The Role of Investment Banking for the German Economy

Final Report for Deutsche Bank AG, Frankfurt/Main

Michael Schröder, Mariela Borell, Reint Gropp, Zwetelina Iliewa, Lena Jaroszek, Gunnar Lang, Sandra Schmidt, and Karl Trela

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1 Introduction and Executive Summary

1.1 Motivation and Scope of the Study

The aim of this study is to assess the contributions of investment banking to the economy with a particular focus on the German economy. To this end we analyse both the economic benefits and the costs stemming from investment banking.

The study focuses on investment banks as this part of banking is particularly relevant for financing companies as well as the development and use of specific products to support the needs of private and professional clients. The assessment of benefits and costs of investment banking has been conducted from a European perspective. Nevertheless there is a focus on the German economy to allow a more detailed analysis of certain aspects as for example the use of derivatives by German companies, the success of M&As in Germany or the effect of securitization on loan supply and GDP in Germany. For comparison purposes other European countries and also the U.S. have been taken into account.

The last financial crisis has shown the negative impacts of banks on the financial system and the whole economy. In a study on the contribution of investment banks to systemic risk we quantify the negative side of the investment banking business.

In the last part of the study we assess how the effects of regulatory changes on investment banking. All important changes in banking and capital market regulation are taken into account such as Basel III, additional capital requirements for systemically important financial institutions, regulation of OTC-derivatives and specific taxes.

1.2 Outline of the Study

The structure of the study aims at considering the following aspects of investment banking. First, an overview of the worldwide and European activities of investment banks is given. Second, empirical relationships between investment banks and the German economy are investigated. The main activities of investment banking that are included are, in particular, equity and debt financ-

ing, mergers and acquisitions, securitized products, and derivatives. The developments of these activities are analyzed over time and cross-country. From this, the study infers on the economic relevance of investment banking. Finally, investment banking in an environment of systemic risk and changing regulatory rules is considered.

One part of the investment banking business is not taken in to account: Proprietary trading. This is mainly due to the lack of appropriate data to investigate the costs and benefits of proprietary trading for the capital markets and the economy.

In the following, the aims and scopes for each item are presented.

Investment Banking and Growth

First of all, the study provides a comprehensive definition of investment banking. Then, a review of the theoretical and empirical literature gives an overview of the findings of academic research on the contributions of (investment) banking for the economy. In the this literature review, the relationships between the development of the financial sector and economic growth are investigated. This section also considers the direction of causality between the financial system and the development of the economy.

Empirical Analysis of the Contributions of Investment Banking to the Economy

- **Financial Advisory with focus on mergers and acquisitions advisory**

An in-depth analysis on the use and the perceived benefits of investment banking products, especially mergers and acquisitions (M&A) advisory by German companies is conducted. This research is based on a survey amongst the companies that are part of DAX, MDax and SDax. This survey is extended to further questions in the upcoming parts of the study. Throughout the analysis of all parts of the survey we, inter alia, investigate whether there are significant differences between companies of different size. In the M&A section, we address the use and perceived advantages of investment banks in M&A advisory.
M&A in Germany and their impact on productivity and profitability are investigated in the next in-depth study. M&A belongs to the core investment bank-

ing activities. Most transactions could not have been taken place without the support of investment banks. Our empirical study provides evidence on the causal relationship between firm performance and the participation in M&A and looks for the medium-term real economic gains from mergers.

- **Primary Market: Analysis of the relationship between securitized products, loans and GDP in Germany**

In this section the importance of primary markets and access to primary markets via investment banks is analysed. We start from a macroeconomic perspective and estimate the relationships between securitized products and both loan supply and GDP in Germany. In this part we also investigate the effects of the increasing use of securitizes products on credit and GDP growth. Then descriptive overviews of equity and debt financing form a basis for the understanding of the quantitative importance of products considered. The last part is the description and analysis the results of a company survey which is dedicated to the perceived benefits from capital market access for German companies.

- **Derivatives**

The role of derivates is assessed by a descriptive analysis of the derivatives market; and then complemented by literature review that considers the impact of derivatives on financial market characteristics as, for example, market efficiency and completeness.

A related literature review concentrates on the effects of exchange rate volatility on trade and the benefits of currency hedging and currency unions.

Using the companies survey on derivaties amongst German companies, it is finally be analysed why and to which end (e.g. hedging, speculation) companies are using derivatives. Of particular interest is the question how the use of derivatives changes the economic behaviour of the companies under consideration.

- **Investment Banks and Systemic Risk Spillovers**

This analysis refers to the assessment of the risk of investment banks, in particular the systemic risk stemming from investment bank activities. For this

purpose we estimate risk spillovers in a system of several financial sectors/institutions (commercial banks, insurance companies, investment banks, hedge funds). In addition, the risk contribution of specific single banks is analysed.

Implications of regulatory changes on investment banks

This part of the study is aimed to discuss the implications of recent and expected future regulatory changes on the business of investment banks and their contributions to the real economy. This includes the aspects of the changes from the Basel II to the Basel III regulatory framework as well as new taxes levied on banks and other regulatory measures that are currently discussed such as regulation of OTC derivatives.

2 Investment Banking and Growth

2.1 Investment Banking Definition

In the German universal banking system, banks perform tasks of both commercial banks and investment banks. In practice there is thus no uniform definition on investment banking in Germany. In the United States the Glass- Stegall Act of 1933 imposed a legal definition of investment banking for the purposes of strict legal separation between investment banking and commercial banking activities. The definition of investment banking has not been substantially changed since then although the Glass-Stegall Act has been amended by the Gramm-Leach-Bliley Act in 1999. This latter Act diluted the strict legal separation of activities. The year 2008 marks the bottom of the development of the special banking system since, in the course of the financial crisis, all investment banks in US had to convert to commercial banks. In general, in the US definition activities of investment banks are closely intertwined with services pertaining to capital market activities. This definition has been adopted in the prevailing general definition of investment banking in academic literature.

A first step in characterizing the activities of an investment bank can be done isolating them from the broad set of banking activities in a universal bank. The legal assignment of banking activities is provided in §1 KWG (Kreditweseng-

esetz). The main banking activities can be summarized by following categories: classic loan and deposit services (*Kreditgeschäft, Einlagengeschäft*); transaction banking (*Girogeschäft, E-Geld-Geschäft*); advisory activities (such as M&A advisory, PE and VC advisory, advisory in structured finance etc.); brokerage and origination (*Finanzkommissionsgeschäft, Emmissionsgeschäft*); custodian services (*Depotgeschäft*); trading and sales on the secondary market of a broad class of assets and financial market instruments (e.g. equity, bonds, foreign exchange, commodities etc. as well as derivatives and structured products) on behalf of clients as well as on the bank's own account; services connected to that such as research and strategy. Thereby classic loans and deposit services as well as transaction banking are the activities which are anonymously not included in the set of investment banking activities in the literature. Hartmann-Wendels et al. (2010, p. 23), for instance, consider the legal term „Finanzdienstleistungsinstitute" the German equivalent of investment banks. According to the legal definition of the functions of financial service providers ("Finanzdienstleistungsinstitute", §1a KWG), however, the term is rather broad as it also includes other financial service providers besides investment banks. Another issue is raised by the assignment of some financing activities closely intertwined with investment banking activities (e.g. financing of M&A transactions). Although in practice such financing activities may be considered a part of investment banking, the widespread definition of investment banking in academic literature refrains from assigning any financing functions to the term investment banking.

Hartmann-Wendels et al. (2010, p. 16) define investment banking as the set of "all functions of a bank, which support trading at financial markets". The common opinion in the literature is that investment banking comprises all services which serve financial allocation opportunities, as long as they are provided via securities transactions. Broadly speaking, investment banks assist "the capital market in its function of capital intermediation" (Subramanyam, 2008, p. 8.1). The emergence of financial intermediaries is owed to the market imperfections inherent in financial markets. They act as intermediaries between providers and users of financial capital to overcome these imperfections. A common function of investment banks as well as commercial banks is that they act as financial intermediaries, however, in different aspects. While commercial banks directly fulfill primary financial intermediation functions by

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taking deposits of investors and distributing this money to capital acquirers in the form of loans, investment banks rather act as financial intermediaries for capital market activities by enabling or facilitate trade between investors and capital acquirers on the capital market. Beside their role as an intermediary on the capital markets, investment banks further act as market participants by trading assets on their own account on the secondary market.

We can approach a description of the main investment banking activities by outlining their activities on the capital market. We distinguish between the intermediary activities of investment banks and proprietary trading. Intermediary activities divide into: (1) origination of investment banking products on the primary market, (2) financial advisory, (3) trading of existing products on the secondary market. In proprietary trading investment banks act as market participants on the secondary market themselves and trade diverse asset classes in their own name and for their own account. Figure 1 illustrates these investment banking functions.

In the primary market, where new securities are issued, investment banks occupy an important role. Besides the common debt financing through credits, corporations also have the opportunity to finance their business on the capital market with debt, e.g. by issuing bonds. Concerning the issuance of corporate bonds, investment banks participate in the origination process as well as in the distribution to potential investors.[1] Alternatively, a corporation may finance their business by issuing equity. This is done by executing an initial public offering (IPO) or a private placement. The tasks of an investment bank in the process of the IPO are among others the advisory before and during the issuance, the implementation of marketing activities (e.g. research reports), the determination of the price of the stock, the conduction of the transaction and the adoption of the risk of placing the stock (underwriting). Investment banks also help in placing, arranging or originating securitized products. Securitized products comprise products where different types of assets are pooled and sold as a security. Examples for those underlying assets are mortgages (mortgage-backed securities (MBS)), or other assets (asset-backed securities (ABS))

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[1] In some countries (e.g. USA, Canada, UK) investment banks also participate in the auction of government securities acting as primary dealers.

such as consumer credits or leasing claims. The process of securitization helps to make assets marketable that are normally illiquid. ABS and MBS have the advantage of the enhancement of the equity ratio, they help to diversify the financing situation of a corporation, they facilitate the interest rate risk management and they may have tax advantages. Those advantages are confronted by a high ratio of fixed costs, making this instrument only feasible for corporations with high capital needs. Investment banks also occur as originators of exchange traded derivatives. Derivatives have the advantage of generating cash-flows which cannot be structured by a combination of other products. Besides the mentioned products, investment banks also take part in the origination of certificates and hybrid form of capital and occur as a market maker. In this market maker function, the investment bank always offers an asking and a bid price in certain markets and thereby ensures liquidity on these markets.

The financial advisory function comprises all advisory services an investment bank performs on capital markets. These include among others the advisory of corporations in the purchase and sale of business shares. This may also take place off-market. In private equity, investment banks advise on equity investments in established corporations while venture capital concerns the financing of innovative early-stage companies which show high potential but also high investment risks. Investment banks further perform financial advisory on project finance, structured finance products, syndicated loans (loans provided by two or more banks) and in the rating of products and corporations. Nevertheless, the assistance in mergers and acquisitions (M&A) is the most prominent part of the financial advisory activities of an investment bank. As an acquisition, whether friendly or hostile, or a merger is no daily routine for the bidder as well as the target, normally both employ an investment bank, or a consortium of investment banks. The chosen investment bank accompanies the client through the whole M&A process by doing client analysis, due diligence, risk analysis, deal structuring (e.g. determination of the appropriate offer price), strategically and tactically supporting the negotiation process and developing a financing concept. Furthermore, in most cases a second opinion from an independent investment bank is inquired (fairness opinion).

The secondary market is where securities are traded after they have been issued. Investment banks act here on behalf of their clients. The securities are

thereby either traded in the bank's own name and on their own account and then sold further to the client (the bank thereby acts as a dealer) or directly traded in the client's name (brokerage). Trading is performed by the investment bank in a wide array of instruments, including for example foreign exchange, stocks, bonds, commodities, indices of various asset classes, certificates, derivatives and securitized products.

The tasks mentioned above are commonly attributed to investment banking. However, a uniform definition of investment banking is problematic as in the German universal banking system, for example, banks perform tasks of both commercial banks and investment banks. Throughout the current report we thus focus on a broad definition of banking activities in the German banking system focusing on their assignment to investment banking activities according to academic literature and according to the practical implementation.

Figure 1: Investment Banking Activities
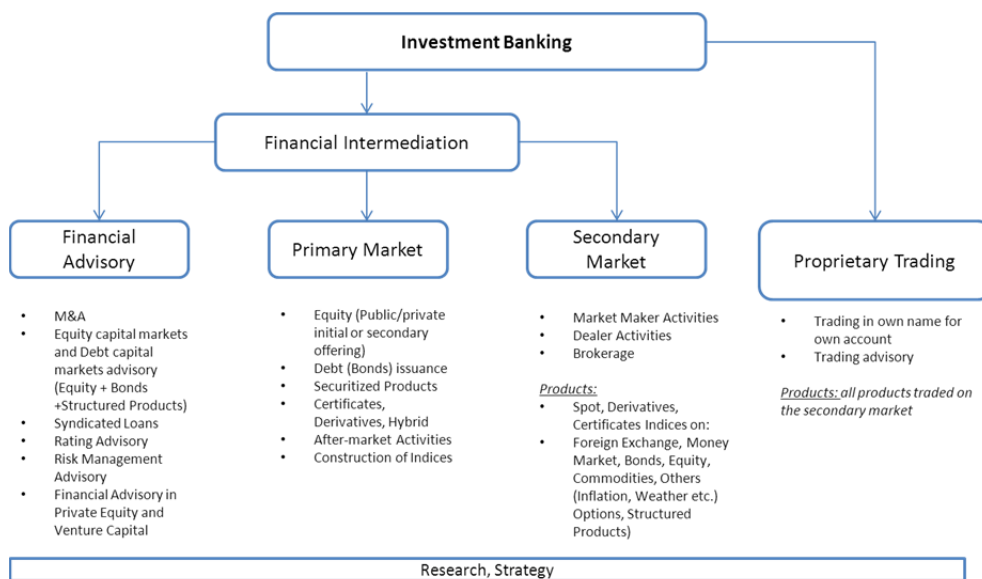
2.2 Finance and Growth Literature

2.2.1 Theoretical Literature

Levine (2005) subsumes five channels through which financial systems may have an effect on economic growth: Financial intermediaries *provide ex ante information, monitor investment, manage risk, mobilise savings* and *facilitate the exchange of goods and services*. Investment bank activities can be attributed to some of these channels, which are explained in more detail in the following.

Acquisition of ex ante information on firms or investment opportunities may involve high fixed costs for investors. Financial intermediaries can reduce these costs by utilising economies of scale in information acquisition (Boyd and Prescott, 1986) or provide higher quality information (Greenwood and Jovanovic, 1990). Investment banks provide ex ante information to market participants in various ways. First, within the scope of M&A advisory, investment banks specialise in information generation and value determination of companies. This information supports more efficient companies in taking over less efficient companies, which in turn should add to the efficiency of the entire economy. Second, prior to IPOs, investment banks distribute general information about the company to the public, which should reduce adverse selection costs. Moreover, the investment bank's sell side analysts provide information about shares in the secondary market. In fixed income, investment banks perform rating advisory and issuer evaluation, also a form of information generation. Finally, the market making position, which many investment banks perform on secondary markets, facilitates the efficient use of information.

Three risk ameliorations connected with financial intermediaries are identified by Levine (2005): cross-sectional risk, intertemporal risk and liquidity risk. In the literature a classic function of financial intermediaries is the cross-sectional diversification of individual risks from projects, companies, countries etc. This diversification may have an effect on resource allocation and saving rates and consequently on economic growth (King and Levine, 1993b). One important part of investment banking which serves for cross-sectional risk diversification is the emission of derivatives or structured finance products which can be used to hedge risk. In principle, these instruments relocate vari-

ous risks to agents most able and willing to bear them. Similarly, the design of syndicated loans is a form of cross-sectional risk diversification among the loan participating banks. Finally, the securitisation of assets (into e.g. CDOs, ABS, MBS, RMBS) distributes risks connected with the underlying pool of assets by enabling many investors to buy the different tranches associated with different risk levels. Securitisation also permits investors to diversify geographically and reduce exposure to locally correlated financial shocks.

Financial intermediaries may also serve for intertemporal risk diversification or maturity transformation by investing with long-run horizons. As shown in Allen and Gale (1997), when investors have a short-lived and intermediaries have a long time horizon, a financial system based on intermediation may induce higher welfare than a market-based system. Investment banks facilitate intertemporal risk diversification by performing a market making function and consequently lowering contracting costs. An example would be an investor holding a long-term bond and being able to sell it at a fair price.

Furthermore, financial systems may mitigate liquidity risk, the risk of inconvertibility of assets into a liquid medium of exchange. By pooling different illiquid assets, securitisation can reduce liquidity risk. But the market making performed by investment banks in the trade of various assets should also reduce liquidity risk. In general, information asymmetries and transaction costs can be lowered by the existence of financial intermediaries. Banks transform liquid short-term deposits and long-term illiquid investments (Diamond and Dybvig, 1983). More precisely, they can choose between low-return liquid investments (such as a deposit or a money market fund) and high-return illiquid investments (such as a corporate loan). If there are large enough frictions in financial markets (Diamond, 1991), banks can better insure savers against liquidity risks while at the same time fostering long-run high-return investments, which would be neglected by investors due to uncertainty about their future consumption needs. Financial intermediation is growth promoting by eliminating liquidity risk and therefore making investments in high-return illiquid asset more attractive compared to a liquid but unproductive asset (Bencivenga and Smith, 1991).

Mobilising or pooling of savings is collecting capital from different individual savers, which is connected with transaction costs and information asymme-

tries. Financial intermediaries may carry out this mobilisation, benefiting from economies of scale and thereby increasing savings. The pooling of savings may increase capital accumulation and technological innovation. With regard to investment banking, the emission of structured products, bonds and shares supports the mobilisation and pooling of savings.

2.2.2 Empirical Literature

Empirical literature on finance and growth deals with financial development in general, which may include the development of the banking sector, stock market and legal environment. Unlike with theoretical literature however, the results of these empirical studies cannot be explicitly interpreted for investment banking. Nevertheless, since investment banking can be regarded as a part of financial development, the results presented in the following may indicate a tendency for the effect of investment banking on the economy.

Cross-Country

First empirical work on the correlation between financial development and economic growth was conducted in the form of cross-country or cross-sectional studies. The main result is that credit matters for growth in the private sector and that financial development is a predictor for future economic growth as it captures about 60 percent of overall variation (King and Levine 1993a). Moreover, the long-run effect of financial development on growth is substantial. These positive growth effects exist both for countries with larger banking systems and for countries with more liquid stock markets (Levine and Zervos, 1998). If investment banking enhanced stock market liquidity (e.g. via market making activities) this would imply a positive effect on growth.

The major problem with studies analysing the effect of financial development on economic growth is the direction of causality. Financial development may foster growth, but growth may generate larger financial institutions and markets. Even worse, just the expectation of future economic activity may give rise to a more developed financial system.

Subsequent literature addresses this issue with various econometric approaches and overwhelmingly comes to the conclusion that the direction of causality is indeed from finance to growth. Approaches such as Granger cau-

sality (Rousseau and Wachtel (1998)), the use of instruments for financial development such as legal origin (Levine, Loayza and Beck, 2000b) or accounting rules as a proxy for creditor rights enforcement (Levine, Loayza and Beck, 2000a) all suggest that financial sector development including more developed financial institutions and markets will result in a higher rate of sustainable growth. At the same time, the effect is small beyond a certain level of development as all countries at that level should converge in growth rates (Aghion et al., 2005).

Two further important results have emerged, but have not yet been widely confirmed. First, Loayza and Ranciere (2006) find a significant positive long-run relationship between financial development and output growth. In the short-run, however, this relationship is mostly negative. The negative short-run relationship between growth and financial sector development emphasises the trade-off between financial development and financial stability: Extensive financial development and financial innovation may result in banking or financial crises, higher volatility of output and periods with very high or very low growth. Second, Aghion et al. (2009) show that exchange rate volatility reduces productivity growth in financially underdeveloped countries and increases productivity in financially developed countries. This may be an indication that investment banking helps to hedge exchange rate risk, which in turn may have positive effects on the development of the tradable goods sector in an economy.

Industry Level / Firm Level

Another approach to tackle the causality issue is to analyse the relation of financial development and growth on industry level. Also this part of the literature confirms that financial development fosters economic growth and not vice versa. Better developed financial intermediation should help to overcome market frictions that drive a wedge between the price of internal and external financing. Industries which are naturally heavy users of external finance should benefit disproportionately more from financial development than other industries. The lower costs of external financing in financially developed countries should therefore facilitate firm growth in industries reliant on external finance. In fact, Rajan and Zingales (1998) find that industries which are naturally more reliant on external finance grow comparably faster in financially more

developed countries.[2] The impact of financial development on growth by influencing the availability of external financing is substantial.[3] Countries with less financial development and industries more dependent on external finance would experience the biggest increase in growth. Fisman and Love (2004) find that industry value added growth patterns are more correlated for country pairs with well-developed financial markets, as they are able to respond better to global shocks in growth opportunities. Moreover, financial development has a disproportionately positive effect in industries with a high share of small firms (Beck et al., 2008). Interestingly, Beck and Levine (2002) do not find bank-based nor market-based systems to be better in financing the expansion of industries dependent on external financing. Tadesse (2002) however, finds that while market-based systems economically outperform bank-based systems in financially developed countries, bank-based systems perform better among less financially developed countries. Hence, one could interpret that investment banking, which is more prevalent in market-based countries, is more important in financially already developed economies while commercial banking has a superior effect in financially underdeveloped economies.

Furthermore, while the overall impact of bank concentration on growth is negative, it fosters growth in industries which are dependent on external finance by easing credit access for younger firms (Cetorelli and Gambera, 2001).

If financial intermediation fosters productivity then investment in countries with larger capital markets should be more responsive to value added growth. Indeed, financial development is found to explain a significant part of variation

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[2] In this approach the particular mechanism through which financial development affects growth is external finance, which implies a direction of causality. These results are confirmed using different indicators of financial development (Beck and Levine, 2002), accounting for the effect of sound property rights on intangible-intensive industries (Claessens and Laeven, 2003) and even on a regional level (Guiso, Sapienza and Zingales, 2004).

[3] For example, firms in financially developed regions in Italy experience faster sales growth (Guiso, Sapienza and Zingales, 2004). A firm in the financially most developed region grows 5.7 percent faster than a firm in the least developed region. The per capita domestic product of the most developed region grows about one percent more than that of the least developed one. On an international level, if the EU were to reach the financial development level of the US, the overall growth of value added across all countries and all industries would grow by 0.7 percent (Guiso et al., 2005).

of the investment-output elasticity (Wurgler, 2000). Financially developed countries increase investment more in growing industries and decrease investment more in declining industries compared to financially underdeveloped countries.

Another theoretical mechanism to confirm the direction of causality from financial development on economic growth was established on the firm level. The hypothesis is that financial development removes impediments to investing in profitable growth opportunities. Demirgüç-Kunt and Maksimovic (1998) estimate the firms' potential growth rate in sales from internally available funds and short-term financing only and find that the financial development of both the stock market and the banking system have a positive effect on the firms' excess growth rates. In particular stock market turnover but not size and banking assets show a significantly positive relation.

Event Studies

Event studies represent another way to isolate the effect of financial development on economic growth without reverse causality issues. Events enhancing financial development or removing impediments are found to have an overall positive effect on economic growth. Bekaert, Harvey and Lundblad (2001, 2005) analyse countries that removed capital account restrictions between 1980 and 2000. They find that the annual per capita GDP growth rate in these countries increased by an average of 0.5% to 1%.[4] Henry (2000, 2001, 2003) analyses twelve Latin American and East Asian countries which liberalised their financial systems. He identifies that the growth effect of liberalisation mainly results from increased investment and not from increased productivity. In the period of 1970-1994, 38 US states removed branching restrictions and all states removed interstate bank ownership restrictions. Jayaratne and Strahan (1996) point out that banking deregulation increased real per capita state growth by 0.6 to 1.2 percentage points. Most of this effect results from higher productivity and not from increased investment. In particular, the reforms fostered competition, which in turn increased new firm incorporations

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[4] These results are robust to other reforms, e.g. privatisation, trade liberalisation or product market deregulation, which often coincide in reform packages.

(Black and Strahan, 2002) and enhanced productivity growth especially for small enterprises (Cetorelli and Strahan, 2006). Importantly, these liberating reforms were mainly driven by political factors and not by anticipation of future growth (Kroszner and Strahan, 1999), which means that growth can be assigned to the deregulation effect in this context. Bertrand, Schoar and Tesmar (2007) analyse the French banking deregulation from 1985 and find increased firm-level productivity mainly in bank-dependent sectors.

A natural experiment to quantify the impact of investment banks on the real economy (corporate clients) is given in the case of the bankruptcy of Lehman Brothers. Fernando et al. (2011) measure the impact the bankruptcy of the investment bank had on its corporate, non-financial clients one week after the event. The results indicate that the collapse has induced a stock decrease of slightly below 5% of Lehman's equity underwriting clients. In contrast, the event study has found no significant negative impact of the collapse on any other client group (debt underwriting clients, M&A clients, market-making clients and stock market advisory clients). The authors conclude that the main value of the investment bank has been in providing access to stock market financing.

Alternative Indicators for Financial Development

Most of the theoretical and empirical literature focuses on the development of the financial sector in general, using proxies such as private credit, deposits and stock market capitalisation. The investment banking products, however, differ from these general measures. Hartmann et al. (2007) propose alternative measures that fit the investment bank activity more adequately. Among others, one measure they propose is "financial innovation and market completeness" captured for example by the amount of securitised assets or by venture capital financing. These are measures of financial innovation which should make markets more complete and simplify investment and distribution of risk. Securitisation, which is usually performed by investment banks, transforms illiquid assets into sellable portfolios and hence distributes risk among several agents which are willing to take them. A second potentially investment-banking related indicator proposed is "transparency and information" of

financial markets which may be measured, for example, by dispersion of analysts' forecasts or pricing of firm-specific information.[5]

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[5] Hartmann et al. (2007) use the standard deviation of earnings per share divided by the level of EPS forecasts and R^2 of regressing stock prices on market factors, respectively.

3   Empirical Analysis of the Contributions of Investment Banking to the Economy

Whereas there is an extensive strand of literature on the economic benefits and costs of financial development to the best of our knowledge there is lack of both theoretical and empirical literature on the link between investment banks (or investment banking) and macroeconomic development. That is why we relate the theoretical literature to investment banking and conduct an own empirical analysis focusing on several important investment banking activities. A disaggregated analysis of separate investment banking activities is needed because of the lack of unambiguous definition of investment banking.

Within the scope of the study we cover the three main part of investment banking intermediation activities, typically categorized in financial advisory (chapter 3.1), primary market activities (chapter 3.2) and secondary market activities (chapter 3.3). All three categories are covered by a descriptive part, literature overview and interpretation, corporate survey results and own empirical analysis. In the financial advisory chapter we focus predominantly on M&A advisory but also cover further advisory activities within the scope of the corporate survey. The chapter on primary market activities contains descriptive statistics on equity capital markets/debt capital markets as well as securitised products, an own empirical analysis on securitised products, and survey results on the self-assessed benefits of capital market access. Because of the lack of data on other asset classes the secondary market activities of investment banks in chapter 3.3 focus on the asset class of derivatives only. Finally, we also perform in chapter 0 an empirical study on investment banks and systemic risk which analyses the potential downside of investment banking for financial markets and the economy.

One part of the investment banking business is not taken in to account: Proprietary trading. This is mainly due to the lack of appropriate data to investigate the costs and benefits of proprietary trading for the capital markets and the economy. In addition, the analysis of proprietary trading would make it necessary to consider also the topics "operational risk" and "pay for performance" which are far beyond the scope of this study.

Figure 2: Investment banking activities covered in the study
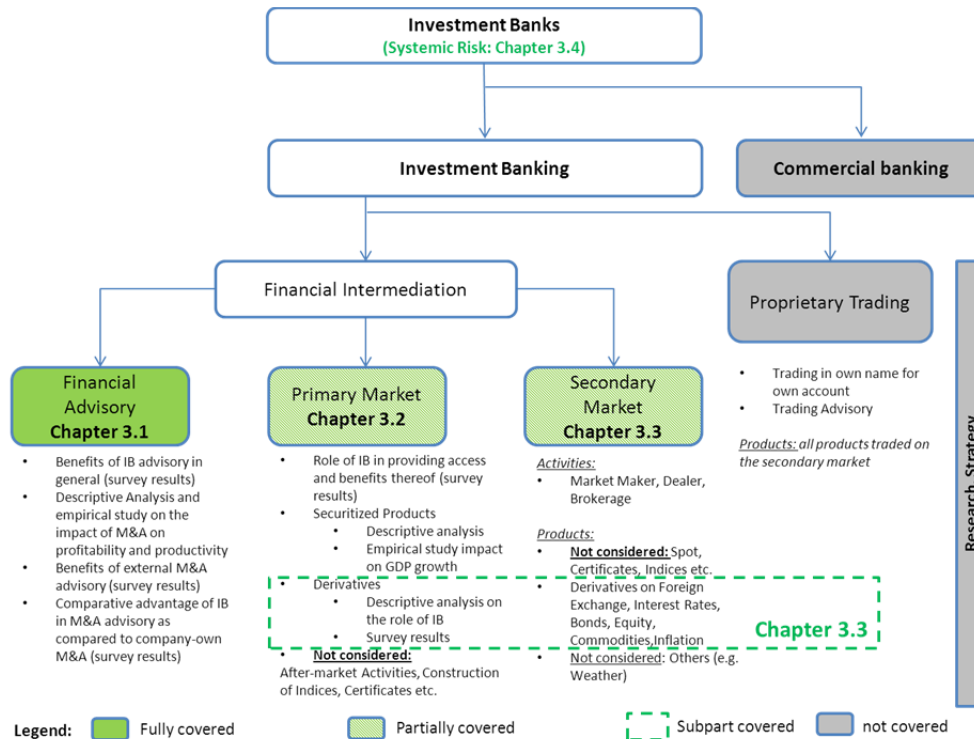
3.1 Financial Advisory with focus on M&A advisory

Companies can grow both organically and through M&A. As corporate transactions are characterized by a high level of complexity and require a set of competences and skills, companies usually hire a professional M&A advisor. The advisors support companies in the initiation, execution and closing of M&A transactions. The M&A advisory belongs to the core investment banking activities. Most transactions could not have achieved favourable conditions for the transaction parties or could not even have taken place without the support of investment banks. Thus, M&A is unthinkable without investment banks.

This section, firstly, describes the M&A market in Germany and the comparison of its development with the development of the markets in other European countries and in the US. Secondly, we present the results of a company survey on the corporate use of M&A advisory. Thirdly, we examine the impact of M&A on profitability and productivity of acquiring and target firms.

3.1.1 The M&A Market in Germany

Similar to the largest M&A markets—the US and the UK—the M&A market in Germany exhibits a cyclical wave pattern. The waves occur in a positive economic and political environment, during favourable debt market conditions and stock market booms. During the analysed time period from 1990 to 2010 M&A activity in Germany reached its peak in 2000 with an aggregate transaction value of 249 billion dollars.[6] However, excluding the acquisition of Mannesmann by Vodafone, which was the largest corporate acquisition in history with a value of nearly 203 billion dollars, the M&A activity in 2000 shows a similar level as in the previous and the following year (see Figure 3). Between the years 2006 and 2010 M&As showed a downward trend as the transactions in Germany similarly to the M&A activity in other countries, suffered from the uncertainty on the financial markets and the weaker economic development. In 2010, transactions for only 6.8 billion dollars were executed in Germany. This has been the lowest level since 1995.

Figure 3: Number and value of M&A transactions in Germany

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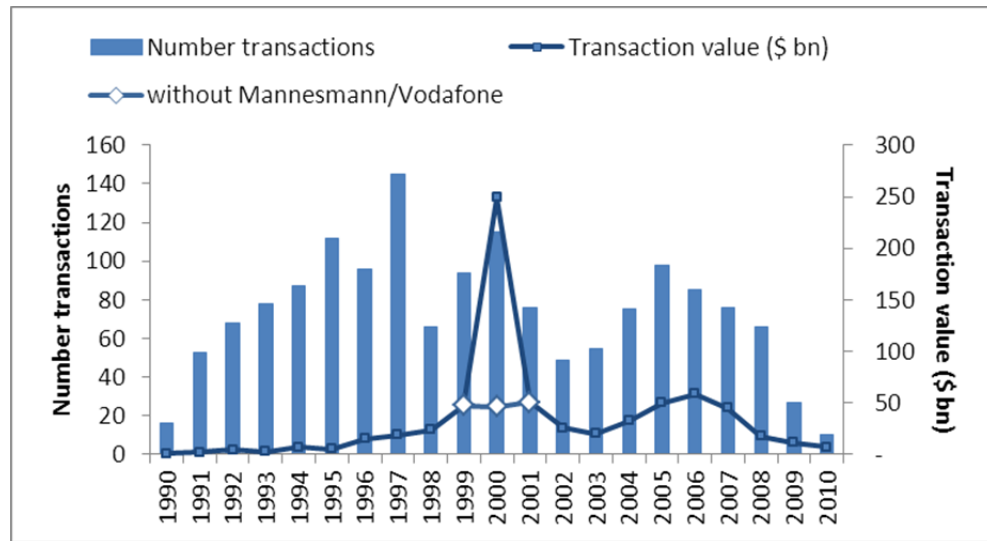
[6] In this section, the data on M&A transactions come from SDC Platinum Thomson Reuters. Access was provided by Deutsche Bank. We restrict the sample to transactions of companies with net sales of at least 50 million dollars in the previous twelve months. Furthermore, we exclude transactions with less than 25% of the shares merged or acquired.

