*, Review of Financial Studies, vol. 26, pp. 2270-2310.

Guiso, L., P. Sapienza, and L. Zingales (2004): *Does local financial development matter?* Quarterly Journal of Economics, vol. 119, pp. 929–969.

Hsu, P.-H., X. Tian and Y. Xu (2014): *Financial development and innovation: Cross-country evidence*, Journal of Financial Economics, Vol. 112, pp. 116–135.

Jones, C. M. (2002): *A century of stock market liquidity and trading costs*, SSRN Working Paper.

Killi, A., M.S. Rapp and T. Schmid (2012): *The value of financial flexibility and capital structure decisions – Empirical evidence from Europe*. 2012 Annual Meeting of the German Finance Association Paper.

Kim, E.H. and Y. Lu (2013): *Corporate governance reforms around the world and cross-border acquisitions*, Journal of Corporate Finance, vol. 22, pp. 236–253.

King, R. G. and R. Levine (1993): *Schumpeter might be right*, Quarterly Journal of Economics, vol. 108, pp. 717-737.

Kohl, C. and M.S. Rapp (2013): *Family firms and standardization of governance: Evidence from the German corporate governance code*. Paper presented at the 6th Workshop on Accounting and Regulation in Siena (Italy).

La Porta, R., F. Lopez-de Silanes and A. Shleifer (1999): *Corporate ownership around the world*, Journal of Finance, vol. 54, pp. 471-517.

La Porta, R., F. Lopez-De-Silanes, A. Shleifer and R. Vishny (1998): *Law and finance*, Journal of Political Economy, vol. 106, pp. 1113-1135.

La Porta, R.,F. Lopez-de-Silanes, A. Shleifer, and R. Vishny (1997): *Legal determinants of external finance*, Journal of Finance, vol. 52, pp. 1131–1150.

Law, S. H. and N. Singh (2013): *Does too much finance harm economic growth?* Journal of Banking and Finance, vol. 41, pp. 36-44.

Levine, R. (2002): *Bank-based or market-based financial systems: Which is better?* Journal of Financial Intermediation, vol. 11, pp. 398-428.

Levine, R. (1997): *Financial development and economic growth: Views and agenda*, Journal of Economic Literature, vol. 35, pp. 688–726.

Levine, R. and S. Zervos (1998): *Stock markets, banks, and economic growth*, American Economic Review, vol. 88, pp. 537–558.

Levine, R. and T. Beck (2004): *Stock markets, banks, and growth: Panel evidence*, Journal of Banking and Finance, vol. 28, pp. 423-442.

Martynova, M. and L. Renneboog (2011): *Evidence on the international evolution and convergence of corporate governance regulations*, Journal of Corporate Finance, vol. 17, pp. 1531–1557.

Mayer, C. and O. Sussman (2001): *The assessment: Finance, law, and growth*, Oxford Review of Economic Policy, vol. 17, pp. 457-466.

McKinsey Global Institute (2013): *Financial globalization – Retreat or reset?,* available at http://www.mckinsey.com/insights/global_capital_markets/financial_globalization.

OECD (2005): *Private Pensions – OECD Classification and Glossary*. Available at http://www.oecd.org/daf/fin/private-pensions/globalpensionstatistics.htm.

Rapp, M. and O. Trinchera (2013): *Regulation and the anatomy of ownership structures in European listed firms*. SSRN Working Paper.

Rapp, M., T. Schmid and D. Urban (2013): *The value of financial flexibility and corporate financial policy*. Paper to be presented on the 2013 Annual Meeting of the German Finance Association.

Rapp, M., T. Schmid and M. Wolff (2011): *Hard or soft regulation of corporate governance?*. HHL Research Paper Series in Corporate Governance No. 6.

Rösch, C. and C. Kaserer (2013): *Market liquidity in the financial crisis: The role of liquidity commonality and flight-to-quality*, Journal of Banking and Finance, vol. 37, pp. 2284-2302.

Romano, R. (1998): *Empowering investors: A market approach to securities regulation*, Yale Law Journal, vol. 107, pp. 2359-2430.

Shin, H. S. (2009): *Securitisation and financial stability*, Economic Journal, vol. 119, pp. 309-332.

Shleifer, A. and R. W. Vishny (1997): *A survey of corporate governance*, Journal of Finance, vol. 52, pp. 737-783.

Wenger, E. and C. Kaserer (1998a): *German banks and corporate governance - A critical view*. In: Hopt, K. J., H. Kanda, M. J. Roe, E. Wymeersch and S. Prigge (ed.): Comparative Corporate Governance - The State of the Art and Emerging Research, pp. 499-536, Oxford University Press, Oxford, 1998.

Wenger, E. and C. Kaserer (1998b): *The German system of corporate governance - A model which should not be imitated*. In: Black, S. W., and M. Moersch (ed.): The German and Anglo-American Models, pp. 41-78, North-Holland Elsevier Science, Amsterdam et al., 1998.

Whitehouse, E. (2007): *Pensions Panorama*. World Bank, Washington.

v. Werder, A., T. Talaulicar and G. L. Kolat (2005): *Compliance with the German corporate governance code: an empirical analysis of the compliance statements by German listed companies*, Corporate Governance: An International Review, vol. 13, pp. 178–187.

Zingales, L. (2009): *The future of securities regulation*. Journal of Accounting Research, vol. 47, pp. 391–425.

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