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Figure 4 presents the development of M&A transaction value across countries and years. The analysis includes M&A deals between 1990 and 2010 of companies operating in Germany, France, Italy, the United Kingdom and the United States. Transactions with a government organisation (i.e., public administration) as an acquirer are excluded, as such deals are mostly rescue transactions of banks by governments after the financial crisis in the years 2008 and 2009.

Figure 4: M&A transaction value across countries
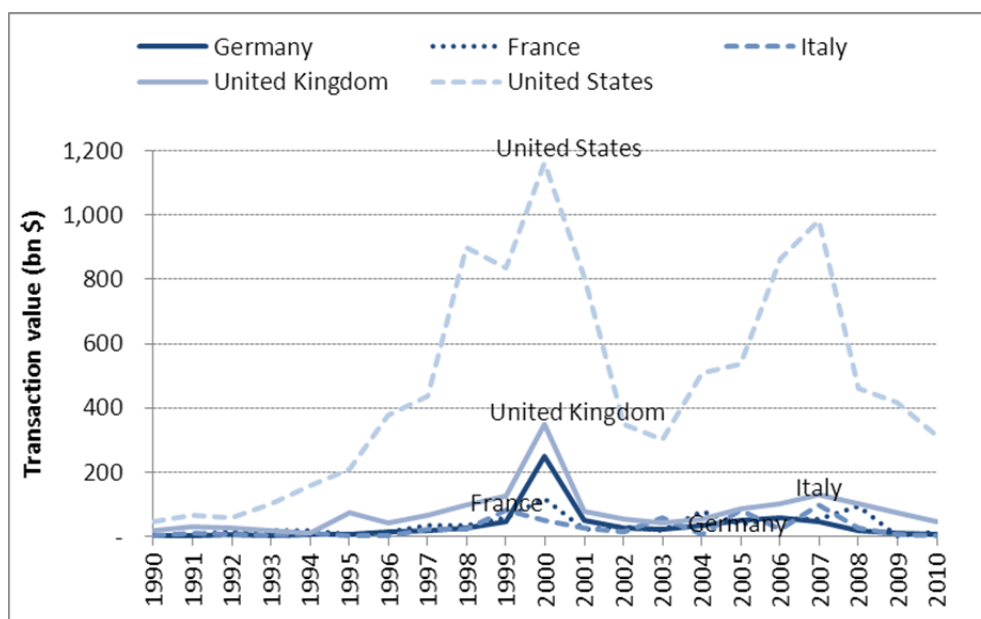
The waves of M&A activity in Germany, with highs in 2000 and 2006/2007, are consistent with the merger waves in other countries during the analysed time period, known as the fifth and the sixth merger wave. Starting in approximately 1993 as the world economy began to recover from the 1990-1991 recession, the fifth merger wave peeked in 2000 and ended in 2001 with the collapse of the Dot Com Bubble. The considered countries achieved an aggregated transaction value of 1.9 trillion dollars in 2000, which dropped to 441 billion dollars in 2003. From this low level the pace of merger activity increased to a total of 1.3 trillion dollars by the end of 2007. Among the principal factors are globalisation, encouragement by the governments of some countries (such as France and Italy) to create strong national or even global champions, the rise in commodity prices, the availability of low-interest financing, and the significant

growth of hedge fund activity as well as growth of private equity funds with an increase in leveraged buyouts.

Figure 5 displays M&A transaction value in Germany as a percentage of GDP. Before 1997, M&A transactions accounted for less than 1% of GDP. In 1997 the transaction value of M&A began to grow strongly, peaking in 2000 (11.7%) which, however, was mainly due to the mega-deal Mannesmann/Vodafone. Without the Mannesmann acquisition the value constituted 2.2% of GDP. It is obvious that in weaker phases the ratio of transaction value to GDP is below 1% and in stronger phases it is about and even above 2%. Following the peak of 2006, the transaction value diminished quickly and dropped to 0.2% in 2010, the lowest ratio since 1993.

Figure 5: M&A transaction value as percentage of GDP in Germany
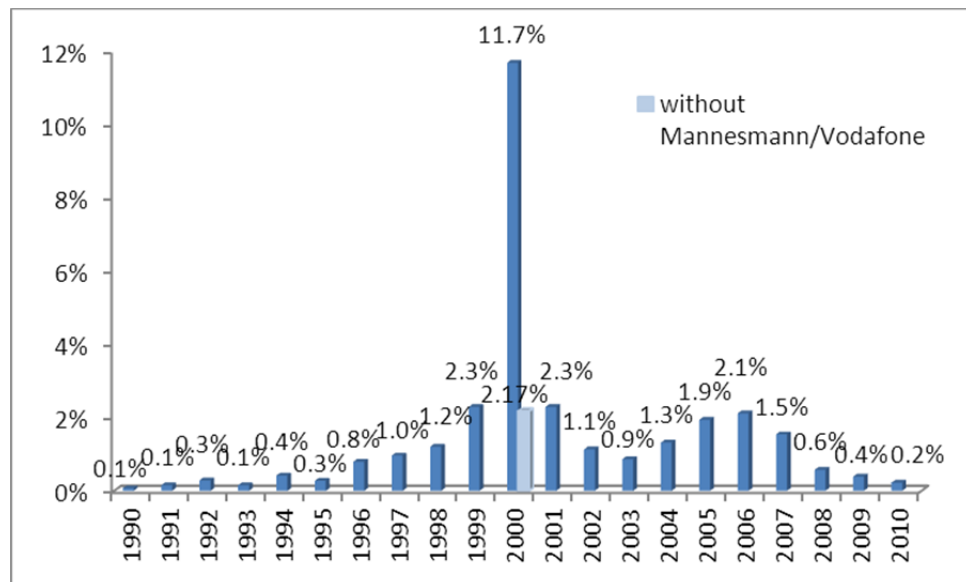
Figure 6 presents the average ratios of M&A values to GDP for the time period 1990 to 2010. In order to exclude the outlying values from 2000, we split the years into two periods of 10 years each, 1990-1999 and 2001-2010. It is not surprising that the UK and the US exhibit the largest M&A markets with the highest ratios of 4.8% and 4.5%, respectively. In both countries the stock markets are more developed and large corporate transactions of publicly listed companies have a long history. France and Italy follow with ratios of 2.1% and

1.7%. The smallest M&A market is found in Germany, as it accounts for only 1.5% of GDP. Excluding the Mannesmann/Vodafone transaction the value of M&As in Germany during the period 1990-2010 accounts for only 1.0% of GDP.

Figure 6: Average ratios of M&A transaction value to GDP
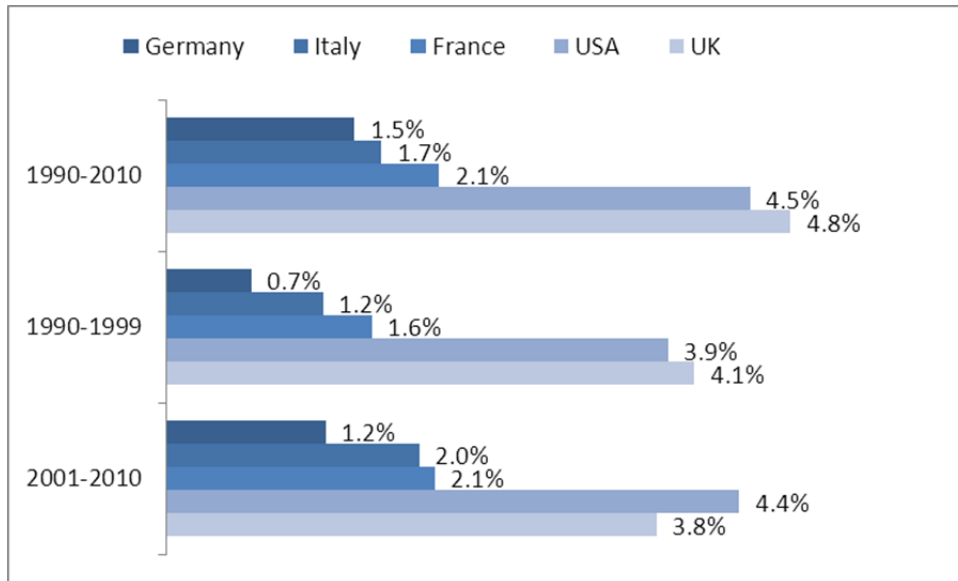
Until 1999 M&A activity in Germany was even lower with a ratio of 0.7%. Main reasons for this low level were structural tax disadvantages, which hindered M&A in Germany. According to the Scientific Council at the Germany Federal Ministry of Finance, Germany was considered to be a high tax country during the 90th, from an international perspective, and high taxes discouraged investment. The Tax Reduction Act which was passed in 2000, aimed to adapt corporate income tax to European Law, and to make Germany a more attractive location for investment. The repeal of the corporate capital gains tax in 2002 was expected to be a revolutionary step towards breaking up the extensive web of crossholdings among German companies and consequently to significantly increase transaction activity. There were further tax reforms, such as the substitution of the full-imputation system by the half-income system, which may have encouraged transaction activity as well. However, in 2009 the half-income system was substituted by a final withholding tax, which on the

one hand made tax rules more transparent. On the other hand, the frequent tax reforms increase foreign investors' uncertainty and hinder acquisitions.

The data analysis shows that after the tax reform in 2000/2001 the intensity of corporate acquisitions in Germany has increased. However, compared to the other countries, the German M&A market remains less developed.

3.1.2 Company Survey on the Corporate Use of M&A Advisory

Companies' Incentives for M&A Transactions

Motives for companies to buy or sell businesses are versatile. First, companies might try to obtain strategically important assets via M&A transactions. Second, companies might plan to penetrate new markets, to maintain or gain market power. Third, economies of scale and economies of scope might motivate M&A-transactions. Fourth, reasons related to finance or diversification might trigger M&A-processes.

The Role of Investment Banks in M&A Transactions

The reasons for the involvement of investment banks and other financial service providers in most M&A transactions are versatile. First, investment banks employ experts who provide support in negotiation as well as in valuation and deal structuring. Second, investment banks have an independent outside perspective enabling them to give impartial advice, especially strategic and tactical advice. Third, investment banks are able to provide financing for the M&A transactions[7] (see DePamphilis 2009).

Whereas investment banks get involved in most M&A transactions, the success of a single transaction might well be dependent on the choice of the specific investment bank. Basically, investment banks' influence on the success of M&A can be summarized as follows:

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[7] The argument is sensitive to the applied definition of investment banking activities. In Germany due to the universal banking system there is no unambiguous legal definition of investment banking activities. According to Hartmann-Wendels et al. (2010) financing is outside the scope of investment banking activities. For a discussion of various investment banking activities see Section 2.1.

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1. Investment banks help identifying the right acquisition partner for a company in order to maximize operating and financial synergies;
2. Investment banks advice bidding and targeting companies concerning the valuation of the target and the calculation of the acquisition premium;
3. Investment banks take an active part in transaction negotiations.

The first two activities concern the function of the M&A advisory firm in overcoming asymmetric information between the acquirer and the potential target. From game-theoretical point of view asymmetric information is well known to harm efficiency as it can lead the uninformed side to refrain from a transaction in some cases, where a transaction would be profitable to both sides (would be efficient).[8] A case can be made, that a large M&A advisory (such as an investment bank) has a potential of a larger contribution to overcoming asymmetric information because of the economies of scale in the process of acquiring information.

On the other hand, the argument that external M&A advisory helps to overcome asymmetric information and thus to increase efficiency is not straightforward. A different kind of asymmetric information – asymmetric information arising from unobservable efforts of external M&A advisors in the search process as well as in developing the applied valuation models, may be the reason for lower efficiency of the conducted transactions. The argument arises from the well-known principal-agent problem, in this case based on the relationship between the client (sell-side or buy-side) and the external M&A advisor.

The argument on the economies of scope of large M&A advisors can also be viewed with criticism. In the case of a too large M&A advisor for example, further aspects concerning monopolistic power should be regarded. Furthermore, the probability that an external M&A advisor is hired by both the sell-side and the buy-side also increases with the size and market share of the advisory firm, which gives rise to criticism regarding arising conflict of interests.

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[8] For this argument we follow the well-known theoretical model by Akerlof (1970).

The third activity mentioned above – the active participation in negotiations is hardly connected to any efficiency gains because it rather constitutes a pure transfer of utility from the one counterparty to the other.

"Better-Merger" and "Bargaining-Power"-Hypotheses

From the theoretical considerations given above, two hypotheses are deducted and often tested in empirical literature - a "better merger"-hypothesis and a "bargaining power"-hypothesis. The former hypothesis points out lower search costs for a company when employing an experienced and prestigious investment bank, the latter hypothesis points out the experienced investment bank's negotiation skills.

On the one hand empirical studies show that the total incremental wealth created in M&A and measured by total abnormal returns or holding period returns are greater in M&A-transactions where a first-tier investment bank is involved. Thus, the "better-merger"-hypothesis can be affirmed (e.g. Bowers and Miller 1990, Stock 2011). Other empirical studies do not provide evidence on significant higher total abnormal returns and thus rather disprove the "better-merger"-hypothesis (e.g. McLaughlin 1992 and Rau 2000). Furthermore, evidence has been found that total abnormal returns are higher in M&A-transactions involving high quality advisers under the constraint that the M&A-transaction features stock and not cash (Walter et al. 2008). In summary, empirical studies provide mixed evidence on the "better-merger"-hypothesis.

In research literature, a bargaining advantage of first-tier investment banks cannot be found due to a sufficiently competitive M&A-market (Bowers and Miller 1990). Thus, the "bargaining power"-hypothesis cannot be affirmed. Aside, a relation between the equity value of both buyer and seller and their choice of a first-tier investment bank cannot be proven, too. The choice of a first-tier investment bank is also not influenced by the difference between the equity values of buyer and seller (Bowers and Miller 1990).

Due to the disagreeing empirical evidence on the topic, we propose a complementary survey procedure to assess financial market experts' opinion on the plausibility of the hypothesis listed above. The survey also allows breaking down the "better-merger"-hypothesis in more detailed sub-hypotheses. A further major advantage of the survey procedure is that it allows us to com-

pare the assessed comparative advantages of external M&A advisory firms in all basic activities connected with M&A transactions.

Short Summary of the Survey Results:

- Higher importance of advisory is reported regarding activities directly connected to financing – primary market access and loan financing as compared to activities indirectly connected to primary market access or secondary market activities

- Half of the respondents consider M&A advisory important for the own company. Larger companies consider M&A advisory more important even when controlling for the importance of a company-own M&A department.

- Companies with an own M&A department assess the past success in M&A transactions to be more positive than companies without an own M&A department.

- Companies with an own M&A department, however, do not fully tend to replace external M&A advisory by an internal M&A department but rather acknowledge the importance of external M&A advisory in complementing company-own M&A know-how.

- The majority of the companies see an advantage of external M&A advisors in activities connected to overcoming the complexity of M&A transactions, followed by reducing the search efforts and overcoming asymmetric information. Negotiation skills are not considered as an advantage of external M&A advisors.

Sample Description

A total of 115 participants have filled in the section on advisory activities of investment banks. A majority of 65.2 per cent of the responding companies have conducted at least one M&A transaction in the last five years[9]. Half of the latter have conducted at least 3 transactions in this period. The average

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[9] Transactions data of the respondents (number of transactions for the last 5 years, last deal date etc.) has been collected from Zephyr.

number of transactions is slightly above 5 (at 5.11 transactions during the last 5 years). Half of the companies which have M&A experience in the last 5 years have conducted their last M&A transaction very recently. Two-thirds of the survey respondents have indicated that their company has an internal M&A department. The average size of the internal M&A departments is four employees.

Data

For the purposes of the following analysis the data collected from the survey responses have been matched with additional data on companies' M&A activities during the last 5 years, balance sheet data (current and lagged) and data on financial ratios. The former has been obtained from Zephyr and the latter – from Amadeus, and comprises inter alia data on size (total assets, turnover,status) as well as financial ratios such as gearing, EBIT etc.

Survey Results - Advisory

Survey participants report a significantly[10] higher importance of advisory activities directly connected to financing – capital market financing (equity and bonds) as well as loan financing (syndicated loans) than to activities indirectly connected to capital market access (rating advisory) or secondary market activities (risk management advisory, advisory on financing of pension obligations). The activities directly linked to financing are considered by the majority of respondents as important or very important (58.5 %, 66.7% and 56.9% respectively for advisory for equity transactions, bond transactions and syndicated loans). The results indicate that companies perceive additional benefits of investment banks for overcoming the complexity of primary market transactions on top of the direct benefits of the provided access to the markets. In contrast, rating advisory, risk management advisory and advisory on financing pension obligations are rather rates as "less important" or even "not important" for the own company by the majority of survey participants (44.0%, 57.5% and 61.5% respectively). The difference in the perceived importance of advisory is not significant regarding M&A advisory. Roughly 50% of the re-

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[10] The results are based on unpaired Wald-tests for each pair of variables respectively. The results are significant at a level of 1%.

spondents consider M&A advisory of investment banks "important" or "very important" for their own company. Although the perceived importance is on average lower than the perceived importance of direct financing advisory (equity advisory, bonds advisory and syndicated loans), the difference is not significant. Whereas there is little disagreement on the perceived benefits of M&A advisory by investment banks on a micro level a more detailed analysis should be conducted in order to draw conclusions on its importance for economic welfare.

Figure 7 How important is advisory of investment banks regarding the following activities for your company?
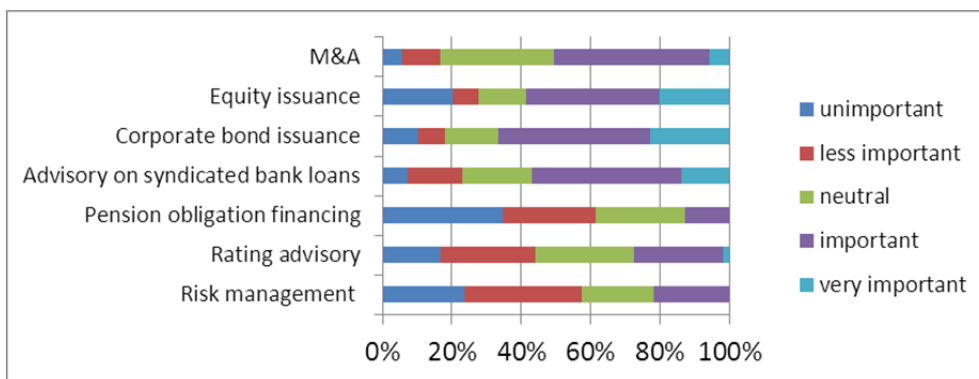
As can be seen from Figure 8 the corporate usage of investment banking advisory activities has remained largely unchanged throughout the recent financial crisis. Whereas more than half of the respondents (51.1%) report rather unchanged usage of bond issuance advisory, 40% perceive the usage of the latter to have increased in the course of the financial crisis (2007-2010). Regarding M&A advisory activities for instance the respective percentage of German companies which have intensified the use of investment banking advisory in the last three years lies at a level of 27.4%.

Figure 8 How did advisory of investment banks change regarding the following activities during the last 3 years (2007-2010)?
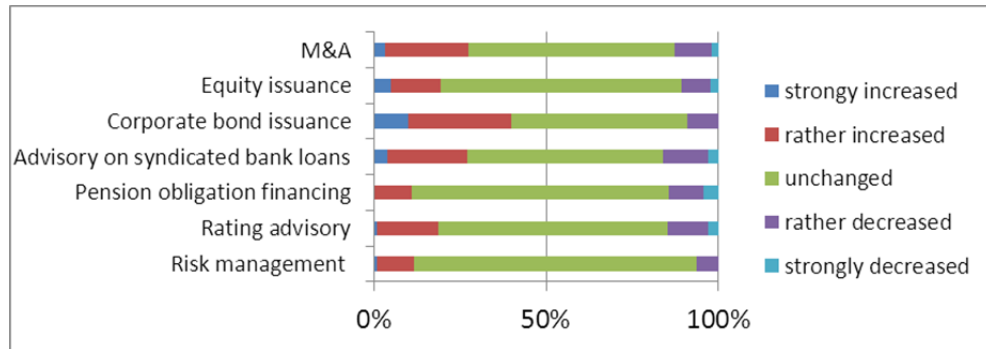
As can be seen from Table 2, column (h5), companies with higher initial leverage ratio before the crisis have assessed a more positive development of the usage of IB bond issuance advisory in the course of the crisis. The results become insignificant when controlling for other companies' characteristics such as equity capital market access (public company), pre-crisis size (total assets), liquidity (current ratio) and profitability (EBIT). The control variables have no significant effect on the development of the usage of IB advisory on bond issuance. An inclusion of an interaction term between gearing and dummy(public) reveals that the positive perceived development of advisory usage in initially higher levered companies is only significant (weakly significant at level of 15%) for non-public companies. This means that restricted loans financing during the financial crisis has forced highly levered companies to consider bond financing more intensively (as the timing has not been optimal for the company to go public).[11] The results have to be interpreted with caution, as the de-

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[11] The variable dummy(public) downloaded from Amadeus only contains information on the current status of the companies. However, there are only 5 companies in the whole sample of 126 companies which have changed their status in the course of the crisis. This is why the data from Amadeus can be taken as a sufficient approximation of the status of the company at the beginning of the crisis.

pendent variable (development of corporate usage of IB activities) is based on a self-reported assessment of the scope of development.[12]

Table 1 Development of the Corporate Usage of IB Bonds Issuance Advisory

y= Development of IB Bond Issuance Advisory [Q. 3.7, option 5]	(h1) y	(h2) y	(h3) y	(h4) y	(h5) y
Gearing [3 years lag]	0.00115+ (0.121)	0.00118* (0.080)	0.00110+ (0.105)	0.00120+ (0.106)	0.00139*** (0.000)
Interaction term: Gearing & Dummy(Public)	0.00107 (0.368)	0.000988 (0.334)	0.000518 (0.603)	0.000525 (0.617)	
Current Ratio [3 years lag]	0.00986 (0.731)	0.0126 (0.749)	0.0130 (0.777)		
Total Assets [TEUR, 3 years lag]	-1.75e-09 (0.745)	-2.95e-09 (0.299)			
EBIT [TEUR, 3 years lag]	-3.54e-08 (0.732)				
R^2	0.139	0.134	0.123	0.117	0.125
N	79	80	80	80	81

p-values in parentheses
(d) for discrete change of dummy variable from 0 to 1
+ p<0.15,* p<0.1, ** p<0.05, *** p<0.01

Note: Results from OLS regressions with bootstrap standard errors. The tested models are of the following form:

$$y = (\hat{\beta}_1 + \hat{\beta}_2 D_{\{Public\}})lag\_Gearing + \hat{\beta}_3 lag\_CurrRatio + \hat{\beta}_4 lag\_TA + \hat{\beta}_5 lag\_EBIT$$

Survey Results - M&A Advisory

The results from Ordinary-Least-Squares (OLS) regressions indicate a significant positive size effect on the perceived importance of investment banking

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[12] The results have also been confirmed by ordered probit regressions with bootstrap standard errors. Ordered probit models have been tested with the self-assessed development of the usage of bond issuance advisory (Q.3.7, option 5) as a dependent variable and companies' 3 year lagged gearing and a dummy(public) variable as independent variables. The results, however insignificant, indicate that companies with high initial leverage more often indicate an increased usage of IB bond issuance advisory in the course of the crisis. If one controls for public companies, however, the results are reversed – public companies with high pre-crisis leverage less often report an increased usage of IB bond issuance advisory. The results of the ordered probit regressions are available upon request.

M&A advisory – larger companies in terms of turnover report higher perceived importance of investment banking M&A advisory activities (see Table 22)[13]. Furthermore, the self-reported importance of investment banking M&A advisory is higher for companies which evaluate M&A transaction as important for the company's profitability and development. Interestingly, the results are insignificant for companies which do not have an internal M&A department. Companies which do have an internal M&A department, in contrast, report significantly higher perceived importance of investment banking advisory in M&A transactions. The result persists when we control for the M&A activities of the companies in the last 5 years. This result indicates that companies which integrate M&A transactions as a part of their corporate strategy do not fully tend to replace external M&A advisory by an internal M&A department but rather acknowledge the importance of external M&A advisory in complementing company-own M&A know-how.

The survey participants were further asked to provide a subjective assessment of the success of their company's last significant M&A transaction. As can be seen from Table 3 companies with an internal M&A department significantly more often tend to mark past M&A transactions as a success. The reason for this can be twofold – First, company-own M&A departments may really manage to pick out better deals. This means that the information advantage of external M&A advisory may be comparably low so that there is no trade-off between information advantage and principal-agent problems of an external M&A advisory. Second, as the results are self-reported reporting biases such as the self-attribution bias may have affected the results. The latter argument is especially relevant considering that the question refers to the period of the financial crisis[14] - a period marked by high uncertainty.[15]

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[13] Similar results are obtained for total assets as a size variable.

[14] A majority of 75% of the respondents have conducted their last M&A transactions after 01/2008.

[15] When making decisions in an uncertain environment reasons for failure/loss are twofold – either the decision was wrong or the decision was right but the environment was risky. A self-attribution bias means that individuals tend to overstate the importance of the latter in the case of a failure and overstate the importance of the former in case of success. In

Table 2 Perceived Importance of Investment Banking M&A Advisory for the Own Company

y= Importance of IB M&A Advisory [Q. 3.6, option 7]	(h1) y	(h2) y	(h3) y	(h4) y	(h5) y
Turnover [Mio EUR, last]	0.00000774** (0.041)	0.00000526* (0.067)	0.00000622* (0.057)	0.00000729*** (0.001)	0.0000137*** (0.000)
M&A Importance [Q. 3.2]	0.00838 (0.905)	-0.0252 (0.778)	0.00394 (0.961)	0.0914*** (0.001)	
Interaction term: M&A important & own M&A dep.	0.121* (0.094)	0.120* (0.096)	0.114 (0.180)		
# of M&A transactions (5 years) [Source: Zephyr]	-0.00998 (0.616)				
(d) Dummy: M&A transactions [Source: Zephyr]		0.139 (0.585)			
R^2	0.218	0.206	0.203	0.190	0.109
N	83	84	84	94	100

p-values in parentheses
(d) for discrete change of dummy variable from 0 to 1
* p<0.1, ** p<0.05, *** p<0.01

Note: Results from OLS regressions with bootstrap standard errors. The tested models are of the following form:

$$y = \hat{\beta}_1 Turnover + (\hat{\beta}_2 + \hat{\beta}_3 D_{\{Q.3.2.=Yes\}})MA^{Im\,por\,tan\,ce} + \hat{\beta}_4 Num\_Trans^{5y} + \hat{\beta}_5 D_{\{Num\_Trans>0\}}$$

As outlined in the literature review (Section 2.2.1) the role of investment banking M&A advisory for economic welfare largely depend on their ability to help overcome asymmetric information. External M&A advisory could enable welfare increases by means of lower search costs on the one hand and better information on the target company on the other hand – both effects lowering adverse selection. In contrast, better negotiation skills of external M&A advisors do not have an impact on welfare but rather shift surplus between the buy-side and the sell-side ("bargaining power" hypothesis).

the case of the survey responses it will lead to an upwards bias in the responses in the cases when transactions are conducted by company-own department.

Table 3 Perceived Success of the Last Significant M&A Transaction

y= Success of last significant M&A Transaction [Q. 3.]	(h1) y	(h2) y	(h3) y	(h4) y
Turnover [Mio EUR, last, Amadeus]	.000000148 (0.981)	-0.00000348 (0.556)	0.00000591 (0.288)	0.0000551*** (0.000)
(d) Dummy: own M&A department	1.159*** (0.002)	2.317*** (0.000)	2.531*** (0.000)	
Number M&A Transactions in 5 years [Source: Zephyr]	0.116** (0.010)	0.0661** (0.017)		
Time since last deal date [Source: Zephyr]	0.354*** (0.000)			
R^2	0.840	0.707	0.700	0.247
N	52	74	75	84

p-values in parentheses

(d) for discrete change of dummy variable from 0 to 1

* p<0.1, ** p<0.05, *** p<0.01

Note: Results from OLS regressions with bootstrap standard errors. The tested models are of the following form:

$$y = \hat{\beta}_1 Turnover + \hat{\beta}_2 D_{\{Q.3.2.=Yes\}} + \hat{\beta}_3 Num\_MATrans^{5y} + \hat{\beta}_4 (Date - Last\_deal\_date^{5y})$$

As outlined in the literature review (Section 2.2.1) the role of investment banking M&A advisory for economic welfare largely depend on their ability to help overcome asymmetric information. External M&A advisory could enable welfare increases by means of lower search costs on the one hand and better information on the target company on the other hand – both effects lowering adverse selection. In contrast, better negotiation skills of external M&A advisors do not have an impact on welfare but rather shift surplus between the buy-side and the sell-side ("bargaining power" hypothesis).

Responses to the survey questionnaire clearly indicate that the majority of the companies (60.1%) see an advantage of external advisors as opposed to company-own M&A department in activities connected to overcoming the complexity of M&A transactions. Furthermore, almost half of the experts see an advantage of external M&A advisory in (1) reducing search costs (better information on potential targets) and (2) overcoming adverse selection (detailed

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information on micro level, access to detailed company data, better valuation methods etc.). Interestingly, companies which have an own M&A department tend to assess the advantages of external advisors more positive when it comes to these activities than companies which do not have an own M&A transaction. The intergroup differences, however, are not significant (Mann-Whitney U test, p-value=0.26 and p=0.19 for (1) and (2) respectively). Companies, which have conducted at least one M&A transaction in the last 5 years tend to acknowledge more often the advantages of external M&A advisory in the search of potential targets. The intergroup difference is highly significant (p-value of Mann-Whitney U test = 0.005).

Figure 9 Which core competences of external M&A advisors (i.e. investment banks, M&A boutiques) are beneficial to your corporation as compared to an company-own/internal M&A department?
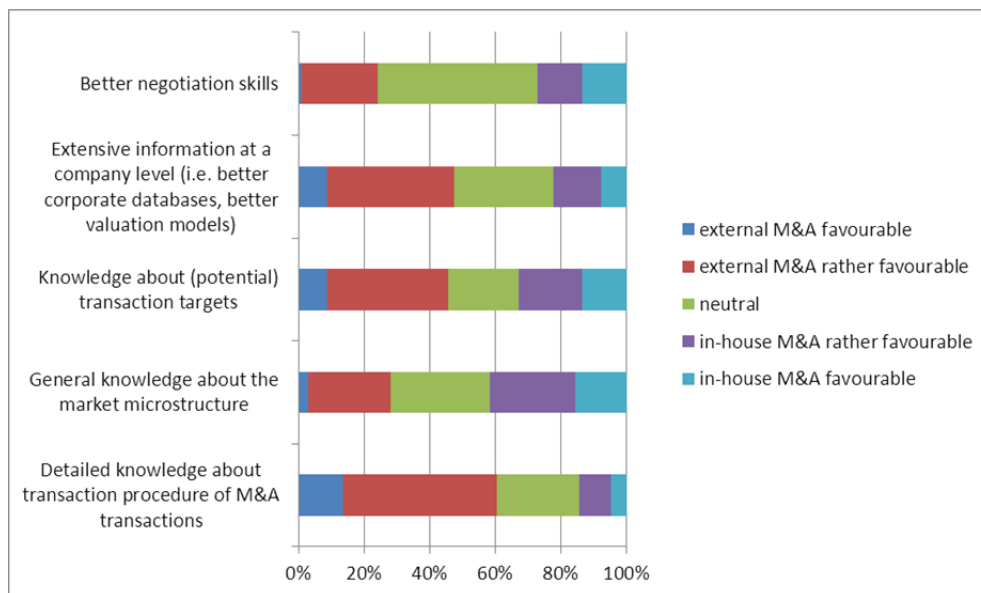
The least advantage of external M&A advisory is seen regarding "better negotiation skills". The majority of 48.5% of the participants assert no differences in the negotiation skills of external M&A advisors. Hence, survey responses do not confirm the better-negotiation skills hypothesis.

3.1.3   Impact of M&A on profitability and productivity

While the wealth effect through excess shareholder returns from M&A transactions on the whole economy seems to be limited, an own empirical analysis based on a sample of 2,677 German companies involved in M&A suggests that the transactions can contribute positively to the overall economy through profitability and productivity increases.

3.1.3.1   Literature Review

In order to determine whether takeovers create or destroy value one can take several perspectives. First, M&A can be evaluated from the shareholders' perspective. Second, a wide range of stakeholders is affected by the transaction, e.g. bondholders, managers, and employees. As the interests of these different shareholders and stakeholders groups diverge, a transaction may be beneficial for one group but may have an adverse effect on other groups.

The most prominent approach to evaluating the impact of M&A is based on event studies analysing short-term shareholder wealth effects. Starting point of the approach is the assumption that announcements of M&A bring new information to the market, such that investors' expectations about the firm's prospects are updated and reflected in the share prices. An abnormal return equals the difference between the realised returns and an expected (benchmark) return, which would have been generated if the takeover bid had not taken place. Long-term shareholder wealth effects of M&A could also be assessed. However, it is more difficult to isolate the takeover effect over longer periods, as many other strategic and operational decisions or changes in the financial policy may arise in the meantime.[16]

A large part of the literature using stock return data to estimate shareholder gains from takeovers separates estimates of bidders' or targets' gains. Such estimates reflect the total gains stemming from the transaction and also depend on how this surplus is divided between bidders and targets.[17] Several

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[16] See Martynova and Renneboog (2008).

[17] See Bhagat et al. (2005).

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works find significant and large positive average abnormal returns for target's shareholders. In contrast, abnormal returns of acquiring firms tend to average fairly close to zero or even tend to be negative. Andrade et al. (2001) show that mergers create value for shareholders overall, but the announcement period gains from mergers accrue entirely to target firm's shareholders. Moeller et al. (2002) find a loss of acquiring firm shareholders of $25.2 million on average upon announcement and Agrawal et al. (1992) calculate a 10% loss for shareholders of acquiring firms over the five-year post-merger period.18 Fuller et al. (2002) suggest that the allocation of gains from a takeover depends on the status of the target – when the target is a public firm, target shareholders generally benefit more and when the target is a private firm or a subsidiary of a public firm, bidding firm shareholders usually realise higher gains. This suggests that buyers in a relatively illiquid market for assets (private firms and subsidiaries) do not pay as high a price for a private firm as for a public target firm.

However, Healy et al. (1992) point out that stock price performance studies are unable to distinguish between real economic gains and market inefficiency explanations and are therefore unable to determine whether takeovers create real economic value. According to the authors, there is near-unanimous agreement that target's stockholders benefit from mergers, as evidenced by the premium they receive for selling their shares. Bidders generally break even, and the combined equity value of the bidding and target firms increases as a result of takeovers. Nevertheless, these increases in equity values are typically attributed to some unmeasured source of real economic gains, such as synergy. But researchers have had little success in relating equity value gains to improvements in subsequent corporate performance. Therefore, equity value gains could also originate in capital market inefficiencies, arising simply from the creation of an overvalued security.19 Following Healy et al. (1992), post-merger accounting data is more appropriate to test for effects of M&A transactions. The authors find that the post-merger returns of firms im-

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[18] Jensen and Ruback (1983), Jarrell et al. (1988), and Schwert (1996) review this evidence.

[19] Shleifer and Vishni (2003) present a model of M&A based on stock market misvaluations of the combining firms.

prove in comparison with the respective industry and that this improvement arises from post-merger increase in asset productivity.

According to this argumentation, several studies use either ex post accounting performance or plant level productivity data to infer the existence of operating improvements and provide mixed evidence. While Ghosh (2001), for example, finds little evidence of operating improvements compared to control firms matched on size and prior performance, Healy et al. (1992) and Heron and Lie (2002) show that operating performance improves after a merger. In contrast, Ravenscraft and Scherer (1987) and Herman and Lowenstein (1988), who examine earnings performance after takeovers, conclude that merged firms do not achieve operating improvements.

Maksimovic and Phillips (2001) use plant-level data for manufacturing firms and find no evidence for an improved productivity of the acquirer's assets after a merger. However, when a firm adds capacity to its main divisions and increases the firm's focus, productivity increases. Larsson and Finkelstein (1999) conceptualise M&A performance in terms of synergy realisation and define it as the actual net benefits (e.g., increased income) created by the interaction of two firms involved in M&A. In addition to the possibility of gaining post-transaction synergies, the displacement of inefficient managers implies a positive development of operating profitability after a takeover relative to the pre-takeover situation (Ravenscraft and Scherer, 1987). Knowledge and technology transfer between the merged companies can also drive efficiency. However, if managers seek growth rather than profits, or because of managerial hubris and herd behavior, mergers can lead to decreasing efficiency and decreasing profitability (e.g., Gugler et al. 2003).

Devos et al. (2008) analyse three main sources of gains: productive efficiencies, tax savings, and enhanced product market power. While improved productive efficiencies are economically beneficial, tax savings and increased market power generate stockholders' gains at the expense of the government and other stakeholders, such as customers and suppliers. The potential for such wealth transfers in mergers has generated considerable controversy in discussions about public policy toward mergers. The authors find that tax considerations and increased market power are not the major sources of merger gains. Overall, the study suggests that mergers generate benefits by improving

resource utilisation in the economy rather than by merely transferring wealth to stockholders from the government, customers, and suppliers.

The existing literature does not permit finite conclusions about improvements in operating performance following mergers. The goal of our study is, thus, to close this gap, in particular for Germany. We assess the question if M&A can create economic value in terms of performance and productivity improvements after the transactions.

Profitability

On the one hand, acquisitions might be motivated by the goal of achieving efficiency gains by purchasing underperforming targets and improving their performance. Following this argumentation, firms with lower profitability or inefficient firms might be more attractive targets for acquisitions. According to the inefficient management hypothesis of Palepu (1986), firms with inefficient managements are likely targets. Regarding the acquiring firms, high profitability, which indicates good management and high internal cash generation potential, should be a likely characteristic of an acquirer (Harford, 2005). Successful firms may seek growth by acquisitions or may desire to use acquisitions to increase their market power (Sorensen, 2000). It is often suggested that acquisitions are a market mechanism by which resources are transferred from inefficient managers to efficient ones.

On the other hand, due to the common leveraged acquisition financing, the realisation of sufficient returns by the target firms prior to the transaction, which could be an indicator for the post-transaction return potential, might be an important selection criterion for the acquirers. Higher target returns enable the new entity to better service the debt after the transaction. Therefore, we define the following two hypotheses.

Hypothesis 1: Profitability of firms improves after M&A

Hypothesis 2: Acquiring firms choose more profitable targets prior to the transaction

Productivity

Jensen (1993) and Andrade and Stafford (2004) propose that most merger activity in the 1970s and 1980s was motivated by the need to eliminate excess

capacity.[20] In that time period, excess capacity drove industry consolidation and restructuring through M&A. Since faulty internal governance mechanisms prevent firms from "shrinking" themselves, mergers are the principal solution of removing excess capacity. This excess capacity could be reduced through consolidation, closure of marginal facilities, removal of duplicate functions and rationalisation of operations in the merged firms (Andrade and Stafford, 2004). In addition to their "contractionary" role, mergers can also play an "expansionary" role. In such cases the transactions induce an enlargement of the firm's assets. However, when mergers are due to industry-wide causes such as deregulation, increased foreign competition or financial innovations, their association with expansion becomes less clear. In particular, at the industry level, the immediate effect of own-industry mergers is the reallocation of existing assets. According to Andrade and Stafford (2004), during the 1990s, merger activity appeared to be more closely related to industry expansion. The authors argue that incentives to expand are stronger in times when existing capacity is near exhaustion, and thus M&A activity should be positively related to capacity utilisation. In contrast, the consolidating role of mergers implies that M&A activity should be negatively related to capacity utilisation. At the firm level, the theory of mergers and optimal resource allocation by Levine and Aaronovich (1981) states that acquiring firms may seek out less efficient firms in order to utilise their resources more efficiently. In line with the findings of Maksimovic and Phillips (2001), we expect that M&As facilitate the redeployment of assets from firms with a lower ability to exploit them to firms with a greater ability. We define the following two hypothesis:

Hypothesis 3:   Productivity of firms increases after M&A

Hypothesis 4:   Merger activity is motivated by the need to eliminate excess capacity at the acquiring firms

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[20] As capacity utilization can be used as a measure for productivity, excess capacity is associated with low productivity.

3.1.3.2 Descriptive analysis

The analysis of the impact of M&A on the involved firms is based on M&A data from Zephyr, a Bureau van Dijk database, which provides information on mergers, acquisitions, private equity and venture capital transactions, and initial public offerings dating back to 1997. However, the coverage of transactions is more satisfying beginning in 1999. Therefore, we consider a transaction period starting in 1999. In order to analyse the characteristics of firms involved in the transactions, we combine the transaction data with accounting data from Amadeus, another Bureau van Dijk database.

Table 4: Breakdown of M&A transactions in Germany by year

	M&A (total)	Acquirers	Targets
1999	393	306	87
2000	168	130	38
2001	170	109	61
2002	208	99	109
2003	186	99	87
2004	210	95	115
2005	270	115	155
2006	337	130	207
2007	413	160	253
2008	322	142	180
Total	2,677	1,385	1,292

Our sample consists of 2,677 firms operating in Germany which were involved in M&A transactions during the time period 1999-2008. We focus on transactions with acquired stakes of at least 50%. In such majority acquisitions the influence of M&A on company's operational and financial situation should be most pronounced. Almost the same shares of firms are acquirers and targets. According to the Zephyr data, M&A activity in Germany peaked in 2007 with 413 transactions.

Table 5: Summary statistics of firms involved in M&A versus those firms not involved in M&A

	Firms involved in M&A			Firms not involved in M&A			t-test	Wilcoxon test
	mean	median	N	mean	median	N		
ASSETS (th. Euro)	21,900	14,009	824	6,761	1,065	109,396	***	***
DEBT (%)	52.21	50.35	1,107	63.37	62.59	113,111	***	***
ROA (%)	5.00	5.82	1,056	7.16	5.54	112,179	***	
AGE (years)	15.76	11	1,704	12.98	8.5	107,798	***	***
UTIL (%)	182.03	152.50	1,010	224.77	195.67	110,317	***	***
GROWTH (%)	18.87	5.37	687	18.00	4.70	95,507		
HHI (%)	14.79	6.83	2,116	9.16	4.04	113,962	***	***

Table 5 reports means and medians of ASSETS (firm's total book assets), DEBT (ratio of debt to total assets), ROA (return on assets), firm age, UTIL (capacity utilisation, similar to Andrade and Stafford (2004) and Healey et al. (1992), we proxy capacity utilisation by the ratio of turnover to total book assets), GROWTH (turnover growth) and HHI (Herfindahl-Hirschman index, a measure for market concentration) for the sample of firms involved in M&A compared to the sample of firms not involved in M&A.[21] Detailed definitions of the variables are provided in the Appendix. The tests for the equality of means (t-test allowing for unequal variances) and the equality of distributions (Wilcoxon-Mann-Whitney test) between the two groups of firms show that firms involved in M&A are significantly larger and older, and have lower debt ratios than firms which were not involved in a transaction during the analysed time period. The profitability of the firms differs significantly in the mean value. The average firm involved in M&A is less profitable than the average control firm. In order to analyse the operating performance of merging firms, we follow Healey et al. (1992), who use assets turnover as a performance proxy. In the year prior to the transaction the participating firms have significantly lower

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[21] The data for the firms involved in a transaction corresponds to the year before the transaction. The data for the control group corresponds to the median values for the time period 1999 to 2008. The number of observations varies across items due to data availability. ***, **, * denote significance at the 1%, 5% and 10% level, respectively.

capacity utilisation than the control sample, indicating that they generate lower sales for each unit of assets.

Table 6: Summary statistics of firms involved in M&A as acquirers or targets

	Firms involved in M&A as acquirers			Firms involved in M&A as targets			t-test	Wilcoxon test
	mean	median	N	mean	median	N		
ASSETS (th. Euro)	26,952	20,108	263	19,034	9,855	521	***	***
DEBT (%)	48.78	47.11	436	55.32	55.10	602	***	***
ROA (%)	6.17	6.77	431	3.99	4.86	559	***	
AGE (years)	16.50	11	636	15.45	11	973		
UTIL (%)	173.56	144.35	419	194.23	161.67	527	***	***
GROWTH (%)	14.30	6.37	278	17.40	3.39	367		***
HHI (%)	14.26	5.63	824	14.56	6.84	1167		

Table 6 reports the characteristics of firms which were involved in a M&A transaction as an acquirer or a target.[22] It is not surprising that acquirers are significantly larger than the targets and have lower debt ratios. The acquiring firms need enough resources and free debt capacity to execute the transaction and to bear the leveraged deal financing. Furthermore, buyers realise higher returns and lower capacity utilisation than targets. Therefore, the merger could be motivated by the possible reorganisation and profitability improvements in the target firms, and the need to allocate resources more efficiently and to remove excess capacity in the acquiring firms.

Furthermore, we evaluate median percentage changes and industry-adjusted changes in total assets, debt ratio, return on assets and capacity utilisation for the three years (year +1, +2, +3) after a M&A transaction relative to the values in the year ending prior to completion of the deal (year -1). Industry-adjusted changes for a given period equal the difference between the change for the company involved in a transaction and the median change for a sample of companies in the same industry during the same period (see Table 22 in the Appendix). We find that, the buyers in an acquisition are characterised by a

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[22] All data corresponds to the year before the transaction.

strong growth in assets and decreasing indebtedness in the two years prior to the transaction. Even after industry adjustment the assets growth and debt decline are significant. After M&A the assets of the involved firms increase significantly. The debt ratios of the acquirers change considerably, presumably as a result of the leveraged financing of the acquisition. The negative development of ROA after the transaction, which loses significance over time and after industry adjustment does not indicate that the merged firms performed worse in the postmerger period, because assets which are the denominator in the ratio considerably increased during the analysed period.

In line with Healey et al. (1992), we investigate the development of asset turnover as a measure for capacity utilisation and operating performance. We find that before the transaction acquirers had a negative industry adjusted change of UTIL. The significantly lower asset turnover of the transaction firms compared to the control group one year before the merger implies that they generate less in sales than their competitors. In years 1 to 3 after the transaction they realise a significant utilisation growth which is higher than the growth of the control group in the same industry. Thus, we find a confirmation of Hypothesis 4, that M&A could be motivated by the need to eliminate excess capacity in the acquiring firms.

3.1.3.3 Empirical analysis

Panel regressions: Impact of M&A on firms' financials

In order to examine the effect of M&A on firm characteristics we employ multivariate panel regressions. We employ firm fixed effects to control for time-invariant, firm-unobservable characteristics and use year dummy variables to account for time-varying conditions. As errors are unlikely to be independent, we cluster them by company.

$$Y = \alpha + \beta_1 POST + \beta_2 SIZE + \beta_3 Y_{jt-1} + \beta_4 D_t + u_c$$

Y is our variable of interest - DEBT, ROA and UTIL. POST is a dummy variable with a value of 1 for firms involved in M&A in the years after the transaction

ZEW

and 0 otherwise. We apply our model for all participating firms as well as for the subsamples of acquirers and targets separately.[23]

We find positive coefficients of the dummy variable POST in the regressions for DEBT which suggest that M&A significantly increase the firm's indebtedness after the event especially for the acquirers. This result holds after controlling for firm size and debt levels before the transaction. One of the reasons might be the frequently used leveraged acquisition financing.

Furthermore, we find a positive impact of M&A on the firms' returns which can be derived from the positive coefficient of the variable POST in the regressions for ROA. Consequently, we can approve our Hypothesis 1. The targets' profitability in particular improves significantly after the acquisition. We find that small firms with lower returns in the year prior to the transaction benefit from M&A to a greater degree. The results of the logit regressions presented in the appendix show that acquiring firms do not select more profitable targets prior to the transaction. Therefore, we disprove our Hypothesis 2. In contrast, after purchasing firms with lower returns, which could be reflected in a lower enterprise value, the buyers have more potential to realise gains after the integration and restructuring of the target.

In line with the results of the pre-transaction/post-transaction comparisons (Table 22 in the Appendix), the positive coefficients of POST for UTIL in the panel regression indicate that there is an improvement in firms' asset turnover in the postmerger period which is most pronounced for acquiring firms. Consequently, acquirers deploy their resources more efficiently and realise higher turnover. This result confirms Hypothesis 3 and is consistent with those obtained by Devos et al. (2008).

3.1.3.4   Conclusion

The sources of gains from M&A are mostly measured in terms of abnormal returns to the shareholders. These gains might be due to capital market inefficiencies or market mispricing and thus, result from a wealth transfer from other shareholders or stakeholders. In contrast, the productive efficiencies

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[23] The results of the panel regressions are reported in Table 24 in the Appendix.

accompanied by increased profitability might be economically beneficial. According to this argumentation but also in accordance with the specific characteristics of the German corporate market, we analyse the impact of M&A on the participating firms and derive their potential economic effects.

The results documented in this study show that, indeed, asset productivity of the firms significantly increases after M&A. Our findings indicate that excess capacity and the possibility to eliminate it and to improve asset productivity through mergers could be main motives for initiating a transaction. Furthermore, we find evidence that the acquirers do not select better targets but they improve the performance of the acquired firms in the three years after the transaction. This outcome indicates that buyers exhaust the operational and financial restructuring potential in the post-merger period and increase the profitability of the targets.

In general, the results of our study suggest that M&A can positively influence the economy by improving productivity and increasing profitability of the merging firms. The first effect is particularly strong for acquiring firm and the second one is particularly strong for target firms.

3.2 Primary Market

In this section the importance of primary markets and access to primary markets via investment banks is analysed. We start from a macroeconomic perspective and estimate the relationships between securitized products and both loan supply and GDP in Germany. In this part we also investigate the effects of the increasing use of securitizes products on credit and GDP growth. Then descriptive overviews of equity and debt financing form a basis for the understanding of the quantitative importance of products considered. The last part is the description and analysis the results of a company survey which is dedicated to the perceived benefits from capital market access for German companies.

3.2.1 Empirical results on the relationhip between credit and GDP

This part of the study aims at estimating macroeconomic relationships that hold within the economic system in Germany. To model the interlinkages within the economy, we estimate a vector error correction model (VECM). This

model choice is mainly motivated by the fact that single equation analysis, i.e. equations which regress GDP on explanatory variables such as credit, assume that the direction of impact runs from credit to GDP. However, also GDP can have an impact on issued credits – for example, strong economic growth can be related with great optimism of entrepreneurs. This would lead to a strong investment and credit demand and, if they are not supply-side restricted, to higher credit volumes. The vector error correction model takes into account that both variables, i.e. GDP and credit, are interrelated. The VECM estimates long run equilibrium relationships among the variables under consideration. Since the model has a rather long term perspective, we need variables available for a longer time period. However, securitized products are available for our German specification as a continual times series only since 1999Q1.

Estimating the cointegrating vectors

The VECM aims at estimating relationships between macroeconomic variables that are likely to have a mutual influence. Similar to Sorensen et al. (2009), a closely related work for the euro zone, we choose the following specification for the cointegrating relationships[24]:

$$K = \beta_{1,0} + \beta_{1,1}S + \beta_{1,2}B + \beta_{1,3}Y + \beta_{1,4}mm$$

$$I = \beta_{2,0} + \beta_{2,1}S + \beta_{2,4}mm$$

$$r = \beta_{3,0} + \beta_{3,4}mm$$

The first equation hypothesizes credit (K) to be in long run equilibrium with corporate surplus (S), corporate bond volumes (B), GDP (Y) and the 3-month Euribor as a money market rate (mm). The second equation relates investment (I), corporate surplus (S) and the money market rate (mm). The third equation assumes longer term interest rate (r), measured by corporate bond yields, to follow the money market rate. The estimation is conducted for quarterly data and a sample period from 1991Q1 to 2010Q4. A detailed description of the variables is given in the Appendix.

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[24] Appendix 2 shows details on the econometric background of the model.

The estimation yields the following estimated cointegrating vectors:[25]

$$K = -4.5 - 0.6S - 0.16B + 2.6Y - 0.01mm$$
$$\quad\;(^{***})\quad(^{***})\quad\;(^{***})\quad\;\;(^{***})\quad\;\;(^{***})$$

(C1)

$$I = 2.1 + 0.2S + 0.01mm$$
$$\quad(^{***})\;\;(^{**})\quad\;\;(^{*})$$

(C2)

$$r = 3.6 + 0.4mm$$
$$\quad(^{***})\;\;(^{***})$$

(C3)

All variables except the interest rates are in logarithms. The coefficients of the log-variables consequently have to be interpreted as elasticities. They show the percentage change of the dependent variable in relation to a one percent change of the explanatory variable. The coefficients for the short term interest rates (mm) are semi elasticities in the first two equations. They give the percentage change of the dependent variable given that interest rate changes by one percentage point. In the third equation, we have no variables in logarithms and therefore only percentage point to percentage point changes.

The first equilibrium relationship (Equation (C1)) says that credit (K) decreases by one percent, if the short term interest rate (mm) increases by one percentage point. The elasticity of credits to GDP (Y) is 2.6, i.e. if GDP increases by one percent, credit will increase by 2.6 percent.[26] The relation of credit to corporate bonds volume (B) is negative. More precisely, an increase in corporate bonds by one percent goes together with a slight decrease in credit by 0.16 percent. This finding suggests that firms take out loans in substitution of an emission of bonds. A similarly negative coefficient of corporate surplus (S) suggests that credit borrowing decreases with improving corporate surplus. This suggests that firms finance investments by their own funding in case of a good profit situation compared to a situation of low profits. More precisely, the coefficient $\beta_{1,1} = -0.6$ indicates that credit will increase by 0.6 percent if a firm's profit decreases by one percent.

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[25] ***/**/* means siginificance at the 1%, 5%, 10%-level.

[26] Sorensen et al. (2009) estimate an elasticity of credit to GDP of 1. In addition to their equation, we include volumes of corporate bonds (B) and firms' surplus (S) in the credit equation.

According to the second equation (Equation (C2)), investment will increase with increasing corporate surplus. The estimated elasticity of $\beta_{2,1} = 0.2$ indicates that an increase in corporate profits by one percent will be accompanied by an increase in investment activity by 0.2 percent. Our estimated elasticity is slightly higher than the one estimated by Sorensen et al. for the euro zone of 0.14. The positive coefficient of investment with respect to the short term interest rates $\beta_{2,4} = 0.01$ may be surprising at the first glance. It says that higher investment is present in times of high interest rates. However, one would expect that investment falls as a consequence of increasing interest rates. Our estimated positive sign is, however, plausible if one considers the fact that we are considering a contemporaneous relationship between interest rates and investment. Thus, it is possible that the central banks increase the interest rate in times of an economic boom, and that naturally, due to the economic boom, the investment is strong, too. In this case we would have higher interest rates and high investment both due to a strong economic performance.

The third equation (Equation (C3)) describes the relationship between long term interest rates (r), which is proxied by the yields of corporate bonds, and the 3-month money market rate (mm). The estimation shows that the long term interest rates are usually higher than the short term rate. The difference can be interpreted as a mark-up, which is due to risks and structural conditions in the bond market. The coefficient $\beta_{3,4} = 0.4$ illustrates that long term interest rates will increase by 40 basis points if the short term interest rate increases by one percentage point. Thus, a positive relationship between both interest rates is given, with interest rate changes at the short end of the yield curve to be transmitted to the longer end of the yield curve. But the relationship is not one-to-one, there are further determinants for short term interest rates such as expected short term rates in the future.

Adjustment of credit and GDP to the cointegrating vectors

For the following single equation estimations in the next section, credit and GDP will be the variables of interest. This section describes the adjustment of

credit and GDP to the estimated cointegrating vectors, if the variables in the cointegrating vectors are in disequilibrium.[27]

The adjustment of credit and GDP to the cointegrating vectors takes the following form:

$$\Delta K = -0.210 \cdot EC1 + 0.048 \cdot EC2 + 0.002 \cdot EC3$$
$$(***)$$

$$\Delta Y = 0.003 \cdot EC1 + 0.005 \cdot EC2 - 0.003 \cdot EC3$$

with

$$EC1 = K + 4.5 + 0.6S + 0.16B - 2.6Y + 0.01mm$$

$$EC2 = I - 2.1 - 0.2S - 0.01mm$$

$$EC3 = r - 3.6 - 0.4mm$$

The adjustment of credits in the first equation should be interpreted as follows. If, in the initial situation, the variables are in equilibrium, the value of the cointegrating vector EC1 is equal to zero. If, ceteris paribus, GDP increases, the value of EC1 becomes negative. Consequently, credits have to increase to restore the equilibrium. This is reflected in the negative coefficient (-0.210) for EC1. It thus shows an error-correcting behavior of credits, i.e. credits adjust, if the equilibrium given by EC1 is disturbed. With the adjustment of the credit variable, equilibrium will gradually be restored. The adjustment of credit to EC2 and EC3 is not significant. Similarly, the short term reaction of GDP to deviations from equilibrium for all equilibrium terms EC1 to EC3 is not significant.

The following section will estimate single equations, which also contain the securitized products, for credit and GDP growth. Since we have shown that the EC1-term is a relevant variable for explaining changes in credit volumes, it will be used as an explanatory variable in the credit equation. According to the explanations above, the remaining terms EC2 and EC3 do not explain changes in credit volumes and will, therefore, be ignored. Likewise, the single equation estimation for GDP will not consider the EC-terms.

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[27] For a more detailed description of the other cointegration vectors, see the Appendix to this Section.

3.2.2   Securitized products and their relationship to credit and GDP growth

This part empirically investigates the relevance of securitized products for the economic activity. Theoretically, securitized products are first of all likely to influence credit supply. Banks can, by securitizing credits, take credit risks off their balance sheets and receive refinancing for their supplied credit. Therefore, we empirically test whether a stronger growth of securitized products indeed induces an acceleration of credit growth. Furthermore, since GDP growth best describes the economic activity of a country, we test whether securitized products influence GDP growth. We test for a direct influence of securitized products by regressing GDP growth on securitized products and further control variables.

However, we must be aware that there may be an endogeneity problem, because not only securitized products may influence e.g. credit growth, but also vice versa. i.e. high credit growth is likely to induce more securitization activity. To avoid this endogeneity problem, we use lagged values of the explanatory variables. Thus, we assume that the explanatory variable affects GDP or credit growth with a time lag.

Equation 1

$$k_t = \gamma_0 + \gamma_1 k_{t-1} + \gamma_2 y_{t-1} + \gamma_3 r_{t-2} + \gamma_4 b_{t-1} + \gamma_5 EC_{t-4} + \gamma_6 sp_{t-x} + \varepsilon_t$$

In distinction to the vector error correction model presented above, we now use the yearly growth rates of the variables.[28] Equation 1 tests whether securitized products (sp) have an influence on credit growth (k). The hypothesis is that securitized products, calculated as the sum of ABS and MBS, have a positive relationship to credit growth because one would expect that banks are more willing to give a credit if they can transfer credit risks to further investors. Securitized products may need some time to have an effect on the amount of credit granted. Therefore, we experimented with a lag from 1 to 8

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[28] The yearly growth rate x is calculated as the log difference between the value of a variable X today and 4 quarters ahead: $x_t = \log X_t - \log X_{t-4}$. Using yearly growth rates, seasonal effects cancel out.

quarters.[29] Thus, we estimate whether a high securitization in one of the previous quarters influences today's credit growth. We control for further variables that might be relevant to credit growth. First, we control for lagged credit itself, because it is highly probable that credit growth follows an autoregressive process. Next, we use lagged GDP growth (y) to test whether the economic situation impacts GDP. It might be possible that strong economic activity stimulates investment and credit. Furthermore, we include corporate bond yields 2 quarters ahead. In this case we use 2 lags to take into account that interest rate changes may need more than one quarter for changes to transmit into credit growth. Taking into account a further source of refinancing of firms, we also consider growth of outstanding bond volumes (b). Finally, we also include the cointegrating relationship EC1 estimated in the vector error correction model.

Table 7: Influence of securitized products on corporate credit growth

Dependent variable: Credit growth (k)			
Explanatory variable Spec I	*Estimated coefficient Spec II*	*Explanatory variable Spec II*	*Estimated coefficient Spec II*
const	-0.012	const	0.002
k(-1)	0.825 ***	k(-1)	0.900 ***
y(-1)	0.314	y(-1)	0.064
r(-2)	-0.012	r(-2)	0.001
b(-1)	-0.014	b(-1)	-0.024
EC1(-4)	-0.003 *	EC1(-4)	0
sp(-1)	-0.003	sp(-4)	0.010 ***
Adj. R-squared	*0.86*	*Adj. R-squared*	*0.86*

Notes: ***/* denotes significance at the 1 and 10-percent level. Sample period: 2001Q1 to 2010Q4.

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[29] To avoid possible endogeneity problems, we did not consider a contemporaneous relationship between the two variables.

Table 7 shows the results of explaining credit growth on the basis of Equation 1. We present two Specifications, Spec I with a one-quarter lag of securitized products and Spec II with a four-quarter lag. First, we see that in both specifications, we indeed find a significant and strong first lag of credit growth (k), i.e. the autoregressive component is relevant. The lagged macroeconomic variables GDP growth (y), credit rates (r) and, growth of bond volume (b) do not seem to have a significant influence on credit growth. The EC1-term we introduced to take into account differences in the long run equilibrium is significant in Specification I, but not in Specification II. Hence the fact, that credit growth will decrease if there is disequilibrium between the macroeconomic variables is not very robust towards changes in the specification. With respect to securitized products, we find no significant impact on credit growth if securitized products lead credit by one lag. An increase in the lead horizon to four quarters, however, produces a significant result. In this case, an increase in German securitized products by one percentage point increases the growth rate of corporate credits in Germany by one basis point. Note, however, that this result can only be found for a number of exactly four lags. For the lags of one to three quarters as well as five to eight, we did not find a significant impact of securitized products on credit growth. The missing significance for the other lag numbers suggests a lack of robustness which renders it difficult to derive a general positive relationship between the two variables. Furthermore, by estimating a single equation, we only estimated a reduced form and could not take interdependencies within the economic system into account. An estimation for the economic system, with a longer time series for securitized products, which may be available in the years to come, could provide more rigorous results.

Next, we estimate a similar model to test whether growth of securitized products (sp) has an influence on GDP growth. To this end, Equation 2 assumes that GDP growth (y) follows an autoregressive process and includes GDP growth in the first lag. The interest rate (r) is included with 4 lags because interest rate changes usually need about one year to transmit into changes in real economic activity. Again, we test for the significance of the growth of securitized products using several lags from 1 to 8:

Equation 2

$$y_t = \kappa_0 + \kappa_1 y_{t-1} + \kappa_2 r_{t-4} + \kappa_3 sp_{t-x} + \varepsilon_t$$

Table 8 presents the estimation results of two specifications with different lag structures. The estimated results show a strong estimated autoregressive component in GDP growth (y). While the lagged interest rate (r) and outstanding bond volumes (b) are not significant, we find a significantly positive influence of securitized products on GDP growth for lags of one and three quarters.[30] I.e. an increase in the growth of securitized products by one percentage point would lead to an increase by 0.5 basis points after one quarter and 0.8 basis points after three quarters. However, these results are not robust towards a variation of the lag structure. The positive coefficients as presented in

Table 8: Influence of securitized products on GDP growth

Dependent variable: GDP growth (y)			
Explantory variable Spec I	*Estimated coefficient Spec II*	*Explantory variable Spec I*	*Estimated coefficient Spec II*
const	0	const	0.004
y(-1)	0.785***	y(-1)	0.667 ***
r(-4)	-0.082	r(-4)	0.001
b(-1)	0.014	b(-1)	-0.006
sp(-1)	0.005***	sp(-3)	0.008 ***
Adj. R-squared	*0.69*	*Adj. R-squared*	*0.72*

Notes: *** denotes significance at the 1-percent level.

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[30] In another study, we also asked for the influence of securitized products on credit and GDP. There, we used a data series for securitized products from SIFMA which described outstanding securitization volumes in Europe. In that case, we found a positive, weakly significant coefficient of securitized products on credit for a one-quarter lag. More precisely, the coefficient size indicated that credit growth would increase by 3 basis points if growth of securitized products increased by 1 percentage point. However, investigating the influence of securitized products on GDP, we did not find a significant relationship.

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Table 8 indicate a pro-cyclical, leading relationship between securitized prod-ucts and GDP. Indeed, descriptive evidence has shown that the beginning of the financial crisis has caused securitization activity as well as GDP growth to break down. Similarly, around 2010, GDP growth as well as securitzation activi-ty have started to recover again. However, GDP recovered rather strongly and securitization activity only to a small degree.

3.2.3 Equity and Debt Financing

This section presents a quantitative overview of the most important aspects of the primary market functions of investment banking. The primary market functions of investment banks we refer to are the initial or secondary offering in the field of equity financing and the debt securities issuance in the field of debt financing (see Figure 1 for an overview of investment bank activities). To give the reader an impression about the empirical importance of these func-tions, we present for each category a quantitative overview of products result-ing from the respective investment banking activity. To put the figures into perspective, we mostly look at the shares relative to GDP for a country. These figures are compared across countries and during time.

Figure 10: Domestic Market Capitalization (in % of GDP)

Source: ECMI
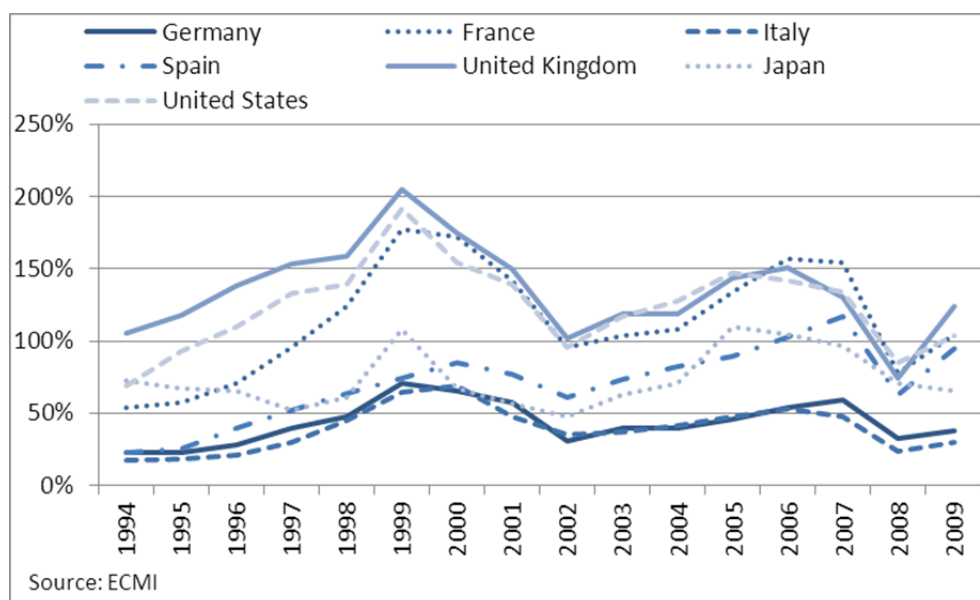
To compare equity and debt financing in major industrial countries, Figure 10 first displays domestic market capitalization in seven major industrial countries, representing the equity side of financing. Market capitalization in % of GDP exhibits peaks in all countries in the years 1999 and 2007, highlighting the high stock prices before the dot-com bubble in 2000 and the ongoing financial crisis starting in 2007. The seven countries under investigation can be put into three groups: Italy, the United States and the United Kingdom with their high market capitalization (all over 100% of GDP in 2009), France and Germany with its rather low market capitalization (both below 40% of GDP in 2009), and Spain and Japan who are in between.

Figure 11: Corporate Debt Securities – outstanding amount (in % of GDP)
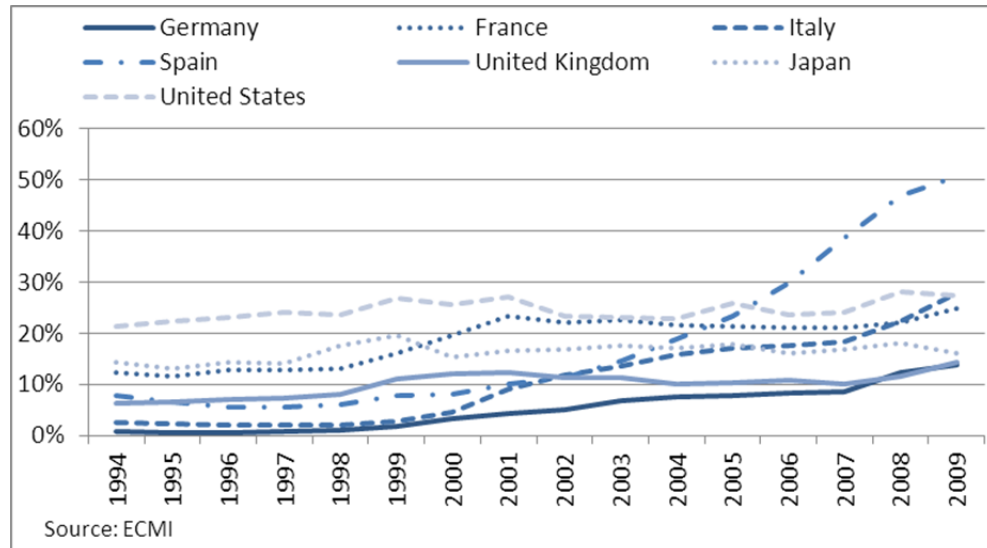
Figure 11 depicts the financing of corporations by issuing corporate debt securities. Again, the same seven countries are taken into account. The first thing to catch the eye is the much lower amount of financing compared to the market capitalization in Figure 10. Furthermore, financing through corporate securities became more important in all countries over time compared to GDP concerning the time span from 1994 to 2009. Again, the numbers for Germany are very low: until 1998, the outstanding amount of corporate debt securities was below 1% of GDP, but this figure rose to nearly 14% in 2009. Compared to the United States, this is still a small share. Here, corporate debt securities are worth 27% of the GDP and they were consistently above 20% over the time

span under consideration. While in Spain and Italy, corporate debt securities became dramatically more important, increasing from 8% of the GDP in 1994 (2.5% respectively) to 51% of the GDP in 2009 (28% respectively), they showed nearly no change in Japan.

The assistance in issuing corporate debt securities falls under the primary market functions of investment banks, whereby the allotment of loans is normally ascribed to the commercial banking side. Figure 12 depicts the value of loans to non-financial corporations in five European countries in % of GDP from 2003 to 2010. While Germany exhibits a slight decrease in loans to non-financial corporations in percent of GDP (from 38% in 2003 to 36% in 2010), lending increased in all other countries. However, with the exception of Spain (from 47% in 2003 to 87% in 2010), the increases are rather small.

Figure 12: Loans to non-financial corporations – outstanding amount (in % of GDP)

Source: ECB
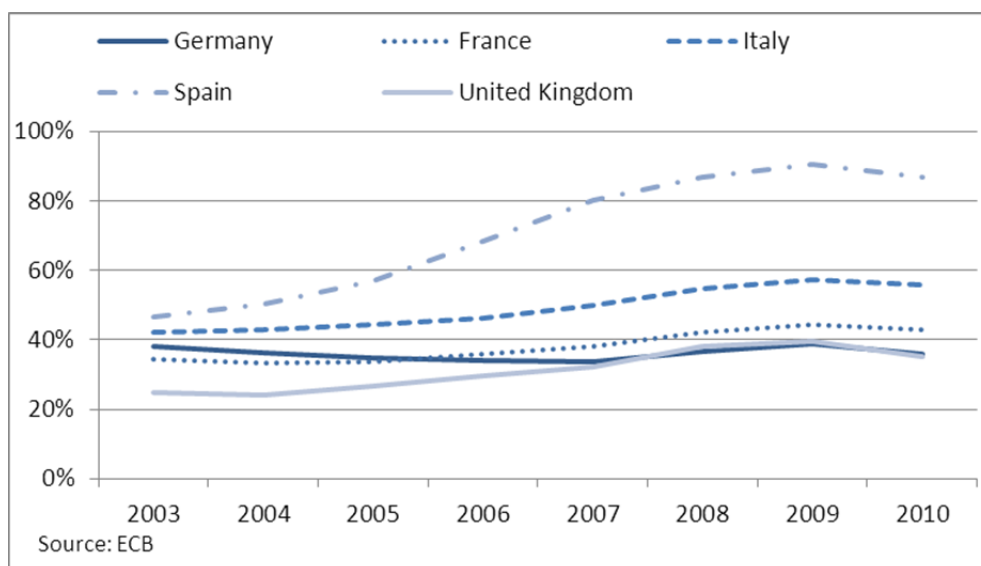
Using the data above, a corporate loans-to-debt-securities ratio can be calculated. It displays the value of loans allotted to non-financial corporations in comparison to debt securities issued by corporations. The outcomes of this ratio are depicted in Figure 13. As the ratio is above one in all countries at any time, it can be inferred that corporations prefer financing through lending over financing through the issuance of debt securities. In 2009 the ratio was

highest in the UK and in Germany. However, in Germany, the issuance of debt securities seems to have become a much more appreciated way of financing by corporations in comparison to lending, as the ratio fell from 5.6 in 2003 to 2.8 in 2009. In the other countries, the ratio is, with a few exceptions, always below 3 and has a slight tendency to fall over the time period under consideration. Thus, the issuance of corporate debt securities may gain importance compared to corporate lending.

Figure 13: Corporate Loans-To-Debt-Securities Ratio

Source: ECB, ECMI, Own Calculations
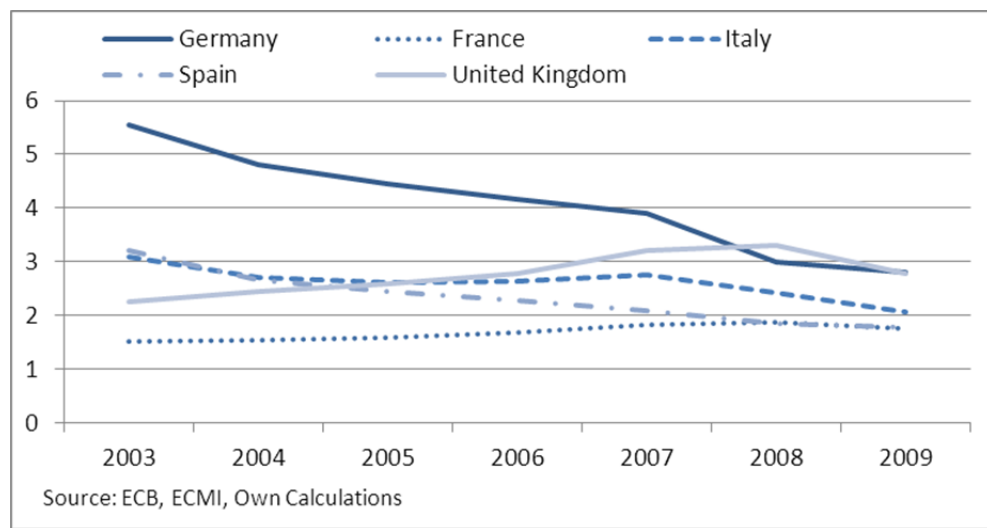
In sum, Germany has relatively low shares of debt and equity financing relative to GDP compared to e.g. the US. Furthermore, the data show that the financing for corporations by loans is in general more important than by issuing debt securities. However, in particular for Germany, debt issuance has caught up during time.

3.2.4 Company Survey on Capital Market Access

Origination activities are crucial in providing financing alternatives to corporate clients that is why a part of our survey questionnaire is exclusively dedicated to the self-assessed advantages of capital market access as opposed to classic debt financing.

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Short Summary of Survey Results:

- Corporate capital market access to equity is granted almost exclusively by investment banks.

- Whereas the fact that a company is public significantly increases the probability by 60% for the company to assess its *equity capital market access* as beneficial, there are no significant size effects in participants' assessment. Furthermore, there are no significant differences in the assessment of growth and values firms and the corporate assessment is not significantly correlated with past performance of the own stock.

- Companies with high book-to-market ratio (value stocks) assess significantly higher benefits of *capital market access for debt financing* as companies with low book-to-market ratio (growth stocks).

- Investments in Research and Development projects in new technologies as well as long-term investment in established technologies are preferably financed by retained earnings, followed by loan financing. The latter is significantly preferred to both equity financing and bond issuance.

- On average companies prefer loan financing to bond issuance and to equity issuance with regard to additional financing of R&D projects, long-term investments and liquidity increases. In contrast, when financing M&A transactions companies tend to have higher preferences for equity issuance compared to bond issuance.

Sample Description

A total of 126 participants have filled in the section on investment banking activities connected to capital market access. There are 52 DAX, MDAX or SDAX companies which have filled in the questionnaire. The other participating companies have (on average) total assets of EUR 4.8 billion (median=1.5 billion). A majority of 75% of them are non-public companies. On total, public companies add up to 56.5% of the sample.

Data

For the purposes of the following analysis the data collected from survey responses has been matched with additional data on companies' balance sheet data (current and lagged), data on financial ratios and history of companies' stock performance. The former has been obtained from Amadeus, and comprises among other things data on size (total assets, turnover, dummy(public)) as well as financial ratios such as gearing, EBIT etc. Data on current market capitalization as well as a history of 5 years of daily stock returns of the responding companies have been obtained from Datastream.

Capital Market Access

Figure 14 How important are investment banks for your company's access to the following financing alternatives?
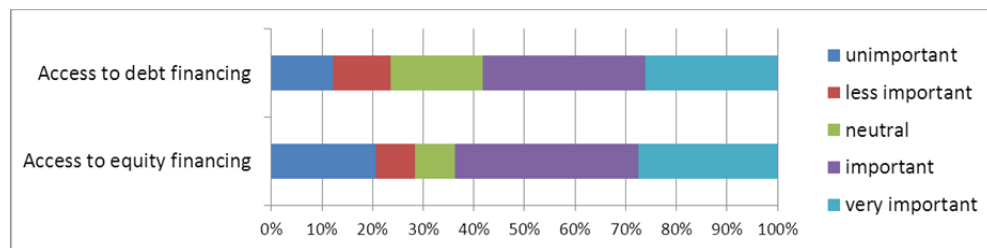
Regarding the importance of investment banks for access to debt financing and equity financing a majority of 58.3% and 63.7% respectively assert that investment banks play an important role or even very important role for their company's access to both financing alternatives. As only slightly more than half of the responses come from public companies it is important to obtain results on investment banking activities conditional on the respective financial option being relevant for the company at all. Figure 15 depicts the results for the group of survey participants who consider debt financing and equity financing respectively at least highly beneficial to their company. This opinion is held by majorities of 77% and 62% for debt and equity respectively.

As can be seen from Figure 15 companies get access to equity capital markets almost exclusively through investment banks. A majority of 87% of the companies relying on equity consider the contribution of investment banks for granting primary market access as important or very important and only a minority of 2.9% thereof assess investment bank activities as completely irrel-

evant for corporate access to equity financing.[31] Considering the access to debt financing a slightly different picture arises – a majority of 68.9% of the companies relying on debt financing report that investment banks play an important role for the access to debt financing. The result is plausible considering the fact that a part of debt financing is loan financing which is rather ascribed to commercial banking activities.

Figure 15 How important are investment banks for your company's access to following financing alternatives? (conditional 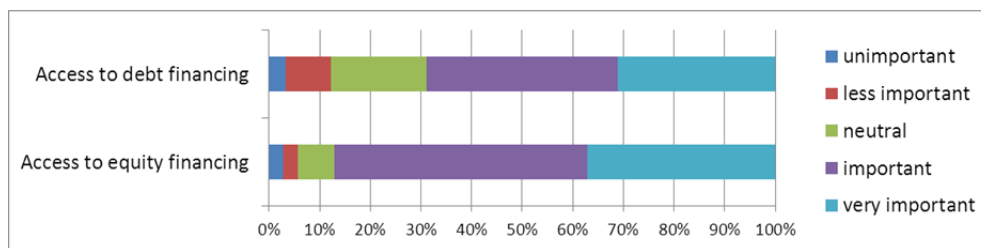on respondents assessing the access to the respective financing alternative as at least highly beneficial to the company [Q.1.2.])

Fehler! Ungültiger Eigenverweis auf Textmarke. shows that there is no significant evidence for size effects on the perceived benefits of capital market access. Analogous results are obtained for total assets as a proxy variable for company size. As could be expected, a large part of the variation in the perceived benefits of equity capital market access can be explained by a dummy variable whether the company is public or not. The results suggest (h2) that the fact that a company is public increases the probability by 60% for the company to assess its equity capital market access as beneficial. Equations (h1) and (h2) attempt to explain the remainder of the variation as they focus on the group of survey responses from public companies alone. Surprisingly, the perceived benefits of equity capital market access are not significantly influenced by the past development of the own company's stock market returns (see h1).[32]

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[31] This positive assessment of the contribution of investment banks regarding the access to equity finance is confirmed by Fernando et al. (2011) for US companies.

[32] The independent variable "mean daily returns" comprises the returns over the last 5 years obtained from Datastream. Surprisingly, similar results are obtained when the rela-

Table 9 How do you assess the benefits of equity capital market access for your company?

y= Prob(High/very high benefits of equity access) [Q.1.2.] dy/dx= Marginal effects after bootstrap Model: probit	(h1) dy/dx	(h2) dy/dx	(h3) dy/dx	(h4) dy/dx
Turnover [Mio EUR, last, Amadeus]	2.30e-06 (0.873)	2.36e-06 (0.924)	4.08e-06 (0.847)	9.57e-06 (0.432)
(d) Dummy: Public company Source: Amadeus	-	-	0.58*** (0.000)	
Book-to-market ratio [Source: Amadeus]	0.0106083 (0.883)	0.0029918 (0.963)		
Mean Daily Return (5y) [Source: Datastream]	81.9767 (0.497)			
mean(y)	0.85	0.85	0.65	0.65
Pseudo R^2	0.032	0.021	0.281	0.057
N	61	62	95	95

Marginal effect s; p-values in parentheses

(d) for discrete change of dummy variable from 0 to 1

* p<0.1, ** p<0.05, *** p<0.01

Note: Results from Probit regressions with bootstrap standard errors. The tested models are of the following form: $\Pr(\, y = 1 \,|\, x) = \Phi(x'\beta)$

Furthermore, the impact of book-to-market ratio for public companies has no significant impact on perceived benefits of capital market access. The results suggest that value companies (high book-to-market) assess only insignificantly more often the access to equity financing as beneficial as compared to growth companies (low book-to-market). Regarding the assessment of the benefits of capital market assess for debt financing, however, the relationship is significant – companies with high book-to-market ratio (value stocks) assess significantly higher benefits of capital market access for debt financing as companies with low book-to-market ratio (growth stocks).[33] This is the result of a (non-

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tive daily volatility of the own stock returns is used as a proxy variable. Results are available upon request.

[33] This is an indication that companies with high book-to-market ratio perceive their stocks as being undervalued which diminishes their interest in issuing equity. The opposite is true for companies with low book-to-market value.

parametric) unpaired Mann-Whitney U Test for differences between the responses of the group of value stock companies and growth stock companies[34] in the sample and the result is significant at 5% significance level (p-value=0.0178).

Survey participants were also asked to assess the development of their company's access to different financing alternatives – equity, debt and loan financing.

Figure 16 How did your company's access to the following types of financing change over the past 3 year (2007-2010)?
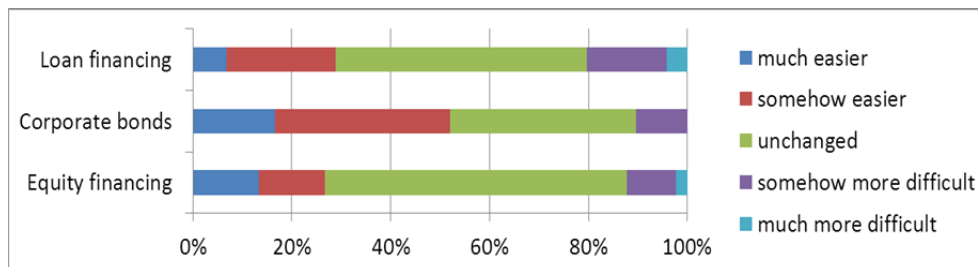
As can be obtained from the results depicted in Figure 16 regarding access to loan financing and equity capital market access, the majority of companies (50.9% and 61.1% respectively) do not report any changes for the period 2007-2010. In contrast, a majority of 52.1% of the responses indicate that the access to corporate financing through bond issuance has rather increased. Comments of the survey participants indicate that the considered timeframe has been marked by two subsequent periods of opposite development of the access to all three financing alternatives – whereas the development of the access in the first years of the financial market crisis has been negative, a positive development after the beginning of 2010 is reported. The two opposite developments might be a reason for the rather neutral results on the development of the access to loans and equity financing illustrated on Figure 16.

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[34] The sample (of public companies) is divided into two equally sized subsamples and value stocks are defined as stocks with a book-to-market value above the sample median and analogously growth stocks are defined as stocks with book-to-market value below the sample median book-to-market value.

The survey participants were also asked to assess the relevance of different financing alternatives for diverse investment projects. The results are depicted in Figure 17 - Figure 19.

Figure 17 For the funding of which projects in your company would you consider additional equity issuance as a part of the financing mix?
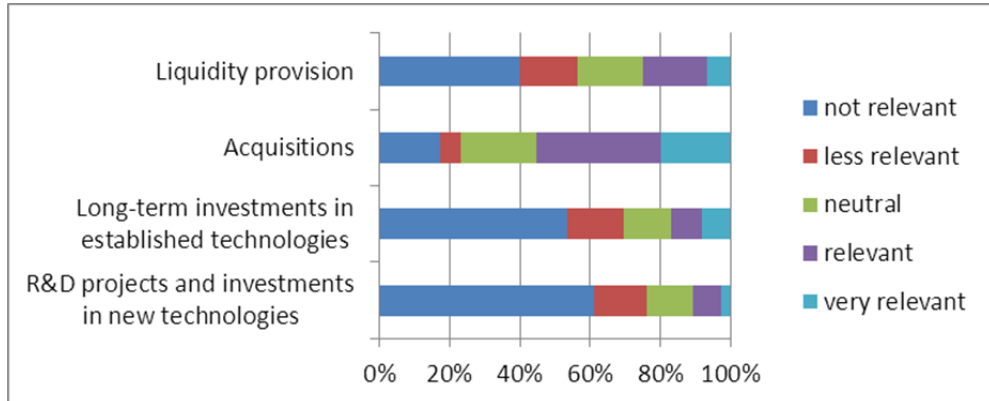
Figure 18 For the funding of which projects in your company would you consider additional bond issuance as a part of the financing mix?
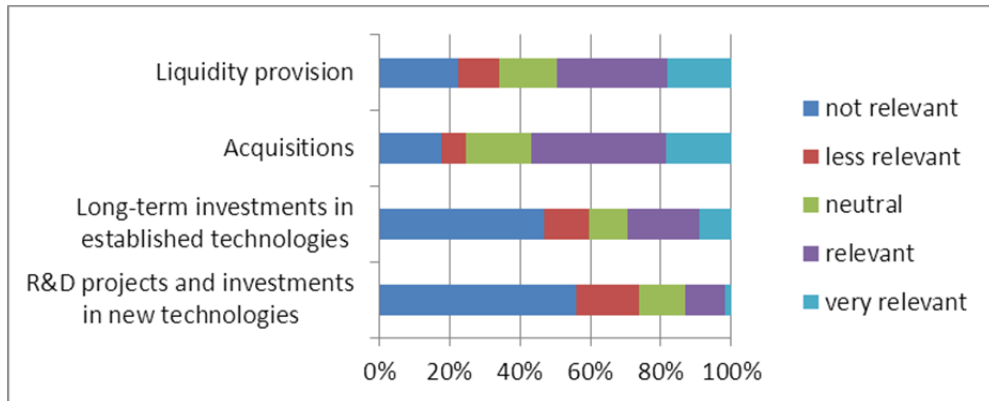
Figure 19 For the funding of which projects in your company would you consider additional loan financing as a part of the financing mix?
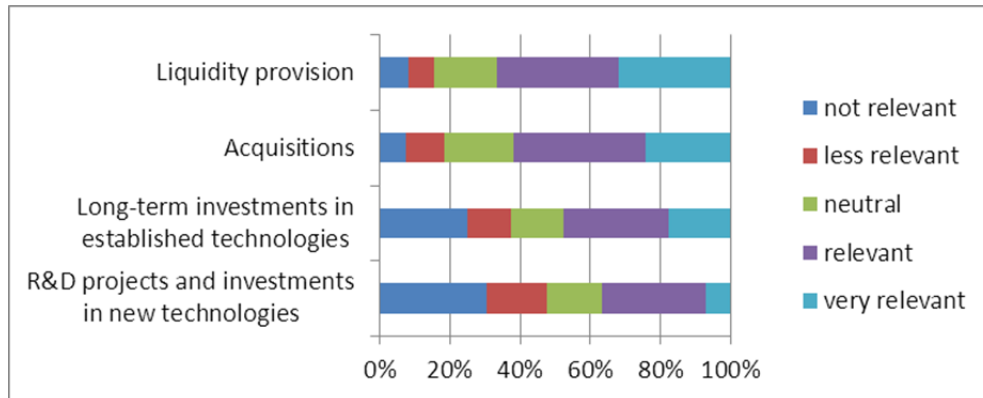
Table 10 depicts the differences in the responses for different financing alternatives (equity, bond, loans). The results from the paired t-test reveals the t-statistics for differences in the mean perceived relevance of financing alternative X1 (on the vertical axis) and financing alternative X2 (on the horizontal axis). A negative sign of the t-statistic means that the average relevance of financing option X2 is greater than the average relevance of financing option X1. The left column depicts analogously the p-values from the nonparametric Wilcoxon sign-rank test for differences in the distribution of perceived relevance of financing alternative X1 and financing alternative X2.

The results suggest that loan financing is considered more relevant with regard to any of the four types of investments – Research and Development (R&D) projects, long-term investment in established technologies, M&A transactions and liquidity increase. As could be expected classical debt-financing is the first-best alternative regardless of the investment project. Furthermore, additional bond issuance is considered significantly more relevant than (the more volatile) equity financing when it comes to long-term investment in established technologies or liquidity increase. Regarding R&D investment in new technologies, in contrast, the companies in our sample are rather indifferent between bond and equity financing. The best financing option for R&D projects among the listed financing options, loan financing, is still considered "relevant" or "very relevant" by slightly above one-third (36.5%) of the respondent, indicating that other financing opportunities – e.g. retained earnings, are the first-best option for financing of innovation projects. A similar picture aris-

es with regard to long-term investments in established projects – retained earnings remain the first-best option followed by loan financing. In this case, however, bond issuance is significantly preferred to equity financing.

Table 10 Testing for differences in the relevance of financing alternatives across diverse investment projects

H0: Relevance (fin. altern. X1)=Relevance (fin. Altern. X2)	Wilcoxon Sign-Ranks tests p-values		T-test, paired t-stat (X1-X2)	
X1\X2	Bonds	Loans	Bonds	Loans
R&D Projects				
Equity	(0.9540)	(0.0000)	-0.289	-6.181***
Bonds		(0.0000)		-5.4151***
Loans				
Long-term investment				
Equity	(0.0285)	(0.0000)	-1.886**	-6.567***
Bonds		(0.0003)		-4.0159***
Loans				
M&A Transaction				
Equity	(0.7080)	(0.1230)	0.676	-1.8174**
Bonds		(0.1258)		-1.9577**
Loans				
Liquidity				
Equity	(0.0001)	(0.0000)	-3.904***	-8.3053***
Bonds		(0.0000)		-4.4776***
Loans				

* p<0.1, ** p<0.05, *** p<0.01

The results further suggest that for almost all of the listed projects bonds are on average preferred to equity financing. An exception, however insignificant, is given in the case of financing M&A transaction – on average companies report higher preferences for equity issuance to bond issuance.

3.3 Derivatives

3.3.1 Descriptive Analysis of the Derivatives Market

OTC Derivatives and Market Volume Worldwide

By the end of December 2010, the total notional amount outstanding of OTC derivatives accounted for EUR 452 trillion. At the same time, the gross market

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value of OTC derivatives added up to roughly EUR 16 trillion.[35] Both in terms of notional amount (Figure 20) and gross market value (Figure 21), interest rate contracts make up the largest part of all OTC derivatives. In terms of notional amount outstanding, 77.4 % of all OTC derivatives are interest rate contracts, namely swaps (60.6%), options (8.2%) and forward rate agreements (8.6%).

Figure 20: OTC-Derivatives by Notional Amount Outstanding (billions of Euro)
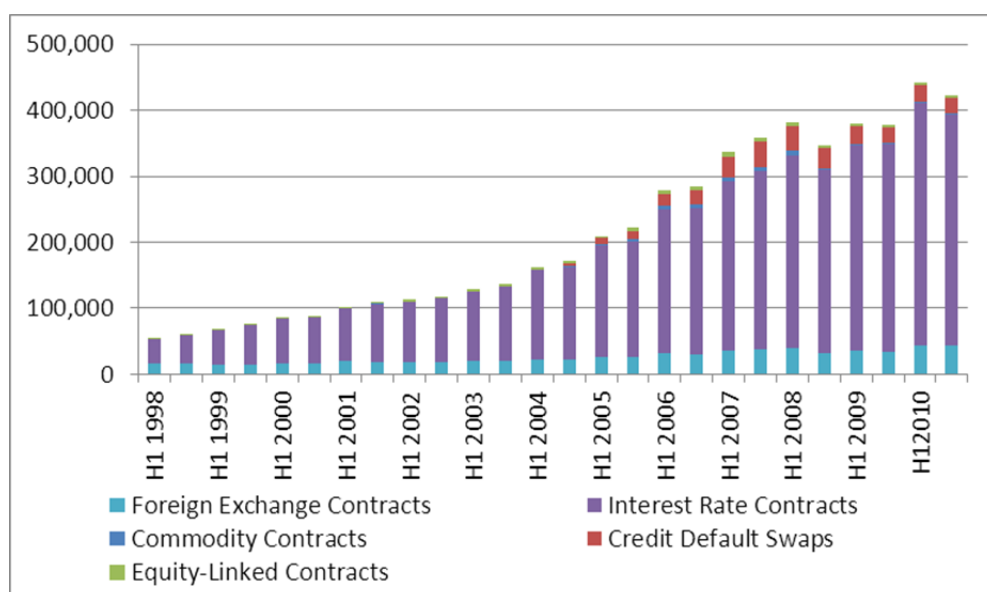
Source: ECMI Statistical Package 2010 and Bank for International Settlements (2011a)

Note: The notional amount outstanding is defined as the gross nominal or notional value of all deals concluded and not yet settled on the reporting date. The amounts are converted to EUR at the EUR/USD rate prevailing at the end of the month of the reporting period. Not allocated contracts are not included.

Interest rate derivatives tend to have longer maturities as roughly 60% of all interest rate derivatives have a maturity longer than 1 year in contrast to the

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[35] The data is obtained from Bank of International Settlements (2011a). Data for previous periods is obtained from ECMI Statistical Package 2010. The ECMI Statistical Package is largely based on BIS data. BIS gathers data on OTC-traded contracts from the reports of leading global dealers in 11 reporting countries and data on exchange-traded contracts from FOW TRADEdata, the Futures Industry Association and various futures and options exchanges.

second-largest OTC derivatives type - foreign exchange derivatives, where the respective percentage lies at roughly 34%. The proportion of interest rate derivatives lies slightly lower when accounting for market value - in terms of gross market value, interest rate derivatives still account for 69.1% of the total volume of OTC derivatives. This may be due to the fact that interest rates are a less volatile underlying compared to foreign exchange rates. Foreign exchange contracts and credit default swaps account for a considerably lower percentage of all OTC contracts.

Figure 21: OTC Derivatives in Gross Market Value (billions of Euro)

Source: ECMI Statistical Package 2010 and Bank for International Settlements (2011a)

Note: Gross market values are defined as the sum of the absolute values of all not settled contracts evaluated at market prices prevailing at the end of the reporting period. The amounts are converted to EUR at the EUR/USD rate prevailing at the end of the month of the reporting period. Not allocated contracts are not included.

In terms of notional amount outstanding, 9.6% of all OTC derivatives are foreign exchange contracts and 5.0% of all OTC derivatives are credit default swaps. Equity-linked contracts and commodity contracts play a minor role within OTC derivatives, as they account for less than 1 per cent of the total notional amount outstanding. In terms of gross market, value this percentage

is slightly larger - 3% of all OTC derivatives are equity-linked contracts and 2% of all OTC derivatives are commodity contracts. Roughly 7% of all OTC derivatives are unallocated (both in terms of gross market value and notional amount outstanding). As can be seen in Figure 20, the notional amount outstanding remained almost unchanged during the Financial Crisis and reached its historical maximum in the first half of 2010. Although significantly diminished during the Financial Crisis, the derivatives usage measured by the total volume of gross market value (Figure 21) has largely recovered during 2010 and exceeds its pre-crisis level.

Exchange-Traded Derivatives and Market Volume

At the end of December 2010, the total notional amount outstanding of financial derivatives on organized exchanges accounted for EUR 51 trillion, with 33% futures and 67% options (Bank of International Settlements 2011b).

Figure 22: Notional Amount Outstanding of OTC Derivatives vs. Exchange Traded Derivatives (billions of Euro)

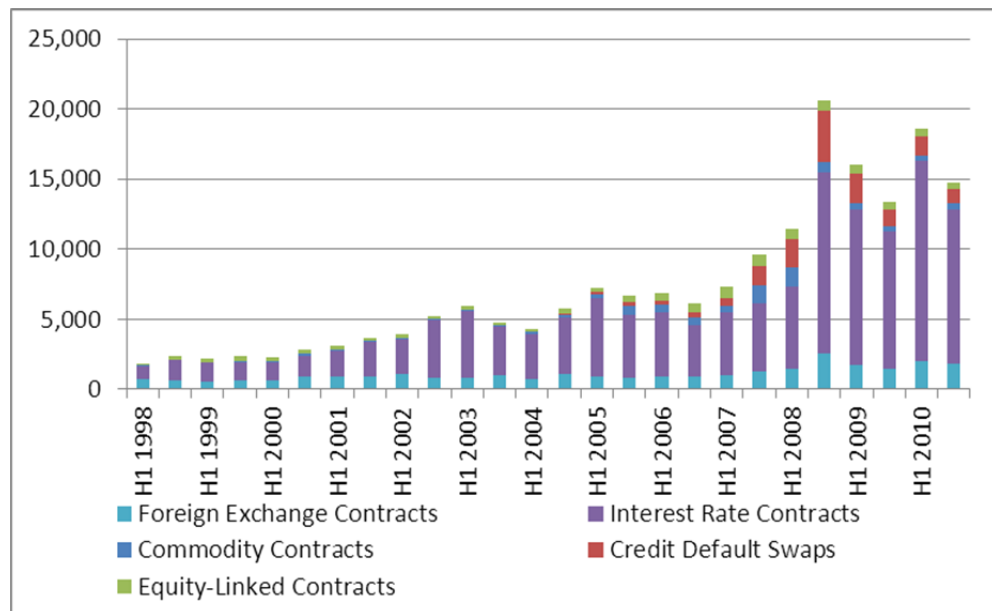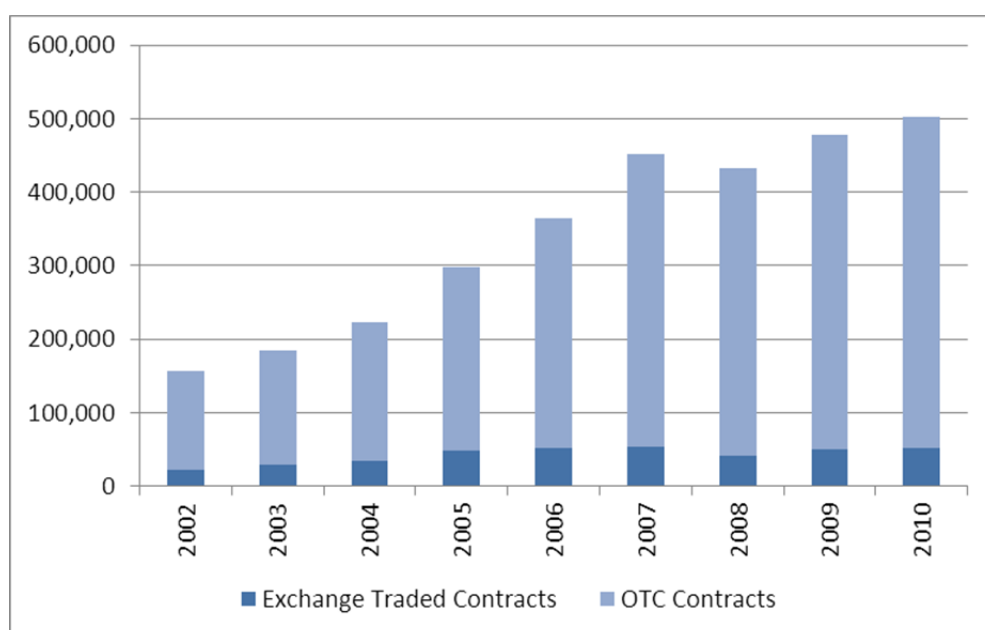*Source: ECMI Statistical Package 2010 and Bank for International Settlements (2011a)*

Around 40% of the exchange-traded futures and the exchange-traded options were traded in Europe. Exchange-traded derivatives contracts account for

around 10% of the total derivatives volume measured by notional amount outstanding (see Figure 22). The proportion of exchange-traded contracts has decreased significantly (by 6.15 percentage points) compared to the respective proportion 5 years ago due to an increase in OTC derivatives usage in the last years.

OTC Derivatives Trades by Corporate Firms

A comparison of the counterparties of OTC derivatives contracts worldwide shows that non-financial customers[36] only account for less than one-tenth of the total OTC derivatives trades. Most OTC derivatives are executed within the financial industry – between commercial and investment banks and security houses in the reporting countries[37] acting as Reporting Dealers for the statistics of Bank of International Settlements (2011a) and between Reporting Dealers and other financial institutions such as central counterparties, non-reporting banks and funds. It should be noted that the relation of transactions of corporates vs. financial institutions is reported based on transaction data and an application as a proxy for derivatives usage is not straightforward. A financial institution A can for instance hedge a derivative contract concluded with another financial institution B by means of a second (opposite) derivative contract concluded with financial institution C. Both transactions thereby practically cancel each other out in terms of risk-exposure but the reported notional amount outstanding equals twice the notional amount of each of the transactions. While this case is particularly relevant for financial institutions[38] it rarely appears in transaction of non-financial insitutions. That is why the reported relation of transactions of corporates vs. financial insitutions should rather be regarded as an upper bound of the relation of derivatives usage of corporates vs. financial usage.

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[36] The definition of non-financial customers includes all counterparties other than financial institutions and reporting dealers. In practice the group is composed of corporate firms and governments. Since data on the separate groups is missing, the reported statistics can be interpreted as an upper bound for the derivatives usage by corporate firms.

[37] There are 11 reporting countries given as follows: Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom and the United States.

[38] See e.g. ECB (2009) regarding credit derivatives.

The proportion of usage of OTC derivatives by non-financial customers such as corporate firms is highest in OTC foreign exchange derivatives. In December 2010 the proportion of the notional amount outstanding of OTC foreign exchange derivatives traded by non-financial customers lies at 17.7% of the total notional amount outstanding of OTC foreign exchange derivatives (see Figure 23). In the course of the financial crisis, this percentage has only been slightly diminished. In contrast, the usage of foreign exchange derivatives contracts by financial institutions (including reporting dealers) has been significantly affected by the Financial Crisis but has returned to its pre-crisis values in the meantime.

Figure 23: Notional Amount Outstanding of OTC Foreign Exchange Rate Derivatives by Counterparty (billions of euro)
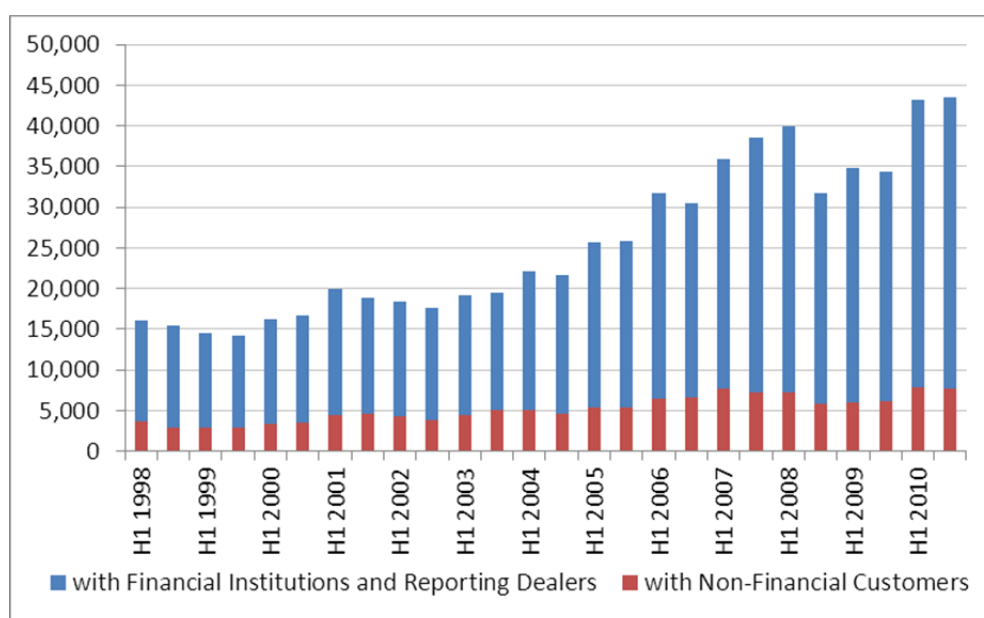
Source: ECMI Statistical Package 2010 and Bank for International Settlements (2011a)
Note: The notional amount outstanding is defined as the gross nominal or notional value of all deals concluded and not yet settled on the reporting date. The amounts are converted to EUR at the EUR/USD rate prevailing at the end of the month of the reporting period.

The proportion of OTC derivatives usage by non-financial customers lies at 8% in the category of interest rate derivatives measured by the notional amount outstanding of OTC interest rate derivatives contracts (see Figure 24). Similarly to non-financial customers' usage of foreign exchange derivatives, the usage

of interest rate derivatives decreased only slightly in the course of the financial crisis. For financial institutions (including reporting dealers) the usage of interest rate derivatives displays an increase in the course of the financial crisis in contrast to the usage of foreign exchange derivatives. Germany accounts for 14% of the trading volume of interest rate derivatives (see Deutsche Bundesbank 2003). According to the report Germany is thus the third most important dealer of interest rate derivatives worldwide after the United Kingdom and the United States.

Figure 24: Notional Amount Outstanding of OTC Interest Rate Derivatives by Counterparty (billions of euro)
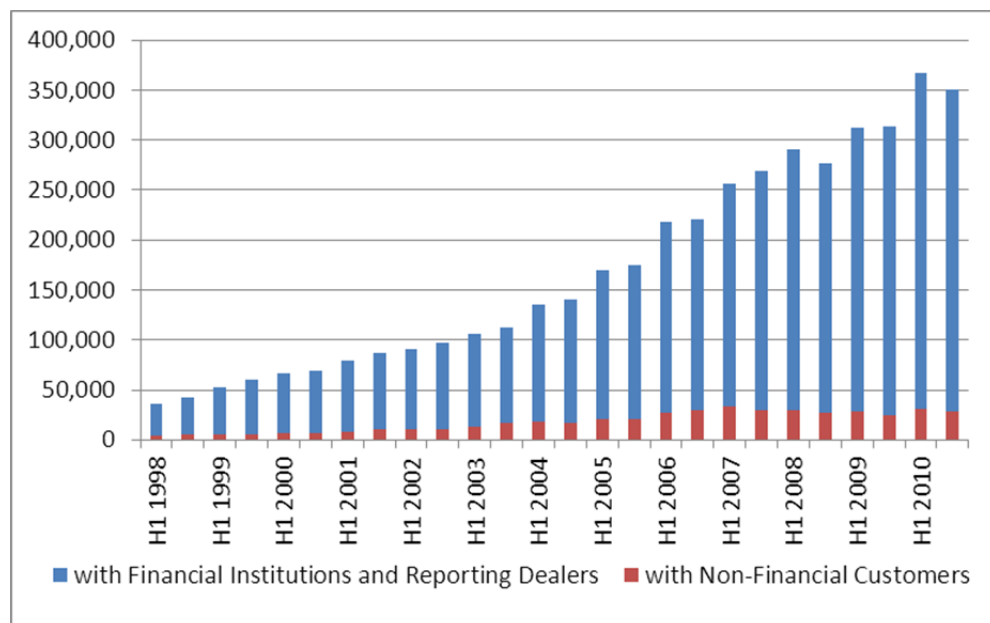
Source: ECMI Statistical Package 2010 and Bank for International Settlements (2011a)

Note: The notional amount outstanding is defined as the gross nominal or notional value of all deals concluded and not yet settled on the reporting date. The amounts are converted to EUR at the EUR/USD rate prevailing at the end of the month of the reporting period.

The third-largest category of OTC derivatives – OTC Credit Default Swaps (CDS), exhibits an even smaller proportion of usage by non-financial counterparties (see Figure 25). In December 2010 non-financial customers accounted for roughly 1% of the OTC-traded CDS measured by notional amount outstanding. The highest proportion of OTC CDS is traded by financial institutions including reporting dealers (73.2 %) and banks and security firms (24.6%). Insur-

ance firms also account for only a marginal part of the OTC traded CDS. Despite the reported comparably low percentage of OTC derivatives traded by non-financial customers directly, the indirect derivatives usage of both companies and private investors might well exceed direct usage. Private investors for example invest roughly 85% of their wealth in funds (e.g. hedge funds, mutual funds, pension funds), banks and insurance companies (see Schröder et al. 2010) which, on their part, invest it partly in derivatives. The analogous argument holds for corporate investments in funds, banks and insurance companies. That is why the impact of derivatives on the real economy through their usage by corporate firms and private investors might well exceed the impact through the direct usage of derivatives. However, measuring the indirect usage of corporate and private customers through their investments in banks, funds and insurance companies is outside the scope of the current research report.

Figure 25: Notional Amount Outstanding of OTC Credit Default Swaps by Counterparty (billions of Euro)
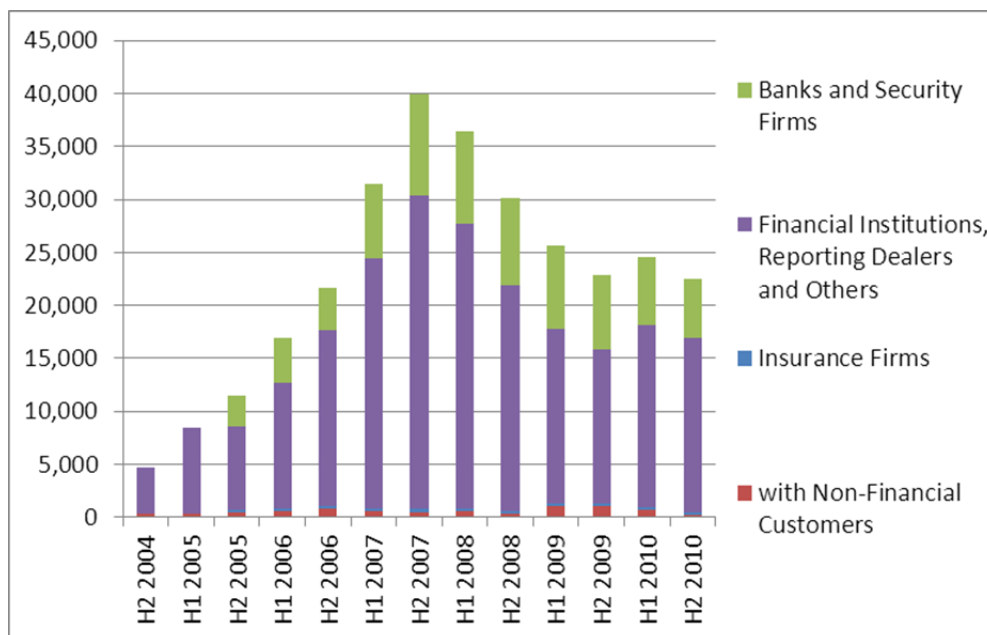
Source: ECMI Statistical Package 2010 and Bank for International Settlements (2011a)

3.3.2 Literature Review on Role of Derivatives for the Economy

The microeconomic and macroeconomic benefits of the usage of financial derivatives are closely intertwined. From a microeconomic perspective, financial derivatives may occur as a zero-sum game because every position has an exact counter position (Gibson and Zimmermann 1996).[39] In practice market participants are not equally informed about the risks they are exposed at because information is not available to everyone or because it is available but is costly[40]. Market participants are furthermore heterogeneous with respect to their risk aversion. In this case an efficient asset allocation would rather imply that risks are faced by the most risk neutral and most informed agents and the most risk-averse and uninformed agents are rather "insured" against them. Because of differences in the level of information among market participants and differences in their risk aversion, derivatives transactions may increase the utility of both counterparties, which means that derivatives transactions are no pure zero-sum games but rather enable real welfare increases (see e.g. (Arrow 1953, 1964 and Debreu 1959).

From portfolio choice perspective derivatives constitute an additional asset class. First, by means of a combination of options (structured products) certain cash-flow structures can be achieved which are not achievable with any combination of the underlying assets. Second, derivatives markets allow investment in (or insurance against) underlyings which are otherwise not tradable on financial markets (e.g. weather derivatives, mortality rate derivatives). Derivatives thus provide investment opportunities which otherwise would not be available to investors and in such a way they possibly contribute to improvement of the portfolio choice of both corporate firms and institutional inves-

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[39] In the case of an interest rate swap for example variable interest payments are exchanged against respectively agreed fixed interest payments. In the case of an interest rate option (cap, floor etc.) the excess interest payments are exchanged against an option premium.

[40] The time required to acquire information is also included in the definition of "information costs". In fact, the more binding the time constraints of the individual market participants are the higher the information costs are.

tors[41]. Theoretical models undermining this argument show that simple options are necessary and sufficient to complete markets and achieve an efficient risk allocation and thus maximize welfare (see Ross 1976, Hakansson 1978).

On the other hand, it has been frequently argued that derivatives may harm spot markets because they deprive them of *liquidity* and increase their *volatility*. Furthermore, discussing the impact of *speculation* is even more relevant with regard to derivatives markets because derivatives enable taking a view on future price development with less employment of capital and even in the presence of short-selling constraints which makes them more suitable for speculation. The effects on speculative behavior, liquidity and volatility are not independent but rather intertwined. Because derivatives are more suitable for speculation than direct investment on the spot market, derivatives markets are argued to increase the proportion of speculators on the markets in general and thus increase volatility. Speculative trades can be induces by better information (or insider information) or by noisy information. Whereas the former case leads to improvement of information efficiency in the latter case the impact of speculation is either considered negligible (Friedman effect) or rather harmful. Theoretical literature argues that presence of noise traders itself adds uncertainty from the point of view of informed investors which makes them stay out of the market ("create-space" argument by DeLong et al. 1990b). As a consequence liquidity of the spot market is decreased and volatility is increased. Whether or not derivatives have an impact on the spot markets liquidity and volatility is a matter of empirical evidence.

Empirical studies on the impact of derivatives on volatility distinguish between the impact of futures and the impact of options on the underlying spot mar-

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[41] It should be noted that improved diversification opportunities for institutional investors (e.g. banks, funds, insurance companies) contributes to more stable investment returns of private investors' and corporate investors' assets as a significant part of it is invested in banks, funds and insurance companies. By improving diversification opportunities for institutional investors and thus enabling more stable investment opportunities for private investors and corporate firms, derivatives have an additional, *indirect* impact on the real economy.

kets. For options contracts a tendency towards stabilization of the price development on the spot market is evidenced (see Rudolph and Schäfer 2005, p. 386). The results should be interpreted with caution because they no longer hold in times of a crisis. Regarding the impact of futures on volatility of the spot market empirical studies face a problem of data availability and the scarce empirical evidence is rather mixed.

The impact of derivatives on *liquidity* of the spot markets is ambiguous. On the one hand derivatives constitute an alternative investment as opposed to a direct investment in the underlying on the spot market insofar are derivatives markets argued to deprive spot markets of liquidity. On the other hand derivatives used in combination with an investment in the underlying may make the latter more attractive (e.g. less risky). By enabling cash-flow structures which are not achievable solely by investment in the underlying on the spot market the availability of derivatives may boost trading volumes on the spot market and increase their liquidity. Empirical studies on the impact of derivatives on both liquidity and trading volumes of the spot markets find no evidence of any significant relationship.

Last but not least, economic risks resulting from the usage of financial derivatives should be considered. Amongst the arguments against the usage of financial derivatives is a decline of long term investments in favour of short term *speculative transactions* (Gibson and Zimmermann 1996). Case studies such as Procter & Gamble or Metallgesellschaft have been frequently cited in order to illustrate the harmful effects of the usage of financial derivatives for speculation (see e.g. In fact, financial derivatives played an important role in the recent financial crisis. In 2008, credit default swaps accounted for a significant part of the trading volume of all derivatives (Figure 20). It is considered as rather unlikely that this significant proportion results from market stabilizing hedging but rather from market destabilizing speculation. After the recent financial crisis, international regulators identified the weaknesses of OTC-derivative markets, namely counterparty risks and higher intransparency of pricing as compared to exchange-traded derivatives where counterparty risks are considered negligible and the pricing is more transparent because products are standardized and quotes are two-sided.

3.3.3 Literature Review on Exchange Rate Uncertainty and Trade

A research field that might give indication of investment banks' importance is the literature on foreign exchange rate uncertainty. The relevance of foreign exchange volatility for internationally trading companies is obvious. Since investment banks supply valuable instruments for hedging the risks emerging from foreign trade, the question of their overall importance for enabling stable trade relationships in volatile exchange rate environments is at hand. The main points discussed are:

- For developed countries no (economically) significant effect of foreign exchange rate uncertainty on trade can be observed.

- Empirical analysis fails to explain this insignificance by the advantages of the availability of hedging instruments.

- The positive effect of membership in a currency union is largely attributed to other aspects than the reduction in foreign exchange risk that come along with currency unions.

- For less developed countries a negative impact of exchange rate volatility on trade is confirmed. Since their foreign exchange markets are typically less developed this speaks in favor of the importance of liquid and accessible hedging markets.

Does exchange rate volatility hamper trade between developed countries?

It is usually argued that exchange rate risk has a negative effect on international trade. The rationale is that greater exchange rate risk increases the riskiness of trade profits, leading risk-averse traders to reduce trade. This widespread view was one of the main economic arguments for the European Monetary Unification (see EU Commission, 1990). Surprisingly then, results in academic literature are less clear in theoretical as well as in empirical analyses. Consensus is lacking on the direction of the impact of foreign exchange volatility on trade as well as on the magnitude of the impact. Overall, a larger number of studies find that volatility tends to reduce the level of trade, but when the effect is measured, it is found to be relatively small.[42]

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[42] Comprehensive reviews can be found in the papers of Côté (1994) and McKenzie (1999).

Review of the Theory

Theoretical analyses of the relationship between higher exchange-rate volatility and international trade transactions have been conducted for a long time. An early example is the work of Hooper and Kohlhagen (1978). The economic rationale in the models is as follows: Higher exchange-rate volatility leads to higher costs for risk-averse traders and to less foreign trade. Clear-cut conclusions, however, require restrictive assumptions of the underlying utility functions. Furthermore, the effect of volatility also depends on the risk exposure of the firm towards the risk which is determined by different factors including processing of imported inputs, currency denomination of contracts and in particular hedging possibilities. Hedging should be relatively simple and inexpensive for firms with a short-term delivery horizon.

More recent theoretical models take into account sunk costs that can appear in international transactions (Dixit 1989). These models focus on the profit opportunities created by greater exchange rate uncertainty. Such opportunities arise from the probability of making exceptionally large profits. The value of the "real option" to export increases with an increasing volatility of exchange rates. This positive effect on the utility of the firm has to be weighed against the negative effects created by greater uncertainty for the risk-averse firm.

In summary, the impact of exchange rate volatility on foreign trade is an empirical issue because theory alone cannot determine the sign of the relation between foreign trade and exchange rate volatility.

Review of Empirical Results

The empirical studies examining the relationship between foreign exchange volatility and trade take into account different measures of foreign exchange uncertainty as well as different econometric approaches. Furthermore, a wide range of countries is analyzed. However, like theoretical analysis, empirical analysis does not allow clear conclusions either. Overall, a larger number of studies confirm the conventional assumption that exchange rate volatility tends to reduce the level of trade (De Grauwe and Verfaille 1988, Bini-Smaghi 1991, Rose 2000 and Barro and Tenreyro 2007). However, the magnitude of this effect is mostly rather small. On the other hand, there is also evidence on the theoretical models predicting a positive effect of exchange rate volatility

on export volumes (Asseery and Peel 1991 and Kroner and Lastrapes 1993).To give an impression of the possible effect of foreign exchange volatility on bilateral trade[43] a more recent study by Clark et al. (2004) can be referred to. The authors confirm that the long-run real exchange rate volatility has a statistically significant negative effect on trade. Their results are comparable to the previously mentioned studies. They find that an increase in exchange rate volatility by one standard deviation would lower trade by about 7 percent. However, Clark et al. (2004) point out that the negative effect on trade is not robust to a more general specification model linking bilateral trade to its determinants.[44] They therefore conclude that their finding of a negative effect of exchange rate volatility on trade is not robust.

Hedging

Among the most prominent reasons which are quoted when trying to explain the lack of significant and clear results is the availability of hedging techniques, which allow traders to avoid most exchange risk at little costs.[45] If hedging can be verified as the factor reducing the impact of foreign exchange volatility on trade to insignificance, this would make a strong point arguing in favor of the economic importance of investment banks which offer hedging instruments to companies. Taking a closer look at the empirical research findings in time it shows that studies finding a significant and negative correlation between foreign exchange volatility are relying on data from the 1970s or early 1980s. In a comparison of early and more recent data, Frankel and Wei (1994) find a negative coefficient before the mid-1980s, but the negative effect has disappeared since. These observations speak in favor of the hedging hypothesis since currency hedging products were not as well developed and readily avail-

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[43] At an aggregate (worldwide) level, there is no evidence of a negative effect of exchange rate on world trade.

[44] The negative effect diminishes when controlling for time-varying country-specific effects.

[45] Other common explanations as mentioned in Côté (1994) are that: (i) even for risk-averse businesses, an increase in risk does not necessarily lead to a reduction in the risky activity, (ii) exchange rate volatility may actually offset some other forms of business risk, and (iii) exchange rate volatility can create profitable trading and investment opportunities.

able in the 1970s and early 1980s as they are nowadays. Aligning the development of hedging instruments to the diminishing significance of exchange rate uncertainty on trade lends plausibility to the hedging hypothesis. However, Wei (1999) raises some issues which need to be considered for the analysis of the hedging hypothesis: First, the cost of hedging instruments is often positively related to exchange rate volatility, furthermore the effect of volatility on forward rates can indirectly be passed on to trade, and hedging instruments may only be available for time horizons shorter than the planning horizon of many internationally trading companies. These points weaken the explanatory power of hedging in accounting for the insignificant effect of foreign exchange volatility on trade. Accordingly the empirical verification by Wei (1999), which uses data on over 1000 currency pairs, fails to support the validity of the hedging hypothesis.

Do members in currency unions trade more?

A topic related to exchange rate volatility and trade but still distinct is the questions of how a common currency arrangement affects trade. When discussing results it needs to be considered that a currency union entails more than just an elimination of exchange rate volatility among its members. Trade among the members of a currency union may also be promoted by decreased transaction costs and enhanced competition through greater transparency.[46] Especially in the case of EMU, integrated markets may have enhanced intra-EMU trade.

Much of the recent interest in the effect of belonging to a currency union was sparked by Rose (2000). He exploits a cross-country dataset covering bilateral trade between 186 economic systems at five-year intervals. However, only a minor fraction of about 1% of the observations involves currency union members. Additionally, most of these countries tend to be smaller and poorer. The striking outcome of the paper —obtained using a so called gravity model[47]— is that common currency arrangements triple trading volume. Since this enor-

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[46] According to Baldwin et al. (2008) the latter effect prevails.

[47] Gravity models of international trade are used to explain the bilateral trade flows. The trade flow is assumed to be proportional to the economic dimensions of the two trading partners and inversely proportional to the distance between the trading partners.

mous positive effect stands in clear contrast with the related literature on exchange rate volatility and trade, and the typically insignificant impact on trade, the finding by Rose has raised much skepticism.[48] Subsequent analysis generally finds a smaller (albeit still sizable) effect of currency union membership on trade. With regard to EMU, implications from Rose's results cannot directly be transferred for several reasons: the currency union members included in the study are smaller, poorer countries, i.e. EMU countries are not included. Besides, countries in existing currency unions are compared with trade relationship between countries where no such agreements have been met. For the EMU it would, however, be appropriate to take into account the possible change in the level of trade for member states surrounding the introduction of the single currency.

By now the positive effect of EMU on trade is widely acknowledged and is dubbed the "euro effect". Being aware of the many trade-enhancing effects of the EMU, studies analyzing the euro-effect distinguish between the effect of the reduction in foreign exchange volatility and a dummy variably capturing other changes, such as capital market integration. A review of recent studies on the euro effect is provided in Baldwin (2006). It is confirmed that changes induced by EMU have a clear trade enhancing effect. On the contrary they negate a significant effect of the reduction in foreign exchange rate volatility reduction. According to his review of relevant literature Baldwin (2006) estimates the euro effect to range between five to ten percent on average. For global currency unions these results are confirmed by Clark et al. (2004). This study, however, indicates that the effect of currency unions is not robust to a model specification including country-pair fixed effects. It is followed that currency union membership may be correlated with other country-pair characteristics capturing the largest part of trade-promoting effect from currency unions.

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[48] In defense of the earlier results Rose and Stanley (2005) conducted a meta-analysis of twenty-four studies investigating the impact of currency unions on trade. Almost all studies confirm that currency unions have a positive effect on trade. Probably the strongest opposition can be found in works by Baldwin. Take for example Baldwin (2006), wherein Rose's results and those of followers are attributed to misspecifications and/or econometric errors.

Is there a volatility effect for developing countries?

A review of empirical evidence indicates the examination of the linkage between foreign exchange rate volatility and trade to be worthwhile. Considering the possibility of foreign exchange risk hedging in developing countries (LDCs), the foreign exchange markets are typically less developed and less liquid. Therefore, exchange-rate risk for LDCs is generally not hedged completely. Arize et al. (2000) furthermore argue that limitations may remain even if hedging in forward markets is possible. For example, size and maturity of contracts may not fit the firms' needs.[49]

Although in contrast to the earlier mentioned study by Wei (1999) there is broad evidence for an exchange rate effect on trade to exist in LDCs (see e.g. Arize et al. (2008) and Siregar and Rajan (2004) for examples). Put differently, in less developed countries, an increase in volatility appears to depress exports.

Conclusion

Since investment banks supply valuable instruments for hedging the risks emerging from foreign trade, it can be conjectured that they are important to enable stable trade relationships in volatile exchange rate environments. However, examining trade relations between developed countries no (economically) significant effect of foreign exchange rate volatility on trade can be observed. When trying to explain this insignificant relation by the availability of hedging instruments, academic examination fails to find corresponding results. A related topic is the positive effect of currency unions on the trade of their members. Research in this area reveals that the effect is largely attributable to the other aspects besides reduction in exchange rate volatility that come with the membership in a currency union. The probably most robust evidence speaking in favor of the importance of hedging opportunities is found for less developed countries. In these countries trade is usually found to be negatively affected by exchange rate volatility while foreign exchange markets tend to be less developed. However, there is no research available focus-

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[49] For further details on the difficulties of hedging in LDC's, it is referred to Medhora (1990).

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ing on the question whether this finding is primarily attributable to the lack of developed foreign exchange markets. But nevertheless this seems to be an economically sound assumption.

3.3.4 Company Survey on Corporate Usage of Derivatives

Determinants and Incentives for the Use of Derivatives

As can be concluded from the literature review the impact of derivatives on economic welfare inevitably goes throught their use in companies in and the financial sector. Academic studies on the corporate usage of derivatives quote various determinants. Corporate firms use derivative instruments for hedging purposes in order to reduce the costs of financial distress (see e.g. Smith and Stulz 1985), reduce external financial costs (see Froot, Scharfstein and Stein 1993), exploit the availability of growth options (see e.g. Nance, Smith and Smithson 1993). Furthermore, the use of derivatives for hedging is argued to increase with increasing managers' risk aversion as well as with an increasing management ownership (Smith and Stulz 1985). Large firms are furthermore more often found to use derivatives for hedging than small and medium-sized firms (see e.g. Francis and Stephan 1993 and Nance, Smith and Smithson 1993).[50] An international micro-data on the use of derivatives by individual companies is not available that is why empirical studies on the determinants of corporate derivatives usage either rely on survey data for single countries or data on off-balance sheet instruments extracted from companies' reports (e.g. data on US companies or companies in New Zealand, see e.g. Berkman and Bradbury 1996)

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[50] As repeatedly acknowledged, there is a further, indirect impact of derivatives on the real economy through companies' and private investors' assets in financial institutions (e.g. banks, funds, insurance companies). The determinants of the usage of derivatives in the financial sector are thus highly relevant if one would examine the total impact of derivatives (direct and indirect) on the real economy. Research in the field is, however, scarce. Studies of the usage of derivatives by institutional investors find evidence on fewer determinants for the usage of financial derivatives compared to studies on corporate investors. Especially company size and debt ratio are determinants according to relevant literature. Concerning the insurance industry, research shows that the extent of reinsurance is a good determinant for the usage of financial derivatives.

Regarding the incentives of corporate firms to use derivatives an issue which has drawn attention in both empirical and theoretical literature is the corporate usage of derivatives for speculation. For the purposes of the current study and the underlying questionnaire we define speculation as any trading activity motivated by willingness to take a view on the development of risk assets which are not directly connected to the company's main economic activity. In contrast, trading activities are classified as hedging if they result in decreasing companies' risk exposures which arise from regular economic activities. Underlying reasons for speculation in terms of taking a view on future market development can be twofold – on the one hand trading with derivatives similarly to any other financial market instruments may be motivated by better information of the market participants or by use of noisy information. Whereas the former case, in general, increases information efficiency of the financial markets, opinions on the impact of trading in the latter case is controversial. Speculation in terms of noise trading is argued to increase volatility of the market price (DeLong et al. 1990b) and give rise to a rational occurrence of price bubbles (DeLong et al. 1990a). On a micro-level noise trading can persist in the long term because it is not necessarily unprofitable for the noise traders (DeLong 1991). From theoretical perspective it is important to examine possible prevalence of speculation on financial markets because of its potential high impact on market risk as well as its potential persistence.

To the best of our knowledge empirical literature on the determinants of the corporate derivatives usage in Germany is missing. We therefore propose a survey procedure to assess the self-reported incentives underlying derivatives trading in corporate firms and among other things also gain more insights on the proportion of speculative trades by corporate firms. Similar survey procedures on the use of derivatives by corporate firms have been conducted for the United States (see e.g. Phillips 1995 and Bodnar et al. 1995). The results of the survey clearly show that most of the time the majority of firms use derivatives for risk management rather than speculation. Further empirical studies on US companies finds no evidence on increased sensitivity of companies' assets to volatility of the underlying sources of companies' financial market risks (see e.g. Allayannis and Ofek 1997).

Within the scope of the survey we account for the difference in the usage of OTC contracts and exchange traded contracts, As the former are more flexible

in their structure (e.g. underlying, maturity, notional amount) they can provide a better hedge for companies' risk exposures hence hedging purposes could be expected to more often underlie OTC transactions than exchange-traded derivatives transactions. In contrast, standardized exchange-traded contracts provide the advantage of more transparent pricing and narrow bid-ask spreads which makes them in turn more suitable for speculation purposes. In fact, empirical evidence for Germany confirms a prevailing usage of exchange-traded warrant contracts for speculation (see Glaser and Schmitz 2007).

The constructed survey questionnaire further focuses on the relevance of the availability of derivatives for different corporate economic decisions (such as e.g. cross-border activities) as well as the impact of regulatory measures within the scope of Basel III for the availability and costs of derivatives as evidence on this issues is missing in academic literature.

Derivatives Usage by Large Corporates

The newest Derivatives Usage Survey conducted by the International Swap and Derivatives Association (ISDA) in 2009 indicates that almost all world's largest companies (94 %) use derivatives (see ISDA 2009). In line with the reported market volumes in Section 3.3.1 the most widely used derivatives contracts are interest rate derivatives and foreign exchange derivatives. The survey has been conducted in March and April 2009 and includes the 500 world's largest companies according to Fortune Global 500. Among others, 36 German companies are included in the sample. In fact, German large corporates use derivatives slightly more often than large corporates worldwide (see Figure 26).

Figure 26: Derivatives Usage by Large Corporates in Germany
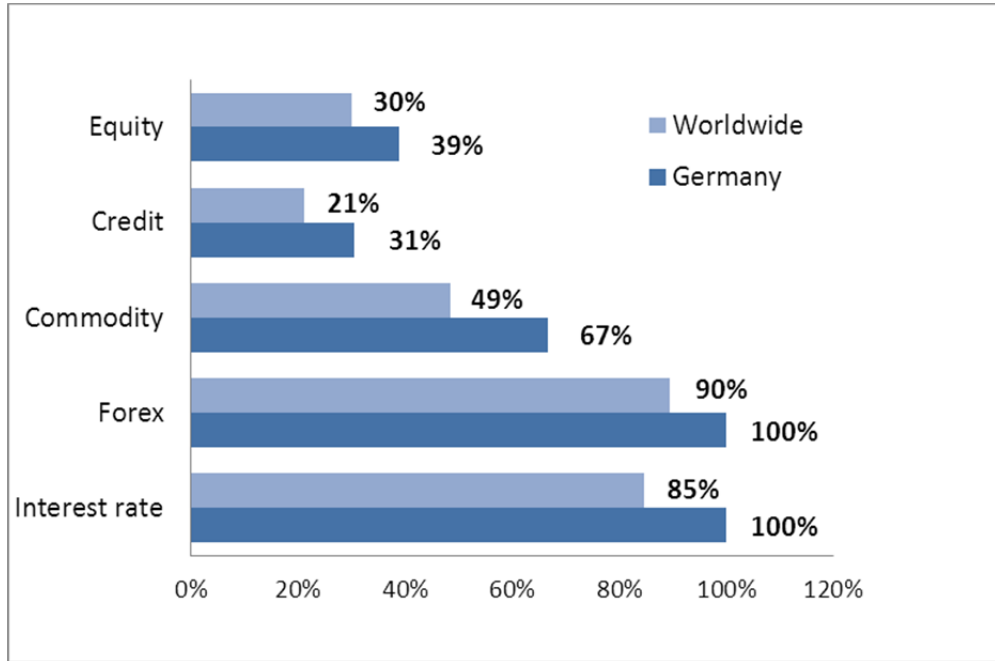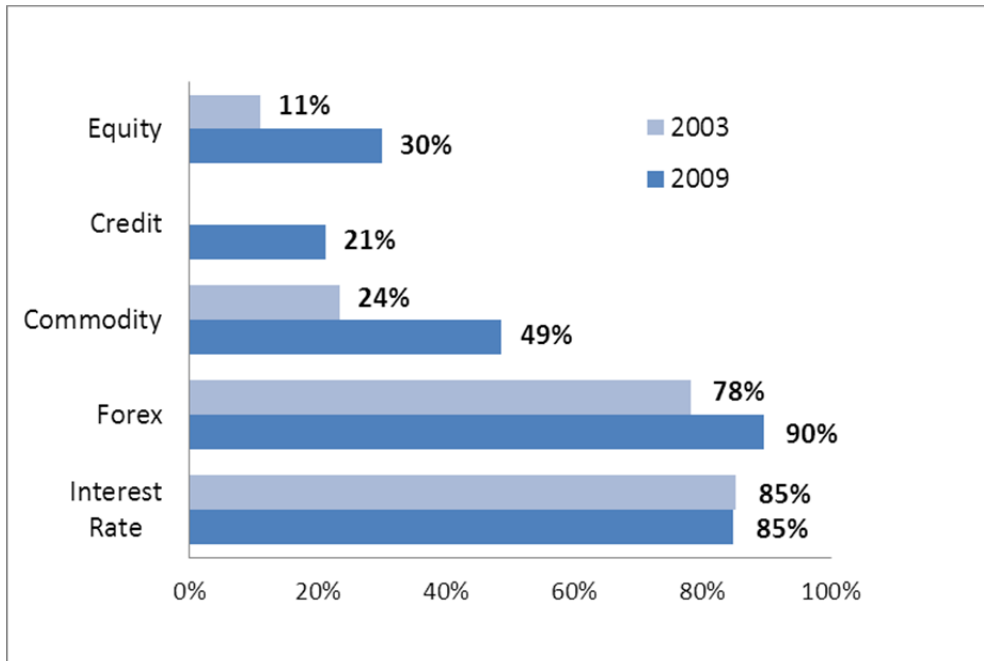

Source: ISDA Derivatives Usage Survey 2009

The high percentage of derivatives usage in 2009 indicates that the Financial Crisis has not had any diminishing impact on large corporates economic behaviour towards derivatives.

As compared to the first ISDA Derivatives Usage Survey in 2003, the use of derivatives by large corporates has even increased over the last 6 years (see Figure 27).

Figure 27: Derivatives Usage Worldwide over Time (by Instrument Type)

Source: ISDA Derivatives Usage Survey 2009

Since 2003 the percentage of large corporates using commodity derivatives and equity derivatives has more than doubled. The percentage of companies using foreign exchange derivatives has also significantly increased by more than 12 percentage points which is in line with the reported increase in OTC notional amount outstanding of foreign exchange derivatives traded by non-financial customers for the same period (see Figure 23). The usage of interest rate derivatives by large corporates has remained at comparably high levels as indicated by Figure 27, although the trading volumes by non-financial customers have significantly increased for the last 6 years (see Figure 24).The difference may be due to increased usage of interest rate derivatives by small- and medium-sized companies. The reported total traded volumes of CDS by far outweigh the trading volumes of equity and commodity derivatives but the usage of CDS by large corporates is much lower than the usage of equity and commodity products. In fact, it is true for all derivatives types that the share of total volume traded within the financial industry is higher than the share traded with corporate firms but in the case of Credit Default Swaps this seems to be even more so.

Summary of Results

- The companies in Germany which participated in our survey are particularly exposed to foreign exchange risk, interest rate risk and commodity price risk;

- In the course of the financial crisis (2007-2010) these companies have increased the use of derivatives on commodities, foreign exchange and interest rates mainly driven by increased market volatility and increased economic activity (economic upswing);

- Firms consider derivatives' greatest benefit to be the stabilization of their economic situation;

- As indicated by a large majority of participants, the availability of derivatives does not play a role in strategic decisions upon economic activity (e.g. capital structure decisions, import/export decisions, foreign investments). Derivatives are nevertheless considered most relevant in sourcing/outsourcing decisions;

- German large- and mid-cap companies use derivatives prevailingly for hedging purposes. In the presence of risk aversion and informational disadvantages of the companies regarding financial market risks, the use of derivatives for hedging potentially improves economic welfare.

Data

For the purposes of the following analysis the data collected from the survey responses have been matched with additional data on companies' balance sheets, data on financial ratios and the history of companies' stock performance. Balance sheet data and data on financial ratios have been obtained from Amadeus, and comprises among other things data on size (total assets, turnover, dummy(public)) as well as financial ratios such as gearing, EBIT etc. Data on current market capitalization as well as daily stock returns (for the last 5 years) of the responding companies have been obtained from Datastream.

Derivatives Usage

Corporate use of derivatives in Germany and its development in the financial crisis

Figure 28 illustrates the relevance of different risk categories for the companies in the survey sample. As can be seen from the figure by far the most relevant risk category is foreign exchange risk – this is indicated by a majority of more than 50% who indicate that FX risks are highly relevant for the own company and additional 25% who denote FX risks as relevant. Further relevant risk categories are interest rate risk and commodity price risk.

Figure 28 Which risk categories are relevant to your company?
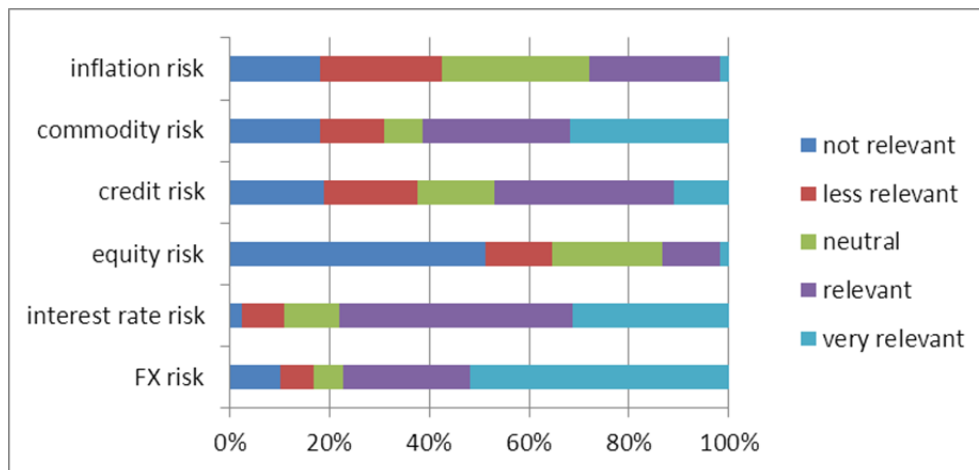
For the description of the corporate use of derivatives on different underlying categories we focus on the group of companies which indicated that the respective risk category is very relevant, relevant or neutral for themselves. Table 11 depicts descriptive statistics on the percentage of hedged risk exposures. As can be seen from the table foreign exchange risk and interest rate risk are hedged to a very high extent – companies which consider them as relevant hedge on average 68.6% and 61.7%, respectively, of their exposure and half of them hedge more than 75% and 70%, respectively. The part of commodity price risk exposure that is hedged is significantly smaller – half of the companies report hedging their exposure at risk to less than 30%, the average lies at 30.5%. Regarding equity risk, credit risk and inflation risk, at least

half of the companies for which those risks are relevant report that they are not hedging them at all.

Table 11 What part of your company's risk exposure in the following risk categories is hedged? Which contract do you use?

	% of risk exposure hedged				% of companies using following contracts			
	mean [%]	median [%]	max [%]	# obs	OTC contract	exchange contract	swaps	# obs
Foreign exchange risk	69%	75	125	90	67%	9%	23%	98
Interest rate risk	62%	70	100	89	16%	0%	72%	105
Equity risk	9%	0	100	27	5%	13%	0%	40
Commodity price risk	37%	30	100	65	21%	10%	13%	80
Credit risk	14%	0	100	48	1%	1%	8%	73
Inflation risk	0%	0	80	42	2%	0%	2%	66

As can also be seen from Table 11 different contracts are used for hedging different risk categories. Interest rate risk exposures, for instance, are prevailingly hedged with interest rate swaps – both OTC and exchange traded.

Table 12 Intergroup differences in the use of derivatives - Large vs. Small Sized

	Total	Group 1 (Turnover<2.2 billion EUR)	Group 2 (Turnover>2.2 billion EUR)	two-sided t-test t-stat (group 1 - group 2)	Mann-Whitney p-value
Foreign Exchange	94,2%	88,1%	100,0%	-2.4099***	(0.0191)**
Interest Rate	88,9%	95,7%	81,4%	2.1974**	(0.0314)**
Equity	20,0%	21,4%	19,0%	0.1676	(0.8650)
Commodities	39,7%	19,4%	56,8%	-3.3449***	(0.0018)***
Credit	13,1%	7,7%	17,1%	-1.0738	(0.2835)
Inflatio Rate	3,4%	0,0%	6,9%	-1.4402	(0.1536)

* p<0.1, ** p<0.05, *** p<0.01

Note: considered are all firms for which the respective risk category
is relevant ("very relevant", "relevant", "neutral")

Roughly 16% of the respondents report usage of OTC forward and OTC interest rate options. Exchange traded interest rate futures, exchange traded caps and floors and warrants are hardly ever used by the surveyed companies.

Among the companies exposed to foreign exchange risk a large majority (80.6%) uses OTC derivative contracts – FX forwards and FX options (67%) and/or FX swaps (23%).

Table 12 shows the survey results on the corporate use of derivative contracts for the different risk categories. Thereby the groups are divided according to their last available turnover and the cut-off point is set at the median level of total assets for the sample (sample median= 2.206 billion EUR). Foreign exchange and interest rate derivatives are the most commonly used derivative types by German corporates, followed by derivatives on commodities, equity and credit. Inflation derivatives are not at all common among the survey participants. There is strong evidence that large firms use derivatives more often than small- or mid-sized firms. This is true in the case of two of the most commonly used derivative types – foreign exchange and commodity derivatives. Interestingly, there is an opposite relationship in the case of interest rate derivatives – mid-size and small-size companies (turnover less than EUR 2.2. billion) tend to use interest rate derivatives more often. This result is confirmed at 5% significance level both by a parametric t-test and by a nonparametric Mann-Whitney U-test. Similar (but less significant) results arise after a comparison of large-cap and mid-cap companies (market capitalization cut-off being set analogously at sample median). There are no significant differences in the corporate use of derivatives between public and non-public companies in the sample.[51]

Survey participants were further asked to assess the recent (2007-2010) development of the use of derivatives in their company. As can be seen from the responses (see Figure 29) roughly half of the participants report an increase in derivatives use in the cases of foreign exchange risk and commodity price risk during the last years.

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[51] Both results are available on request.

Figure 29 How did the use of derivatives regarding the following risk categories change in your company over the past three years (2007-2010)?
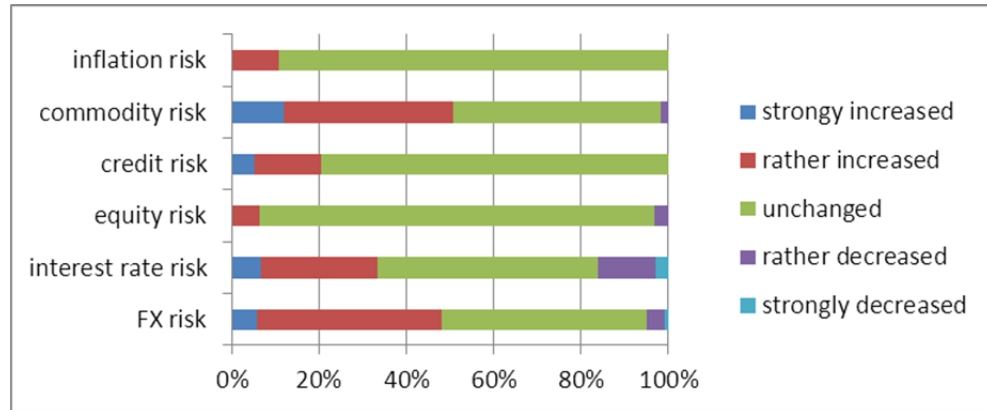
In contrast to the decrease of aggregate derivatives usage by non-financial firms which is documented in the BIS Report the survey results indicate a country-specific intensified corporate use of FX derivatives and interest rate derivatives in Germany This has been confirmed by participants' assessment on the reasons for the reported development of derivatives use in their company. Besides company-specific reasons the majority of responses indicate an economic upswing in Germany as a reason for the intensified derivatives use – due to increased economic activity companies which have already used derivatives before have increased the notional amounts. Increased market volatility is the second prominent reason for increased derivatives use noted in the survey responses. The latter, however, cannot explain the differences between the current survey results and the BIS statistics. Some participants further indicate that the access to derivatives has been improved in the recent past. For the case of interest rate derivatives, respondents indicate the low interest rates as a further reason for increased corporate use of IR derivatives. Due to the lower current interest rates prices of interest rates rate swaps have decreased making it more attractive to corporate to hedge their interest rate exposures.

Benefits of derivatives usage

A majority of 59.1% of the respondents consider that derivatives are important or even very important for the profitability and the financial develop-

ment of the own company. As can be obtained from Table 13 there is a significant size effect, such that large sized companies tend to report higher benefits of derivatives use. This effect, however, is not significant when controlling for the actual use of derivatives. Distinguishing between the use of OTC derivatives and exchange traded contracts shows a significant relationship between perceived benefits of derivatives and the use of OTC derivatives in a way that the group of companies using OTC derivatives perceives the benefits of derivatives to be higher.

Table 13 Perceived benefits of derivatives for the own company

y= Perceived Benefits of Derivatives Use [Q. 2.1.]	(h1) y	(h2) y	(h3) y
Turnover [Mio EUR, last]	0.00000559 (0.624)	0.00000480 (0.511)	0.0000179*** (0.000)
(d) OTC Contracts	0.602*** (0.000)	0.540*** (0.000)	
(d) Exchange Traded Contracts	0.202 (0.460)	0.151 (0.610)	
Book-to-Market Value	-0.163 (0.367)		
R^2	0.139	0.134	0.123
N	79	80	80

p-values in parentheses
(d) for dummy variable
+ p<0.15,* p<0.1, ** p<0.05, *** p<0.01

An analogous relationship cannot be found for the use of exchange traded derivatives. It should be noted, however, that conceivable reasons for the result may be twofold: on the one hand OTC derivatives may contribute to the perceived benefits of derivatives (e.g. because they provide a better hedge for the exposure at risk through a rather flexible structure in terms of the underlying asset, lot size, maturity etc.), on the other hand, the result can be due to omitted variables which are correlated to the use of OTC contracts. For instance, it can be argued that perceived benefits of derivatives are higher when companies face exposures at risk in highly volatile assets such as foreign ex-

change and OTC contracts are more common/available in this underlying assets. [52]

In order to gain more insights in the relationship between perceived benefits of derivatives, the use of derivatives in general and the use of OTC derivatives in particular, we asked survey respondents directly for their assessment. Figure 30 illustrates the responses with regard to the reasons for derivatives usage they consider most relevant for the own company. The responses indicate that benefits of derivatives can definitely be expected to be higher in case the company faces more volatile risk exposures.

Figure 30 What do you consider the largest benefit of derivatives usage in your company?
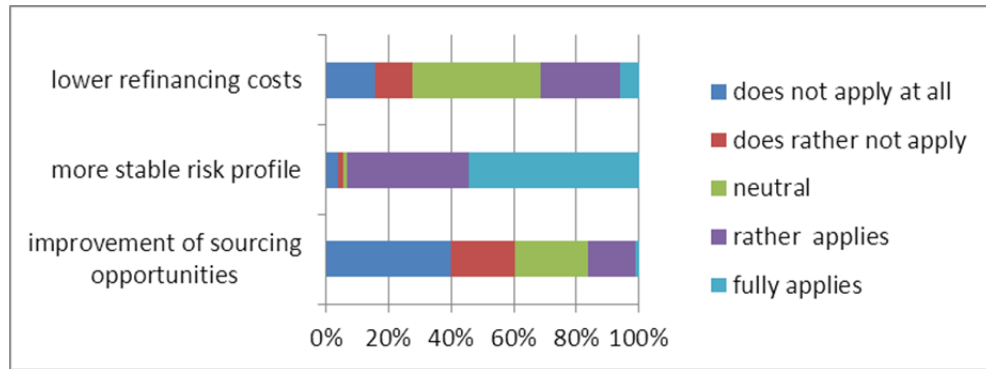
Respondents are almost unanimous that the greatest benefit of derivatives usage is to make company's risk profile more stable. In contrast, a majority of roughly 60% do not consider it as a great benefit for the own company that the availability of derivatives for various classes of underlyings improves sourcing opportunities.

When it comes to the most relevant aspects for the corporate decision between OTC and exchange traded derivatives - liquidity and availability of the

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[52] This would be the case of an omitted variable bias (volatility of the relevant risky asset being hedged by derivatives). In order to be able to draw inference on this argument one should control for the use of derivatives in the respective relevant underlyings separately and the volatility thereof. Evidence on this issue cannot be provided due to small sample size.

respective contracts are indicated to be most relevant for the majority of survey participants.

Figure 31 Which aspects are relevant to your company's decision between OTC and exchange-traded derivatives?
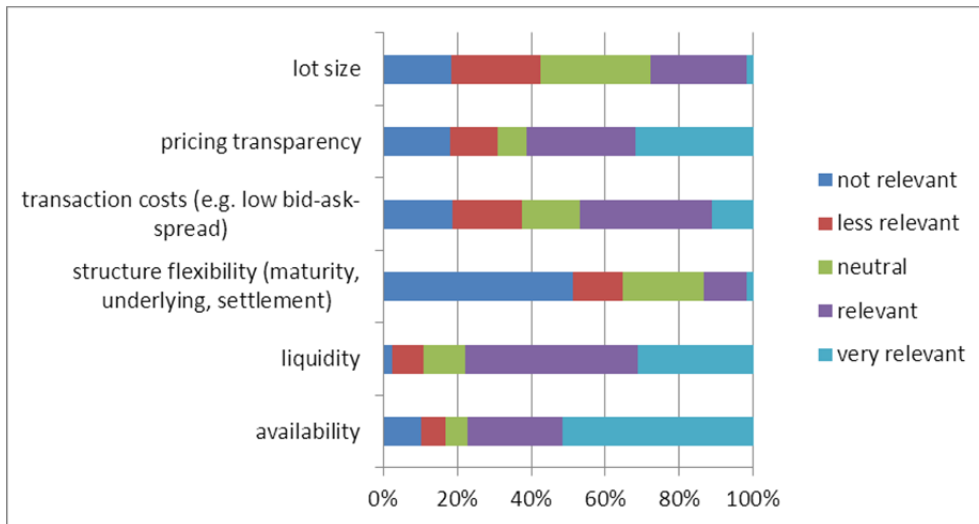
Whereas liquidity is clearly considered an advantage of exchange traded derivatives, OTC derivatives are available for a significantly broader set of underlyings and hedging purposes. Both aspects are relevant (or even highly relevant) for almost 80% of the respondents. Further advantages of exchange traded derivatives – more transparent pricing and lower transaction costs - are considered relevant or highly relevant by 61.2% and 47.0% of the respondents, respectively.

Impact of derivatives on economic decisions

As illustrated in Figure 29 survey participants consider a volatility decrease of the future cash flows as the greatest benefit of derivatives. Hence it can be expected that derivatives are taken into account in economic decisions concerning the firm's risk exposure in highly volatile assets (e.g. foreign exchange). Such decisions would be, for example, foreign investments, import/export decisions, sourcing/outsourcing abroad. An issue of great importance when it comes to the impact of derivatives for the economy is whether the extent of the benefits of derivatives is so high that it even enables certain economic activities, in other words, certain economic activities would

not be undertaken in the absence of derivatives. Survey participants were directly asked about their assessment of this issue. As can be seen from Figure 32 this is not the case for most of the listed economic decision. In the case of sourcing/outsourcing decisions where the availability of derivatives is most relevant, slightly more than one-third of the respondents (34.6%) agree that derivatives are taken into account in their decision.

Figure 32 Is the availability of derivatives relevant for decisions on the following economic activities of your company?
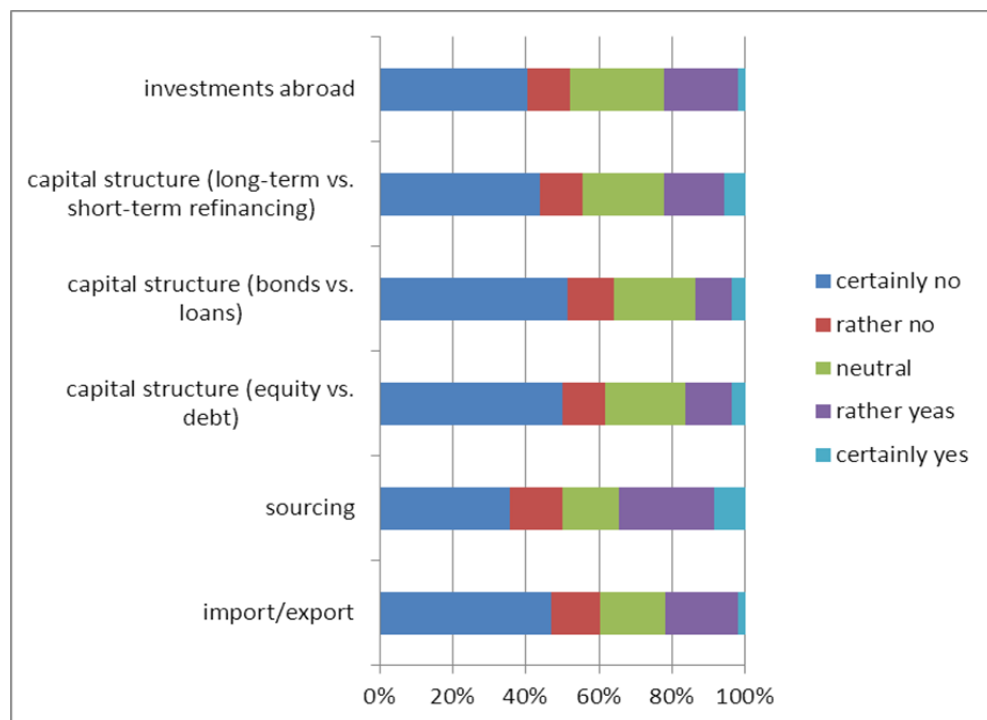
Impact of derivatives on welfare/ Determinants and incentives for the use of derivatives

It is argued in the literature review that the impact of derivatives on welfare is conditional on the purposes of the use of derivatives. From a theoretical perspective hedging induces a welfare increase whenever agents are heterogeneous in their risk aversion and differ in their level of information. First, derivatives possibly increase the utility of the risk-averse agents – the companies, by making cash flows more stable. Second, derivatives enable companies to get an insurance against certain financial market risks they are exposed to be-

cause of their main economic activity (e.g. foreign exchange risk from import/export activity). The latter is eventually beneficial for the companies as they are argued to have an informational disadvantages regarding these financial market risks compared to professional fund managers for instance. . Both positive effects of derivatives use on welfare would be given if derivatives are used in such a way that companies' cash-flows are made independent of the development of the respective financial market risk. For example in the case of foreign exchange risk in import/export activities where a company is exposed to foreign exchange uncertainty for the period between the production of goods and the settlement of the payment (both are typically denominated in different currencies), derivatives are used to make firm's profit independent from exchange rate uncertainty. As the corporate use of derivatives for insurance/hedging is a necessary condition for a welfare increase of derivatives (the availability of derivatives) we will focus on it in the remainder of this chapter. Whereas for companies in the USA the issue has been repeatedly considered in academic literature, to the best of our knowledge this is the first study on this topic for German large and mid-size companies.

Within the scope of the survey we first ask the participants directly on the purposes of derivatives on different underlyings in their company and second propose an own empirical analysis on the sensitivity of stock prices to fluctuations in the most relevant source of risk in order to approach an objective assessment (see Figure 33.)

Figure 33 For which purpose does your company use derivatives? Hedging or exhaustion of profit potentials from expected market movements (speculation) and arbitrage opportunities
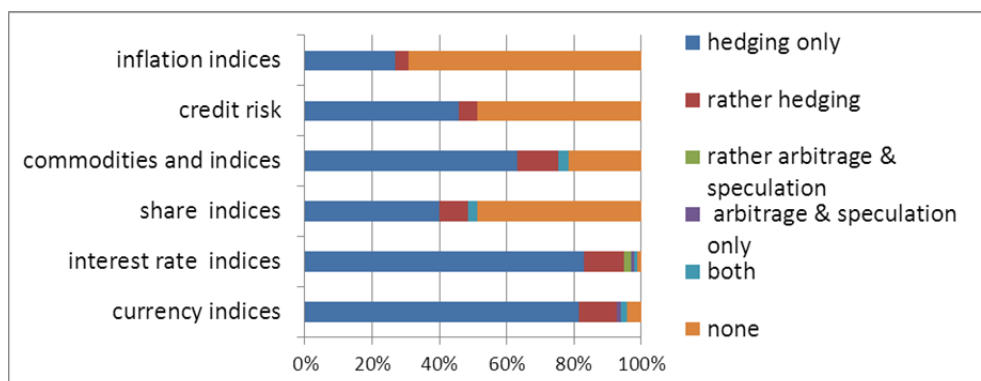
The responses to the direct question on the purposes of use of derivatives indicate that the majority of companies use derivatives to hedge their most relevant risks – foreign exchange (hedged by 96.8%), interest rate (hedged by 95%) and commodity price risk (hedged by 75.4%).

For the subsequent empirical analysis we focus on foreign exchange risks exclusively foreign exchange is indicated as the most relevant source of risk for most of the companies in the sample. The complementary empirical investigation confirms the results of the survey responses: Companies are using derivatives mostly for hedging purposes.

As has been noted above the use of derivatives for hedge (insurance) would imply that company's cash flows and hence profits are independent of fluctuations of the underlying source of risk. In contrast the less companies hedge the more susceptible their profits are against fluctuations in the most relevant risk sources. In case companies use derivatives in connection to their most relevant risks but the risk still remain in the company or are even higher than they would be if the company would not use derivatives – this is an indication that the company does not use derivatives to hedge risks, hence there is no reason to argue a welfare-increasing impact of derivatives. Unfortunately, as time-series data on corporate derivatives use of derivatives is missing, one cannot draw conclusions on the impact of derivatives use for each company individually and draw a conclusion on which companies use derivatives for hedging and which companies do not. However, one can estimate the sensitivity of the company's stock price to fluctuations in the sources of risk and compare these sensitivities in a panel of firms. This procedure allows us to draw conclusions on the prevailing use of derivatives across the companies in our sample.

As the self-reported use of derivatives is obtained only once, an implicit assumption is made that the corporate derivatives use has been constant for the whole period under consideration (5 years), hence the sensitivity of the own stock price to fluctuations in the major sources of risk is not time varying.

The estimated time series model used to estimate the sensitivity of the own stock to fluctuations in the source of risk is given as follows:

$$r_t = \beta_1 + \beta_2 r_{t-1} + \varepsilon_t$$
$$h_t = \exp(\delta_0 + \delta_1 r_t^{Euro\ Index}) + \alpha_1 \varepsilon_{t-1}^2 + \alpha_2 h_{t-1}$$

As the financial market risk exposures of the firms are rather a side effect of their main economic activities, the assumption that developments in the risky assets will be directly priced in the own stock price is subject to criticism. We therefore suggest a volatility perspective, this means that increases in the "riskiness" of the most relevant source of financial market risk of the respective company will be directly anticipated by market participants as increasing the risk profile of the company.

For the empirical analysis we focus exclusively on foreign exchange risk as it is by far the most relevant risk category according to the survey responses. Thereby we only consider companies for which has been indicated that foreign exchange risks are relevant or highly relevant. Because we are focusing on the stock market returns we further restrict the sample to publicly listed companies only. The resulting subsample amounts to 74 companies and we run for each of them a separate GARCH regression on a time series of 5 year of daily data (26/07/2006-26/07/2011). For the purposes of the empirical analysis we obtain data on the historical development of the stock prices of the sample companies on a daily basis for the last 5 years and time series for the development of foreign exchange risk – the value of EUR against foreign currencies, obtained from Statistical Data Warehouse of the European Central Bank[53] as well as self-reported data on the derivatives use in the own company. As a result from the GARCH regressions on Euro Index fluctuations have a significant impact on the volatility of the own stock (δ_1 significant) for 52 companies of the tested 74. In the following we focus on these companies exclusively. We refer to the sensitivity δ_1 of the volatility of the own stock to fluctuations in the Euro Index as sensitivity.

There is a negative correlation (pairwise correlation coefficient of -0.3053) between sensitivity and the extent to which FX risk exposures are hedged (in %, self-reported) in a way that the higher the self-reported proportion of the hedged risk exposure the lower is the sensitivity of volatility of the own stock price to FX fluctuations. An unpaired t-test reveals that there is a significant

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[53] The Euro index of the ECB is based on weighted averages of bilateral euro exchange rates against 20 trading partners of the euro area. The relevant value is the value of the index one day ahead as the reference levels published by the ECB refer to the previous business day.

difference in the scope of the sensitivity if the company uses FX derivatives or not (self-reported use of FX derivatives).

Figure 34 Differences in the distribution of sensitivity if companies use derivatives (group1) and if they do not (group 2)
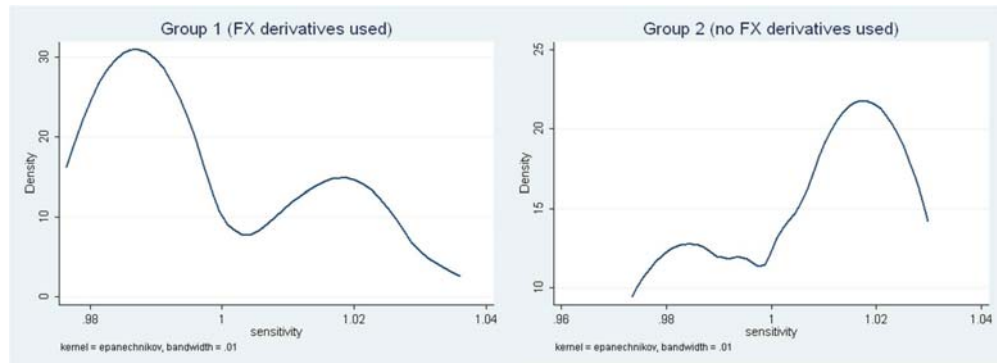
Note: Kernel density smoothed distribution of sensitivity

Companies which do not use derivatives display significantly higher sensitivity to fluctuations in the source of risk. The empirical evidence can be interpreted as a confirmation that most of the companies in our sample , indeed, most of the time use derivatives to hedge risks arising from their economic activity and not for speculation.

3.4 Investment Banks and Systemic Risk Spillovers

The standard theoretical and empirical literature embraces the benefits of financial development for economic prosperity. The financial crisis, however, has emphasised the potential risks associated with a large financial sector and financial innovation.

Distress in financial markets can obviously exert influence on the real economy. Credit-constrained companies bypassed attractive investment opportunities and sold assets to fund their operations during the financial crisis of 2008 (Campello, Graham and Harvey, 2010). Industries that are highly dependent on external financing show a greater contraction in value added during banking crises in countries with more developed financial systems (Kroszner, Laeven, and Klingebiel, 2007).

Apart from the fact that distress in one banking system can transmit across national borders to other banking systems (Gropp, Lo Duca and Vesala, 2009; Gropp and Moerman, 2004), systemic risk most probably can disperse among different financial sectors. Hence, we present results of using a state-of-the-art risk measure to identify spillovers between specific financial sectors, with a particular focus on banks which perform investment banking.

3.4.1 Methodology

The general setup follows Adams, Füss and Gropp (2011). The method uses return series of systematically relevant financial institutions' stocks or shares. In a first step, individual value-at-risks are calculated for each of the return series:

$$VaR_{m,t} = \mu_{m,t} + z\sigma_{m,t}$$

with $\mu_{m,t}$ denoting the mean of institution m at time t.[54] Likewise in the original work we analyse the following individual institution categories m: insurance companies, commercial banks, investment banks and hedge funds. These are represented by index return series, formed by principle component analysis with the according individual stock returns. In addition, we separately include return series of several individual stocks from the investment bank index in the model. By doing so, we can identify the specific systemic risk spillovers originating from and imposed upon the specific banks which perform investment banking activities. [55] $\sigma_{m,t}$ is modelled by the conditional standard deviation extracted from a GARCH model.

In a second step, the obtained $VaR_{m,t}$ are used as the dependent variable and are regressed on their lag and the value-at-risks of the other four institutions.

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[54] This value-at-risk measure can also be thought of as "return-at-risk". More precisely, it is the lowest and potentially negative return to the stock or share that occurs with a 95% probability.

[55] Since "pure" investment banks do not exist (anymore), we analyse banks which perform investment banking acitivites in a considerable manner. Most of these banks had been referred to as "investment banks" in the past. For simplicity reasons we still use this term in the following.

Hence, if the financial institution categories are labelled with *m=i,j,k,l,n*, the estimated equations are represented by:

$$VaR_{i,t,\theta} = \alpha_{i,\theta} + \beta_{1,i,\theta}VaR_{j,t} + \beta_{2,i,\theta}VaR_{k,t} + \beta_{3,i,\theta}VaR_{l,t} + \beta_{4,i,\theta}VaR_{n,t} \\ + \beta_{5,i,\theta}VaR_{i,t-1} + u_{i,t}$$

$$VaR_{j,t,\theta} = \alpha_{j,\theta} + \beta_{1,j,\theta}VaR_{i,t} + \beta_{2,j,\theta}VaR_{k,t} + \beta_{3,j,\theta}VaR_{l,t} + \beta_{4,j,\theta}VaR_{n,t} \\ + \beta_{5,j,\theta}VaR_{j,t-1} + u_{j,t}$$

$$VaR_{k,t,\theta} = \alpha_{k,\theta} + \beta_{1,k,\theta}VaR_{i,t} + \beta_{2,j,\theta}VaR_{j,t} + \beta_{3,k,\theta}VaR_{l,t} + \beta_{4,k,\theta}VaR_{n,t} \\ + \beta_{5,k,\theta}VaR_{k,t-1} + u_{k,t}$$

$$VaR_{l,t,\theta} = \alpha_{l,\theta} + \beta_{1,l,\theta}VaR_{i,t} + \beta_{2,l,\theta}VaR_{j,t} + \beta_{3,l,\theta}VaR_{kt} + \beta_{4,l,\theta}VaR_{n,t} \\ + \beta_{5,l,\theta}VaR_{l,t-1} + u_{l,t}$$

$$VaR_{n,t,\theta} = \alpha_{n,\theta} + \beta_{1,n,\theta}VaR_{i,t} + \beta_{2,n,\theta}VaR_{j,t} + \beta_{3,n,\theta}VaR_{k,t} + \beta_{4,n,\theta}VaR_{l,t} \\ + \beta_{5,n,\theta}VaR_{n,t-1} + u_{n,t}$$

This system of equations is estimated using two-step quantile regressions.[56] This estimation method accounts for the simultaneity in the VaR spillovers, as the different institutions affect each other instantaneously. The system of equations is identified by the assumption that the lags in the equations are exogenous, i.e. $VaR_{i,t-1}$ only affects the *VaR* of institutions *i*. Consequently, controlling for the contemporaneous spillover effects from the other four sets of institutions and the own lag, there are no delayed spillover effects from the lagged VaR of the other institutions. Adams, Füss and Gropp (2011) named the fitted values from these equations state dependent sensitivity value-at-risk (SDSVaR). For example the fitted value from the first equation estimated for the θ-quantile is the SDSVaR for institution group *i* at time *t*:

$$SDSVaR_{\{i|j,k,l,n\},t} \\ = \hat{\alpha}_{i,\theta} + \hat{\beta}_{1,i,\theta}VaR_{j,t} + \hat{\beta}_{2,i,\theta}VaR_{k,t} + \hat{\beta}_{3,i,\theta}VaR_{l,t} \\ + \hat{\beta}_{4,i,\theta}VaR_{n,t} + \hat{\beta}_{5,i,\theta}VaR_{i,t-1}$$

The coefficients and the SDSVaR depend on the choice of θ, which can be interpreted as the state of the economy or of the financial markets. *VaR* in the lower quantiles of the conditional distribution are assumed to occur mostly in

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[56]Powell(1983) derives the statistical properties of this estimator.

volatile states of the financial markets or during financial distress. High quantiles of VaR, on the other hand, correspond to tranquil market states. Hence, the $SDSVaR_{\{i|j,k,l,m\},t,\theta}$ can be regarded as the value-at-risk of institution group i conditional on VaRs of the other institutions j,k,l,n in the same state of the financial markets. The coefficients $\boldsymbol{B}' = (\hat{\beta}_{1,i,\theta}, \hat{\beta}_{2,i,\theta}, \hat{\beta}_{3,i,\theta}, \hat{\beta}_{4,i,\theta}, \hat{\beta}_{5,i,\theta})$ in turn indicate the state-dependent spillovers from one institutional group to the other. For simplicity our analysis is limited to normal market states using median estimation with θ=0.5.

The SDSVaR measure can be interpreted as (i) an extended value-at-risk model that accounts for the spillover or contagion risk caused by related financial institutions, and (ii) as an approach to explicitly reveal the size of the spillover risk through coefficients that vary over time as well as over different states of the economy. Our results should hence reflect usual spillovers between institutions with a particular focus on investment banks.

3.4.2   Data

Our data ranges from 04/02/2003 to 12/31/2010 with a total of 2,023 observations. We use the same daily data as in Adams, Füss and Gropp (2011), ensuring the comparability of the results. The dataset (individual institutional indices) is constructed analogously as follows:

1.   **Commercial Bank Index (26 institutions)**: An index for the U.S. commercial banking sector. Constituents are taken from Acharya, Pedersen, Philippon and Richardson (2010). The index weights are estimated with principal component analysis.

2.   **Insurance Company Index (31 institutions):** The constituents for this index are also taken from Acharya, Pedersen, Philippon and Richardson (2010). Index weights are estimated with principal component analysis.

3.   **Investment Bank Index (8 institutions):** In general, the 8 main publicly listed investment banks are used in the analysis. Since "pure" investment banks do not exist (anymore), we refer to "investment banks" as banks which perform investment banking acitivites in a considerable manner. For each estimation including one separate investment bank, the investment banking index is created for the remaining 7 investment banks. Again principal component analysis is used to generate the index weights.

4.   **Hedge Fund Index:** The Hedge Fund Research Equally Weighted Strategies Index is comprised of all eligible hedge fund strategies. The HFRX index family is an investable index based on information derived from managed accounts for single hedge funds with the longest real track record, i.e. the maximal numbers of observations. The composite as well as the style indices cover the most liquid and largest single hedge funds in terms of assets under management (AUM). The HFRX Equally Weighted Index contains 47 hedge funds.

3.4.3   Results

Spillover Coefficients

The system of equations is estimated for four groups of financial institutions (insurance companies, commercial banks, investment banks, hedge funds) and one separate bank. We choose five individual banks to be analysed separately, referred to as Bank A – Bank E. Four of these banks represent major investment banks from both the US and Europe (Bank A – Bank D), and one large commercial bank (Bank E). Consequently, five separate regressions with five equations each need to be estimated. The results are presented in Table 14 - Table 18. The estimations in Table 14 - Table 17 differ in the investment banks excluded from the investment bank index and included in the regression as a separate institution. In Table 18 no investment bank is excluded from the portfolio. Instead, a commercial bank is added to the system. The presentation of the results in the tables is structured as follows. The columns of the tables denote the financial institution groups from which the shocks spill over to the financial institution groups denoted in the rows of the table. These are the results of main interest. The last column presents the autoregressive lag coefficients. For example, Table 14 shows the estimated coefficients when one includes Investment Bank A separately into the system. In Table 14 a 1-percent increase in the VaR of investment banks increases the VaR of commercial banks by 0.014 percent.

The spillover coefficients among the financial institution portfolios (insurance companies, commercial banks, investment banks and hedge funds) remain relatively similar regardless of which investment bank is analysed separately (Table 14 - Table 17) and regardless of the inclusion of Commercial Bank E (Table 18). Most of these coefficients are found to be positive, which implies

that changes in the VaR of one institutional group affect the VaR of another institution in the same direction. There are also a few significantly negative spillover coefficients. However, these effects are relatively small. So are most of the positive spillover effects among the other portfolios as well. The coefficients from hedge funds to other institutional groups represent the highest spillovers among the portfolios, and investment banks seem to be particularly exposed. The coefficients for this portfolio range between 0.084 (Table 15) and 0.119 (Table 16), which is, however, not as large as the spillover effects from hedge funds to individual investment banks.

To analyse the spillover effects from and to the individual investment banks we look at the fifth column and fifth row of Table 14 - Table 17. First, the effects from the single banks to the other institutional groups are described, which are represented in the fifth column of each table. Investment Bank D in Table 17 is the only examined investment bank which exhibits small spillovers of 0.007 to the portfolio of insurance companies. A spillover coefficient of this size represents merely a 0.007 percent increase in the VaR of the insurance company's portfolio following a 1 percent increase in the VaR of the Investment Bank D, which can be regarded as negligible. The remaining spillover coefficients are of comparable economic relevance.

From a different perspective, the single investment banks are affected more severely by the institutional groups, presented in the fifth row of each table. Nevertheless spillovers from the insurance company index, commercial bank index and investment bank index are still small compared to the spillovers imposed by hedge funds on the individual banks. These range between 0.293 for Investment Bank D (Table 17) and 0.556 for Investment Bank C (Table 16), and are multiple times higher than the remaining coefficients. Apparently, while the effects coming from the hedge funds may cancel out in the investment bank portfolio, an individual investment bank is severely exposed to a change in the VaR of the entire hedge fund portfolio. This relationship becomes clearer when looking at the impulse response functions presented in the next section.

Table 14: Spillovers among financial institutions and Investment Bank A

	Spillover Coefficients					
from...	**Insurance Companies**	**Commercial Banks**	**Investment Banks**	**Hedge Funds**	**Bank A**	**Lag**
to...						
Insurance Companies	-	0.014 ***	0.007 ***	0.053**	-0.006	0.936***
Commercial Banks	-0.012 ***	-	0.014 ***	0.069 ***	-0.005 *	0.973***
Investment Banks	-0.002	0.009 ***	-	0.088 ***	-0.007 *	0.963***
Hedge Funds	-0.001	-0.001 **	0.002 ***	-	0.002**	0.908***
Bank A	0.008	0.03 ***	-0.039 ***	0.412 ***	-	0.892***

Source: Own calculations using data from Adams, Füss and Gropp (2011) and Thomson Reuters Datastream from 04/02/2003 to 12/31/2010. *Lag* denotes the autoregressive lag coefficients in the system equations. *p<0.1, **p<0.05, ***p<0.01

Table 15: Spillovers among financial institutions and Investment Bank B

	Spillover Coefficients					
from...	**Insurance Companies**	**Commercial Banks**	**Investment Banks**	**Hedge Funds**	**Bank B**	**Lag**
to...						
Insurance Companies	-	0.017 ***	0.005 **	0.048 **	0.002	0.933 ***
Commercial Banks	-0.014 ***	-	0.012 ***	0.043	0.004 *	0.975 ***
Investment Banks	0.001	0.011 ***	-	0.084 ***	-0.002	0.955 ***
Hedge Funds	0.001	-0.001 ***	0.003 ***	-	-0.002 ***	0.913 ***
Bank B	0.06 ***	-0.011 *	-0.013 **	0.386 ***	-	0.949 ***

Source: Own calculations using data from Adams, Füss and Gropp (2011) and Thomson Reuters Datastream from 04/02/2003 to 12/31/2010. *Lag* denotes the autoregressive lag coefficients in the system equations. *p<0.1, **p<0.05, ***p<0.01

Table 16: Spillovers among financial institutions and Investment Bank C

	Spillover Coefficients					
from...	Insurance Companies	Commercial Banks	Investment Banks	Hedge Funds	Bank C	Lag
to...						
Insurance Companies	-	0.016 ***	0.013 ***	0.067 ***	-0.01	0.935 ***
Commercial Banks	-0.012 ***	-	0.015 ***	0.059 ***	-0.007 **	0.976 ***
Investment Banks	0.002	0.01 ***	-	0.119 ***	-0.014 ***	0.965 ***
Hedge Funds	0	-0.001 **	0.002 ***	-	0	0.909 ***
Bank C	0.039 ***	-0.005	0.012 ***	0.556 ***	-	0.911 ***

Source: Own calculations using data from Adams, Füss and Gropp (2011) and Thomson Reuters Datastream from 04/02/2003 to 12/31/2010. *Lag* denotes the autoregressive lag coefficients in the system equations. *p<0.1, **p<0.05, ***p<0.01

Table 17: Spillovers among financial institutions and Investment Bank D

from...	Spillover Coefficients					
to...	Insurance Companies	Commercial Banks	Investment Banks	Hedge Funds	Bank D	Lag
Insurance Companies	-	0.013 ***	0.001	0.057 ***	0.007 **	0.934 ***
Commercial Banks	-0.014 ***	-	0.014 ***	0.047 ***	0.001	0.973 ***
Investment Banks	0	0.001	-	0.107 ***	0.013 ***	0.952 ***
Hedge Funds	-0.001	0	0.003 ***	-	-0.002***	0.907 ***
Bank D	0.018 ***	0.003	0	0.293 ***	-	0.956 ***

Source: Own calculations using data from Adams, Füss and Gropp (2011) and Thomson Reuters Datastream from 04/02/2003 to 12/31/2010. *Lag* denotes the autoregressive lag coefficients in the system equations. $*p<0.1$, $**p<0.05$, $***p<0.01$

Table 18: Spillovers among financial institutions and Commercial Bank E

| from... | **Spillover Coefficients** | | | | | |
	Insurance Companies	**Commercial Banks**	**Investment Banks**	**Hedge Funds**	**Bank E**	**Lag**
to...						
Insurance Companies	-	0.019 ***	0.002	0.051 **	0.002	0.933 ***
Commercial Banks	-0.009 ***	-	0.005	0.062 ***	0.002 *	0.975 ***
Investment Banks	0.003	0.002	-	0.054 ***	0.002	0.954 ***
Hedge Funds	0.001	-0.001 **	0.001 *	-	0	0.912 ***
Bank E	0.036 **	-0.02 **	0.004	0.39 ***	-	0.948 ***

Source: Own calculations using data from Adams, Füss and Gropp (2011) and Thomson Reuters Datastream from 04/02/2003 to 12/31/2010. *Lag* denotes the autoregressive lag coefficients in the system equations. *p<0.1, **p<0.05, ***p<0.01

Impulse Response Functions

The risk spillover coefficients presented in the preceding section represent the reactions of the financial institutions to each other within the same day. Due to the relatedness of the financial institutions there may be feedback effects which make shocks last over time and spread differently to specific institutions. To investigate this dynamic behaviour we construct impulse response functions (IRF) by use of the estimated spillover coefficients from each system

regression. A negative shock to one institution is introduced to the system initially, and then the resulting simulated institution series are calculated.[57] These series are plotted as impulse response functions which depict the diffusion of a shock to one institution's value-at-risk. Choosing a shock of one unit facilitates the comparison of the resulting developments with the initial shock (e.g. a value of 0.5 can be simply interpreted as 50% of the initial shock value).[58]

Figure 35 presents the impulse response functions for shocks to individual banks. Obviously a shock to most of the banks analysed would have very little or no effect on the institutional group portfolios. Merely Investment Bank C shows some mentionable spillovers and Investment Bank D shows some negative spillovers, both, however, not to hedge funds. The effects remain visible for around 60 to 80 trading days. Yet, compared to the initial shock, the spillover effects appear marginal.

Figure 36 presents more evident results. A negative shock to the commercial banks portfolio causes noticeable spillovers, positive and persistent to the Commercial Bank E and negative to Investment Bank A. In both cases the spillovers go up to 15 percent of the initial negative shock. A similar picture results when the investment banks portfolio is negatively shocked. In this case however Investment Bank A experiences a positive spillover of up to 17 percent. Investment Bank C shows the highest negative spillover originating from the investment bank portfolio of up to 16 percent. When a negative shock is imposed upon insurance companies, there are only negative spillovers to the individual banks, except for Investment Bank A. The largest negative spillover is imposed upon Investment Bank B, reaching up to 37 percent of the initial shock and remaining noticeable for around 80 trading days. Far more extreme

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[57]The simulation is designed as follows. In the initial observation the hypothetical "VaR" of the institution to be shocked is set to one while the remaining institutions are set to zero. Then series for all institutions, defined simultaneously according to the system coefficients without intercepts, are sequently calculated observation by observation. The resulting series can be interpreted as the exclusive effect of the shock in one institution or as the difference compared to the non-shocked series (where all values remain at zero).

[58]A shock of one unit in VaR would indeed represent bankruptcy in reality, but since the response series run proportionally no matter how high the shock, it can be chosen for convenience.

responses result when there is a shock to the hedge funds portfolio. All analysed banks "over-respond" to the initial shock in VaR such that their VaR increases disproportionately. The highest spillover, which, however, decays relatively fast, occurs to Investment Bank C, reaching up to 225 percent of the initial shock value. Commercial Bank E and Investment Bank B suffer from more persistent risk spillovers of up to 198 percent and 191 percent respectively. Investment Bank D shows a somewhat smaller reaction of up to 155 percent which is still the most persistent and remains apparent even after 100 hypothetical trading days. Investment Bank A experiences the lowest and least persistent spillover effect, which still amounts to 146 percent of the initial shock. While the small spillover effects from the other financial sectors build slowly and abate slowly, the impulse response functions from hedge funds explosively reach extremes no later than after 20 trading days and then retreat markedly; but due to the sheer extent of the responses, the effects remain large for a longer time period.

Finally, Figure 37 presents the spillover diffusion from and to investment banks when the system is estimated without separate treatment of individual banks. A negative shock to the risk of investment banks causes only very moderate reactions of the other institution portfolios, as depicted in the left part of the figure. The spillover to insurance companies is at most 5 percent, to commercial banks at most 8 percent and to hedge funds there is almost none. However, as shown in the right part of the figure, investment banks as an institutional group are clearly exposed to risk spillovers from hedge funds, while being insensitive to the other portfolios. The investment bank portfolio reacts by up to 33 percent of the initial shock to the VaR shock of the hedge fund portfolio. This effect is not as severe as for individual investment banks, but the reason may be that a portfolio is usually not as volatile as single assets and the effects of single banks in the portfolio may cancel out.
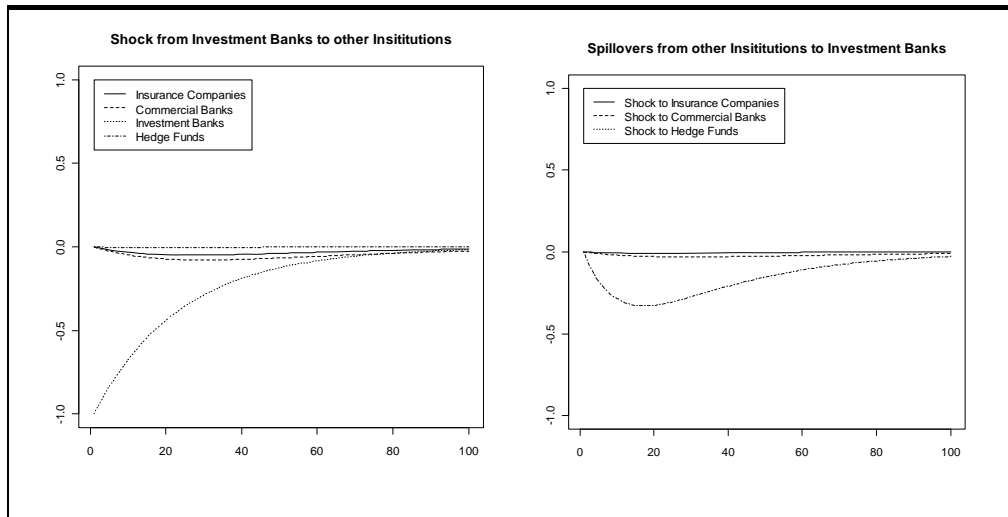
Figure 35: Impulse response functions with shocks originating from separate banks
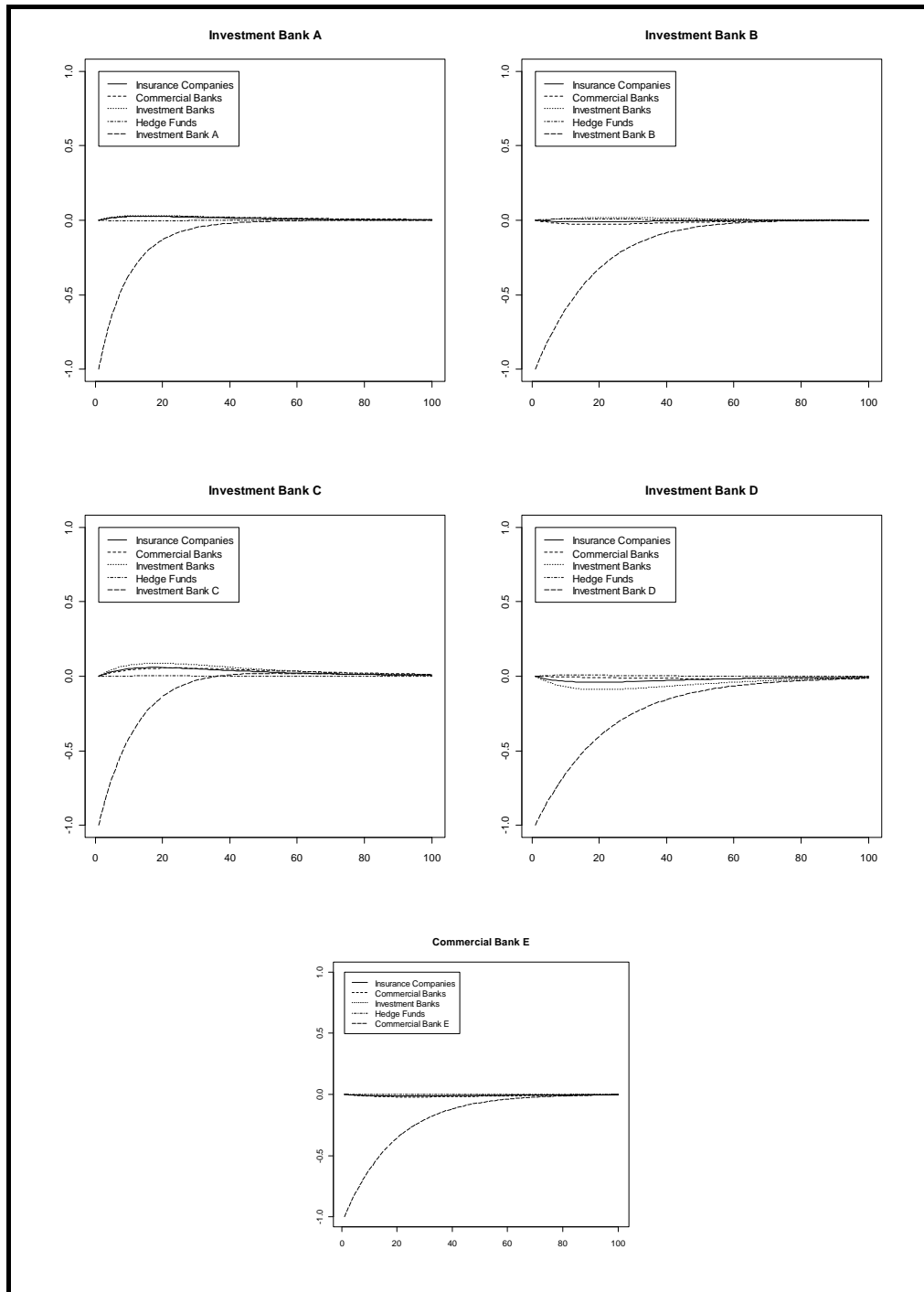
Figure 36: Impulse response functions with shocks originating from financial institutions portfolios
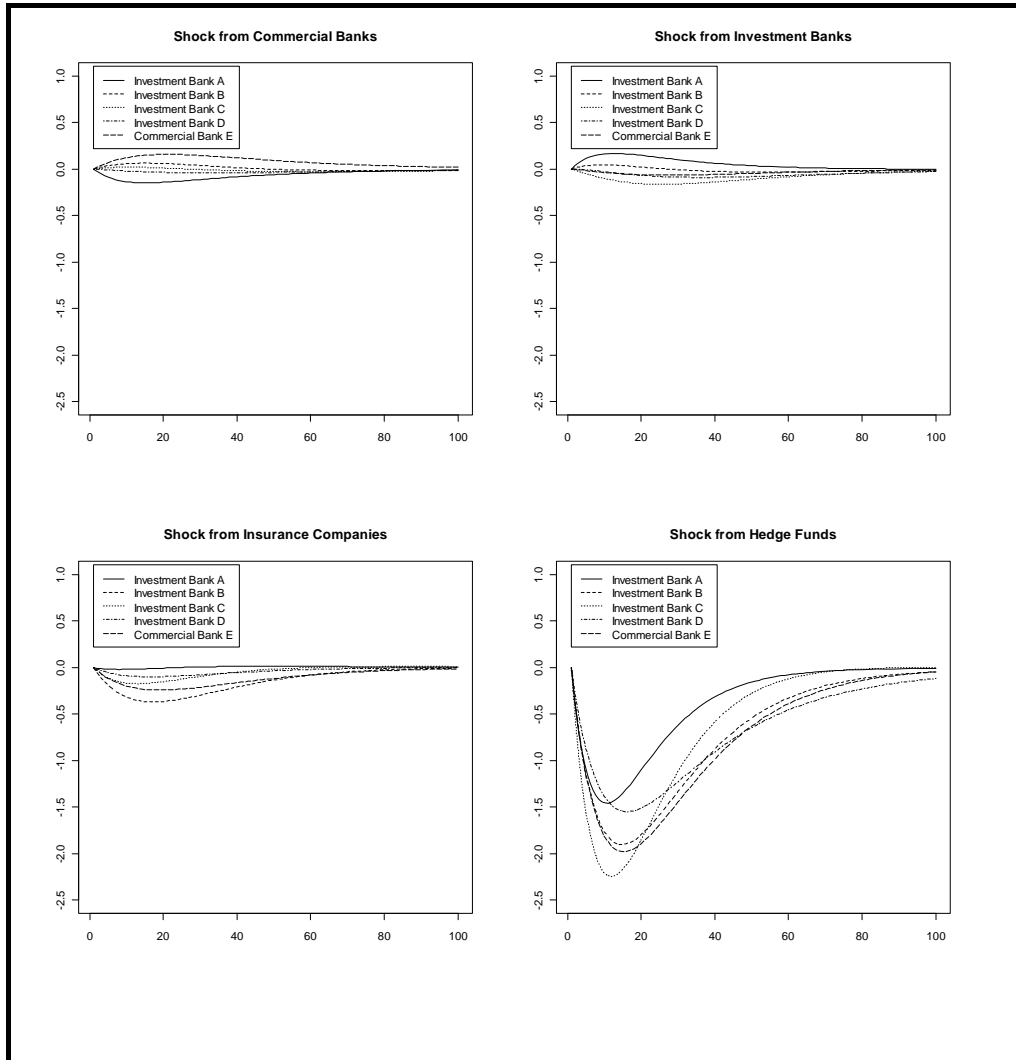
Figure 37: Impulse response functions with spillovers from and to investment banks in a system without individual banks

3.4.4 Concluding Remarks

In summary, a single investment bank is rather unlikely to impose a risk spillover upon an entire financial sector. The estimated response of financial institution groups such as insurance companies, commercial banks, hedge funds and even the remaining investment banks is very small compared to the initial shock experienced by a single investment bank. A single bank obviously does not have enough influence to move a market segment.

Taking into consideration that shocks mostly affect an entire sector at once, the spillovers originating from the investment bank portfolio are of greater relevance for the stability of the financial system. When the entire investment bank sector experiences a shock, the response by the other financial sectors is more eminent, but remains relatively small.

Interestingly, hedge funds are identified as the main source of systemic risk for financial institutions and especially for investment banks. The spillover to investment banks originating from hedge funds is substantial and the highest among the portfolio coefficients. The spillovers to single investment banks are even several times higher. Via feedback effects a shock to VaR of hedge funds

translates into spillovers to investment banks culminating in up to over two times the initial shock.

Altogether it seems that investment banks show significant systemic risk spillovers to other financial institutions, but compared to the influence of hedge funds, these effects are relatively small. This influence is especially high for individual investment banks. Consequently, there is a downside to financial development with respect to investment banking but the far greater systemic relevance is found in another institutional group, namely the hedge funds.

ZEW

4 Implications of regulatory changes on investment banks

4.1 Introduction

The global financial crisis demonstrated the inadequacy of the regulatory framework regarding the financial system's stability and showed very large negative effects on the real economy. In the aftermath of the crises the G-20-countries decided to reform the regulatory framework in order to prevent future financial crises. The direct effect of regulatory improvements on banks depends on its structure of business activities. The gained experiences initiated a broad range of regulatory improvements. There are some areas needing further development, and the debate among politicians, regulators and investors will inevitably continue, but the core principles, however, are set.

The main concerns regarding the new regulatory rules are based on the assumption that higher capital requirements will increase operating costs, restrict lending to corporate customers and inhibit economic growth at the end. Capital requirements could place constraints on the capital structure of banks due to the way in which they fund their operations. In contrast, the results of recent academic research show that these fears may be overstated and the negative effects of Basel III on loan supply, credit costs and economic growth might be relatively small.

This chapter discusses the implications of recent and expected future regulatory changes on the business of investment banks and their contributions to the real economy. In addition to the amendments to the Capital Requirements Directive (usually referred to as CRD IV) suggested within the Basel III framework there are other proposed regulatory measures for European banks.

Therefore we focus on the most relevant aspects of (1) Basel III with (2) additional capital requirements for systemically important financial institutions (SIFIs), (3) the regulating of over the counter (OTC) derivatives, (4) short sales and credit default swaps (CDS), (5) bank resolution and restructuring, and (6) taxes on financial services.

By assessing these measures individually for this study, this chapter primarily aspires to provide an overview of the most relevant considerations, which

predominantly reflect assessments found in the academic literature. Specific considerations of the magnitude of regulatory changes for investment banking segments and their interaction with economic growth have not yet been discussed. Some practitioner-oriented studies identify potential osculation points, which we will also highlight in this study.

We draw on own results of a preceding project on the impact of policy proposals on financial regulation for the European Parliament that has recently been finished.[59] In this context, we also conducted a survey amongst German financial market experts. Overall, over 80% of respondents perceive a (large) deficit in currently effective regulation with respect to main financial stability objectives (see Schröder et al., 2011).

4.2   Expert estimates on the impact of regulatory measures

We have posed questions to a panel of 77 German financial market experts between 30 May and 20 June 2011. These are the same experts that are surveyed by ZEW in the "ZEW financial market survey" on a monthly basis in order to obtain their expectations on financial markets and the economy. The responses give us a qualitative estimation of costs and benefits of specific measures and the results are consistent with the mentioned concerns, as higher expected costs correlate with fewer expected loans to companies.

Figure 38 displays the average expected impact for selected measures on the costs for banks and compares them to the average expected negative impact on the credit supply to companies.[60] The responses suggest that the impact of higher costs for banks on the credit supply strongly depends on the specific measure generating these costs. The highest absolute and relative impact on credit supply is expected to result from higher capital requirements according

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[59] The study Schröder et al. (2011) will be published by the European Parliament under the title "Assessment of the Cumulative Impact of Various Regulatory Initiatives on the European Banking Sector".

[60] The average expected impact is a relative measure. It is calculated by weighting the answers of respondents to the question of how the selected regulatory measures influence the costs for banks and their credit supply to companies. To calculate the average expected negative impact, each weight is multiplied by -1. Thereby much lower, lower, neutral, higher and much higher is weighted with -2, -1, 0, 1 and 2, respectively.

to Basel III. Nevertheless, the mean of about 0.7 for this topic is still relatively small[61]. This means that although a much higher impact on the costs of banks is expected the negative effect on credit supply should be moderate.

On the other extreme, although respondents to the ZEW survey on average expect OTC clearing through CCPs to generate higher costs for banks, they also expect the supply of credit even to rise slightly. This assessment may reflect the reduction of counterparty risk associated with OTC clearing through CCPs (Schröder et al., 2011).

Figure 38: Impact of regulatory measures on the costs of banks and credit supply
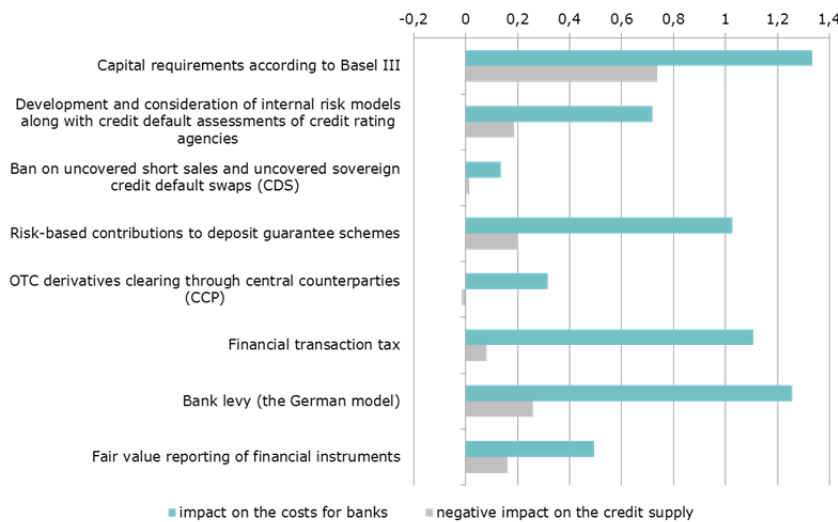
Source: Schröder et al. (2011).

4.3 From Basel II to Basel III and the European responses

At the G20 summit in November 2010 the heads of government endorsed a new regulatory framework for the banking system, which led to the Basel III reform package. The new framework is designed to strengthen global capital and liquidity regulations for a more resilient banking sector, and to enable banks to absorb financial and economic stress. Basel III includes the rulings

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[61] The scale ranges from -2 to +2.

taken since the implementation of Basel II in 2004. At the EU level, the Commission has put forward the CRD IV proposal, published in July 2011. Based on the Basel III framework, it is amended regarding measures on corporate governance (i.e. remuneration of investment bankers) and the penalties. Basel III is to be transposed into national law by the end of 2012 and can be fully phased in by January 2019.

Basel II plus

The Basel Committee complemented its Basel II with improvements in 2009 and updates in 2010/11, which are referred to "Basel II plus" or "Basel 2.5". It includes measures strengthening the requirements for the securitization business and market risk. In the EU, all the improved recommendations have been transposed into regulatory law via CRD 3 and CRD 2, which are supposed to result in national law before the end of 2011. According to the Basel Committee, the switch from Basel II to the revised Basel II plus rules implies the multiplication of minimum capital requirements for trading books by an average factor of between three and four rules on trading books. It is especially based on the measures of using stressed VaR models, incremental risk charges, increased weights for complex securitization transactions and the application of banking book capital requirements to asset backed securities in the trading book.[62]

4.4 Costs and Benefits of the Micro- and Macro-Prudential Measures in Basel III

The new regulation covers both micro-prudential measures on the level of a single bank, as well as macro-prudential measures aimed at strengthening the resilience of the whole financial system by addressing the pro-cyclicality of banking and limiting the risks arising from the interconnectedness among banks. Within the proposed micro-prudential reforms, the corner pillars of the reform related to raising the capital base level are an increase in the minimum common equity requirement from 2.0% to 4.5% of assets and an improvement

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[62] In Germany some corresponding changes were included in the MaRisk rule in 2009 and the implementation of remuneration rules in 2010. Deutsche Bundesbank (2011) and Quigon (2011) give an excellent review on this topic.

of the quality in the tier-1 capital. An agreement has also been reached on introducing an internationally harmonized leverage ratio threshold that serves as a back-stop to the risk-based capital measures and on a new global minimum liquidity standard to restrict the excessive buildup of leverage.[63]

The Basel Committee has tightened its definitions of regulatory capital. Tier 1 capital will now be comprised predominantly of common shares and retained earnings. Capital deductions have been imputed essentially to total regulatory capital. They will now apply to the common equity component of Tier 1. The CEBS (2010) study suggests that the new deductions could eventually amount to between 25% and 40% of the common equity component of Tier 1 capital. So, large banks will be penalised by their disproportional amount of goodwill and deferred tax assets around the world.

Additional Capital Buffers

In the regulatory framework further new measures are introduced that are aimed at directly reducing systemic risk on the macro level. All banks will be required to hold capital buffers above the minimum requirements, i.e. a capital conservation buffer of 2.5% of assets to withstand periods of stress, and a countercyclical buffer protecting the banking sector from periods of excessive aggregate credit growth. The countercyclical capital buffer will range from zero to 2.5% of risk-weighted assets.

The proposed common reference point for taking decisions about countercyclical capital buffer is the difference between the aggregate credit-to-GDP ratio and its trend (credit-to-GDP gap). Repullo and Saurina (2011) show that the correlation between the credit-to-GDP gap and GDP growth is negative in many countries, implying that a reduction of capital requirements is advised in economic upturns and an increase in recession times. They find that credit growth and GDP growth are positively correlated. Hence, the countercyclical capital buffer appears to contradict the intended objective.

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[63] Final changes to the Liquidity Coverage Ratio (LCR) in Basel III would be made by mid-2013 and to the Net Stable Funding Ratio (NSFR) by mid-2016. The LCR, including any revisions, will be introduced on 1 January 2015. The NSFR, including any revisions, will move to a minimum standard by 1 January 2018 (FSB, 2011).

Systemically important financial institutions (SIFIs)

It is also proposed to introduce additional measures to limit and control the systemic risk stemming from large interconnected banks, so called SIFIs.[64] A decision on this proposal shall be made in the next G-20 meeting in November 2011. SIFIs are banks that have a particularly strong influence on the systemic risk of the financial sector.[65] The aim of the new regulation is to internalize the negative externalities stemming from the 'too big to fail'-characteristic of SIFIs. In the focus of the discussion of suitable measures is an increase of the minimum capital requirement for SIFIs. They shall be imposed a surcharge of between 1% and 2.5%, depending on their systemic importance. One percentage point could be added if the systemic importance of a bank grows significantly.

On the one hand, the benefit of higher capital requirements for SIFIs is a reduction in the probability of future systemic crises and also a decrease in the potential costs of such crises for the economy. But only little can be said about the concrete relationship between an increase in capital requirements for SIFIs and the resulting decrease in the probability of future systemic crises.[66] On the other hand higher capital requirements are likely to increase the capital costs of banks with a possible consequence of higher prices for loans offered by these banks to companies and private households.

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[64] This surcharge had to be held in common tier 1 capital and thus so called conditional convertible bonds (abbreviated: CoCos) would not be counted.

[65] If these banks even have a significant influence on the financial sector worldwide they are called 'global systemically important financial institutions', abbreviated G-SIFIs.

[66] Demirguc-Kunt et al. (2010), find that for better capitalised banks the equity value declined less severely during the financial crisis. This effect was particularly strong for large banks. Miles et al. (2011), estimate for the UK that a permanent decrease of the probability of a systemic financial crisis by 1 percentage point in any year in the future will lead to a present value gain of 55% of current GDP. A study by the Financial Services Authority investigates the effect of higher capital ratio requirements in the UK from 1996 to 2007 and their impact on the banks' balance sheets and lending behaviour to firms. The authors find that a 1 percentage point increase in capital requirements reduces lending by 1.2%. It argues that higher capital requirements lower the banks' optimal loan growth (Francis and Osborne (2009).

Impacts of higher Capital Requirements on Capital Lending and Economic Growth

How will banks adjust to new higher capital requirements? An assessment of the direct joint effects of several new capital regulations on funding and changes in banks' business is complex. The range of estimates of the impacts of Basel III on lending rates, volumes and economic activity is quite broad. Academic studies on the implications of Basel III for banks and the economy quote various scenarios. The main finding is that the additional capital requirements of Basel III might increase the capital costs of banks by only a few basis points.

One fact also has to be borne in mind: Banks usually hold equity buffers well beyond the regulatory minimum. According to Gropp and Heider (2010) these capital buffers seem to be the result of market forces and an optimizing behavior of banks regarding their capital structure. Banks that already hold buffers at or beyond the new capital requirements could just hold the same level of equity in the future without further changes. In that case these banks would incur no increase of the weighted average costs of capital (WACC). But they could also, for example, add their "old" buffers on top of the new required minimum capital, holding again the same absolute or relative buffer as in the past.

In addition, prior to the agreement on the Basel III regulation, banks had increased their capital ratios relative to the levels before the financial crisis. Slovik and Cournède (2011) show that, relative to pre-crisis levels as of late 2006, banks in the euro area, the United States and Japan had increased their common equity ratio by an average 1.3 percentage points by late 2009 and their Tier 1 capital ratio by an average 1.5 percentage points. They argue that these improvements in common equity and Tier 1 ratios occurred due to market pressure for higher capital levels in general and that the remaining efforts to meet the Basel III requirements should be reduced by the increases already achieved in the meantime.

Admati et al. (2010) give a comprehensive discussion of the Modigliani-Miller theorem and its applications to the capital costs of banks. They argue that there is no evidence that higher capital requirements force banks to operate at a suboptimal scale and to restrict lending. They also deny the notion that

increased equity requirements raise funding costs for banks due to a larger equity buffer. Shareholders have incentives to maintain a high leverage for banks, because they benefit from government subsidies that reward debt financing (and penalize equity financing by e.g. corporate taxes). These subsidies would be reduced if equity capital requirements were increased with Basel III. They constitute their arguments on insights of Modigliani and Miller (1958)[67], which states that the capital structure (consisting of equity and debt) is irrelevant for the cost of capital. The required return on equity is higher than the required return on debt and their difference reflects a greater riskiness of equity relative to debt. The total risk itself is given by the risks that are inherent in the asset returns of the bank. In conclusion, an increase of equity lowers the required return on equity and would leave the total funding costs of the bank virtually unchanged.

There are only a few studies which empirically estimate these relationships explicitly.[68] For example, an additional capital requirement for SIFIs of 2.5 percentage points would, according to the results of Kashyap et al. (2010), lead to an increase in loan rates between 0.08 and 0.11 basis points and, thus, to a permanent decrease in annual GDP growth of about 0.02 (US) and 0.04 (Euro area) basis point. Kashyap et al. (2010) argue that, however, due to high competition even small increases in capital costs could lead to shifts of business activities from banks to the shadow banking sector. As a consequence they also recommend implementing higher regulatory standards for shadow banks such as hedge funds, private equity funds, money market funds etc.

Similar results have been found for British banks by Miles et al. (2011). The authors estimate that a doubling of the tier 1 capital of British banks (i.e. leverage decreases from 30 to 15) would increase banks' funding costs by about 18 basis points only. Their empirical findings are in line with the prediction of the Modigliani-Miller theorem of Admati et al. (2010). They suggest that the relatively small differences between the predictions and results of these em-

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[67] For an overview on different estimations and a discussion on the application of the Modigliani-Miller theorem, see Quignon (2011).

[68] See, for example, Kashyap et al. (2010) and Miles et al. (2011). The latter gives also an excellent review on this topic.

pirical studies are to a large degree due to a different tax treatment of equity versus debt.

Cosimano and Hakura (2011) use firm-level data to show that banks would need to raise lending rates by 16 basis points in order to meet Basel III minimum capital requirements. Adding the capital buffer and SIFI surcharges would increase lending rates by a total of 71 basis points. Since banks usually hold equity buffers well beyond the regulatory minimum, the total impact could be an increase in lending rates by as much as 84 basis points. They also estimate that the 16 basis point increase in lending rates would produce a 1.3% fall in the (long-run) supply level of credit, increasing to 5.8% when including the capital buffer and SIFI surcharges. The authors do not attempt to assess the effects on the macro economy.

Slovik and Cournède (2011) estimate the medium-term impact of higher capital requirements on economic output with consolidated country-level data. Despite the difference in the system structures and funding across the euro area, the US and Japan, the estimated effects fall in a relatively close range. They suggest that the economic output is mainly affected by an increase in bank lending rates as banks pass rising funding costs on to their clients. To meet the capital requirements effective in 2015 (2019) banks are estimated to increase their lending spreads between 12.3 (63.6) in the US and 18.6 (54.3) basis points in the euro area. The estimated impacts on GDP are larger in the euro area mainly as a consequence of a greater share of bank lending intermediation. The authors estimate that a permanent increase in bank lending rates by 100 basis points should decrease annual GDP growth permanently by 0.18 for the US, 0.27 for Japan and 0.42 basis points for the euro area.

On this basis, the Basel III requirements fully effective as of 2015 (2019) are estimated to reduce the level of GDP in the euro area by 0.39% (1.14%), 0.19% (0.47%) in Japan and 0.11% (0.59%) in the US five years after its implementation. These results are in line with the estimations of the Macroeconomic Assessment Group, respectively the ECB (MAG 2010) and the analysis of the Basel Committee on Bank Supervision (BCBS 2010).

IIF (2011) assumes that these studies do not incorporate the full array of reforms, are too optimistic about the funding consequences and thus downplay

the macroeconomic costs of regulatory reforms. They assess an average impact on the GDP level of -3.0% on average for the three countries by 2015.

Interestingly, in Switzerland and the United Kingdom banks could be forced to hold minimum equity well beyond the new requirements of Basel III. The proposal regarding the Swiss bank law claims a minimum capital of up to 19% for SIFIs.[69] This minimum capital shall consist of 4.5% of core-tier-1 capital, a buffer capital of 8.5% (shall consist of 5.5% core-tier-1 capital and 3% CoCos), and a variable buffer capital of up to 6% (to be held as CoCos).[70]

The so called Vickers report[71] claims for the United Kingdom 10% of minimum capital requirements for the "ring-fenced" retail business of a bank and 17% for the investment banking branch of a SIFI.[72] This report even finds that *net-benefits* of banking regulation might increase if minimum equity is set up to or even above 20% for the largest systemically important UK banks.

Miles et al. (2010) conclude even for banks in general that the minimum capital ratio for UK banks should be about 16% to 20% in the welfare optimum for the UK. This would mean a significant increase of capital requirements compared to the new Basel III rules.

Thus, there is still much room for a lively debate on the optimal amount of equity a bank should hold in order to be able to absorb losses due a financial crisis. Overall, the results of many recent research and policy recommendation publications show that the new Basel III capital standards might still be too low.

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[69] According to Basel III the minimum capital requirements for SIFIs are 10.5% plus 1 - 2.5% SIFI surcharge plus a variable anti-cyclical buffer of up to 2.5% = 14 - 15.5%.

[70] See Abegglen et al. (2011).

[71] See Independent Commission on Banking (2011).

[72] This means 3 percentage points above the Basel III requirement of 7% regarding common equity tier 1 (= 4.5% plus 2.5 capital conservation buffer) for retail business and 10 percentage points for the investment business.

New Channels of Financing and Competition between Financial Centres

Fulfilling Basel III may lead to a disintermediation effect in the European debt markets. Changes in the funding ratio could make long-dated (low-margin) public finance less attractive for investment banks, as well as businesses that do not generate liquid collateral, such as infrastructure finance or segments for small and middle sized corporates. Infrastructure projects may seek to be funded directly through the capital market or by pension and investment funds. Private equity and mezzanine capital could also be an opportunity for the large group of small and medium sized companies. MorganStanley (2011) assumes that long-dated lending will be impacted significantly and it has major implications for how municipal entities obtain funding. They assume that a large part of business could move into the shadow banking system of hedge funds, private equity, asset managers and other alternative sources of capital, over the long term. This is also a conclusion of Kashyap et al. (2010). As a consequence they claim that also the shadow banking sector should be much stricter regulated to avoid regulatory arbitrage between banks and near-banks.

Key advisory experts in the infrastructure business could also migrate to the blooming non-banks and extract value from the shift in activity.

Despite the objective of establishing a homogenous level playing field for banks in Europe, in reality, countries could take different paths in key issues and additional competition especially for investment banks. There is scope for interpretation of the EU remuneration rules among the regulators in the EU member states. But also the entire European investment banking industry may become less competitive relative to global investment banks in their ability to attract and retain key talents. As EU compensation rules under CRD IV would apply not only to the EU based parent company but also to its foreign subsidiaries, European investment banks could be less competitive in the US or Asia. JPMorgan (2011) indicates that the EU compensation rules would affect the key revenue contributors (top 200-400 employees per bank) in the EU investment banking activity.

As a consequence of different regulation level between the continents, European investment banks could, however, benefit from regulatory arbitrage opportunities due to a tougher Volcker Rule and required swap entities for US

investment banks. According to JPMorgan (2011), this might lead to some clients moving out from US banks to European banks.[73]

4.5   OTC Derivatives

The financial crisis has brought over-the-counter-derivatives (OTC derivatives) into the focus of regulatory attention. Although OTC derivatives did not cause the crisis, they do facilitate large speculative transactions and have the potential to create systemic risk. The market for OTC derivatives accounts for 90% of all traded derivatives,[74] still there are currently no reporting obligations for these transactions. This renders it impossible to determine all trade relations or the parties' risk exposure. Due to the high interconnectedness between the dealers, a significant contagion risk arises in the market.

G-20 leaders agreed in September 2009 that all standardised OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties (CCPs) by the end of 2012. Furthermore, in order to increase transparency, OTC derivative contracts will have to be reported to trade repositories.[75]

Benefits of reporting to trade repositories and costs for financial institutions

Such an obligatory report on all OTC transactions to trade repositories (TRs) would allow for a central collection, storage and dissemination of information in a consistent fashion. Besides revealing the concentration of risk-taking activities in the market and the interconnectedness of institutions, increased transparency can also lead to enhanced market liquidity since it reduces market participants' mistrust towards their counterparties.

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[73] Section 619 of the Dodd-Frank Act (commonly known as the Volcker Rule[73]) prohibits banking entities from engaging in proprietary trading. The bill includes an exemption for market-making trades with the limitation that these trades "do not exceed the reasonable expected near term demand of clients, customers or counterparties". Furthermore, Section 716 of the Dodd-Frank Act will require banks to separate their derivative business from US depository banks that are able to tap Federal Reserve credit facility. It will need to be capitalised and funded outside of the US bank entity.

[74] According to the BIS.

[75] The European Commission proposed respectively a regulation (COM(2010)484) which is often referred to as 'EMIR' (European Market Infrastructure Regulation).

Participants would have to bear reporting and connection costs as well as fees. From experience with existing TR services, the fees - although not published - do not appear to be particularly high.[76] On top of connection costs to the new TRs, there arises the cost of hiring additional staff to handle the reporting process and to adapt the systems. However, the overall costs of reporting of transactions to TRs are expected to be relatively limited.[77]

Benefits and Costs of Central Counterparty Clearing

Many benefits directly stem from the way a central counterparty (CCP) works. In the novation process the contractual relationship between the two parties is replaced by contracts with the CCP. The novation process leads to lower interconnectedness between the counterparties since the counterparty credit risk of the market participants is replaced by the credit risk of the CCP. CCP clearing of OTC derivatives is associated with benefits pertaining directly to financial institutions[78]: generally, market participants will perceive trading via CCPs to be beneficial if gains from multilateral netting – which is possible between multiple parties, but only for a certain class of derivatives – outweigh the losses resulting from the original bilateral netting across various derivatives classes with pairs of counterparties.[79] The main advantage of multilateral netting of contracts is the reduction in settlement risk on delivery date. Furthermore, regular margin calls avoid pressure on participants arising from large margin calls in case of infrequent exposure valuation and situations of high market volatility. Among the most important arguments in favour of CCPs are the possible default resolutions: CCP clearing not only allows regulatory capital savings – a default fund also permits mutualisation of losses among the clearing members. Besides, multilateral netting has the potential to increase liquidity in the OTC derivatives market since it allows the involved parties to

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[76] Currently there exist only two trade repositories: one for credit derivatives (the DTCC's Warehouse Trust) and one for interest rate derivatives (TriOptima's Interest Rate Trade Reporting Repository, IR TRR), the latter was launched in 2010.

[77] See European Commission (2010f).

[78] The benefits described are a summary of the results from Bliss & Papathanassiou (2006), Culp (2010) and Ripatti (2004).

[79] See Duffie and Zhu (2009).

increase their trading activities on a given proportion of its balance sheet. Enhanced operational processes associated with CCP clearing also lead to efficiency gains. These gains can stem from reduced counterparty credit evaluations and on-going credit exposure monitoring, since the parties are no longer prone to a multitude of bilateral trading agreements and associated credit risks but only to the credit risk of the CCP. CCPs further reduce operational risks[80] since they establish standard procedures for marking contract prices to market and thus avoid disputes about collateral valuation. Despite these potential benefits market participants can experience, the main aim of CCP clearing from a general view is its potential to enhance financial system stability.

The benefits from multilateral netting and counterparty credit risk management in particular depend on a critical mass of contracts trading via CCPs.[81] However, moving a critical mass of OTC derivatives to CCPs also entails costs the involved participants have to bare: Since OTC contracts are currently under-collateralised, dealers will have to provide significantly higher amounts of collateral when required to move eligible contracts to CCP clearing.[82] Potentially stricter margin requirements (with respect to size and frequency) can also lead to higher costs on the part of participants.[83] Concerning calculation frequency, CCP margins are oftentimes calculated on a higher frequency compared to bilateral trades.[84] On the one hand more frequent and often smaller margin flows avoid participants' exposure to high risks of liquidity shocks. On

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[80] The Basel Committee on Banking Supervision defines operational risk as "the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events.

[81] See Singh (2010).

[82] According to the ISDA Margin Survey (2011) about $1.1 trillion (30%) of exposures in OTC derivatives remain uncollateralised. I.e. the amount of collateral is, on average, too low compared to the level of counterparty credit risk. However, the actual level of collateralisation of exposures may be even lower, as an ECB study ("Credit Default Swaps and Counterparty Risk", August 2009; p. 48-50) indicates. This study estimates the level of collateralisation in the CDS market to amount to only 44%.

[83] For a more detailed argumentation please refer to Culp (2010).

[84] A more detailed discussion on the issue of bilateral collateralisation is given in Chlistalla (2010).

the other hand CCP clearing poses higher demands towards operational management.

A disadvantage of CCP clearing is its need for standardisation in the clearing process. When forced to use standardised OTC derivatives, participants might be unable to hedge sufficiently which might lead them to engage in a bilaterally cleared customised OTC transaction in the end. However, the European Commission decided to focus on contract standardisation (i.e. standard legal relationships, confirmation agreements, documentation, market conventions on event handling) and process standardisation while not per se impacting product variety. This approach is compatible with the ability of market participants to hedge specific risks while permitting the adoption of CCPs. It should be kept in mind that the advantage of allowing bespoke features in contracts with low levels of standardisation comes at the cost of a low automation of processes, which in turn increases operational risk.[85]

Costs of OTC Derivatives Regulation for Other Parties

The new regulation on OTC derivatives also affects SMEs, society in general and competitiveness.[86] Although for SMEs a direct impact is not expected since SMEs are exempted from the regulatory proposals as long as their positions in OTC derivatives do not exceed certain thresholds an indirect impact due to higher cost of hedging and of capital is likely. Concerning the overall social impact, the regulation's potential to decrease systemic risk can reduce the effect of future financial crises on the real economy and thereby also reduce the social costs of these crises. A more critical aspect is the potential impact on competitiveness. On the level of market participants CCP clearing can be a chance for small banks since they have the same access as larger banks. Taking a broader perspective and considering the global nature of the OTC derivatives market, an internationally coordinated approach is crucial. Several members of the G-20 outside the EU are already pursuing comparable legislative initiatives. A prime example is the US: The proposal of the European Commission is consistent with the recently adopted US legislation on OTC de-

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[85] See Pirrong (2009).

[86] See European Commission (2010f).

rivatives, the Dodd-Frank Act. Particular attention should be paid to countries that are not part of the G-20, as they did not commit on the introduction of CCPs and TRs, which can give room to regulatory arbitrage.

Attitude towards Central Clearing

According to research of MorganStanley (2011) banks show a rather positive attitude towards central clearing due to its risk reducing aspects, assuming the impact to be neutral in at the worst case. However, Chlistalla (2010, p.22) argues, that corporations appear "more pessimistic about the impact of centralised clearing of derivatives on costs […]". The survey conducted by ZEW among financial market experts[87] affirms this first impression on banks: almost half of the participants foresee no change in costs, and roughly 40% of the experts expect costs for banks to rise. A small fraction (14%) can even imagine that costs will decrease if OTC derivatives are cleared via CCPs. However, the survey results questions the suspected impact on SMEs. Concerning the impact of OTC derivatives regulation on the credit supply to companies, 77% of analysts do not expect a change in credit supply. Equal fractions of participants anticipate the regulatory measures to influence credit supply to decrease or to increase.

4.6 Short Selling and CDS

The 2007/2009 financial crisis has reinforced concerns of market participants and regulators about short selling. Short selling purportedly increases systemic risk, disrupts orderly markets and encourages market abuse. For this reason, some Member States have unilaterally adopted measures against short selling in response to the financial crisis in 2008 and the Greek bond crisis in 2010. The European Commission's proposal[88] COM(2010)482 for a regulation on short selling and certain aspects of credit default swaps (CDS) intends to harmonise regulation within the EU. It contains transparency requirements, restrictions on naked short sales, and endows national regulators as well as the

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[87] This survey was part of a study prepared for the European Parliament.

[88] See European Commission (2010a).

newly created European Securities and Markets Authority (ESMA) with a set of powers.

Costs and Benefits of Short Selling and CDS

One reason for blaming short selling is its propensity to elicit herding behaviour. There is empirical evidence for the connection between disorderly markets and short selling.[89] It is however widely agreed upon that short selling does not cause crashes but has the potential to increase their magnitude. But the theoretical literature also indicates that short selling fosters market efficiency. More precisely, it helps to mitigate overpricing and contributes to a faster transmission of information into market prices.[90]

The main benefit of credit default swaps is that it allows investors to insure (hedge) default risks of sovereign or corporate debt. The fact that CDS, in contrast to common insurance, are traded in a market creates a second important benefit. CDS spreads are indicative of a fair pricing, i.e. a market pricing, of debt. However, there is concern that speculators can destabilise bond markets by betting on the default of the underlying. If a CDS is excessively bought for the purpose of speculation (not for hedging) it is feared that an increase in CDS spreads could also increase bond spreads.

The Commission's proposal contains a system of circuit breakers and temporary short selling bans to deal with the negative impact of short selling on markets. The circuit breaker rule gives national authorities the power to prohibit short sales of a financial instrument whose price has fallen below a specified threshold until the end of the next trading day. The aim of this is to achieve a slow-down in a chaotic market environment, thereby giving rational investors the time to cross-check their information basis and ensure a rational decision and stop herding. The circuit breaker does not harm market efficiency due to its temporary nature. However, there is room for concern that temporary stops will not suffice when a serious shock hits the market. A downward spiral in share prices cannot be stopped by a circuit breaker when problems are not due to temporary uncertainty but arise from material weaknesses in accounting, risk management or corporate governance.

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[89] See e.g. Bris et al. (2007).

[90] See Miller (1977) and Diamond and Verrechia (1987).

The Commission's proposal would grant national regulators new powers to temporarily ban short selling or CDS trading in exceptional situations. Bans could be more efficient than circuit breakers in preventing negative price spirals extending over a long period of time as they could be imposed for several months. However, empirical evidence suggests that the negative effects of a ban lasting several months will be greater than those of a pure circuit breaker regulation. A significant deterioration of market liquidity was found to result from the temporary short selling bans imposed in September 2008.[91] A further measure is a ban on naked CDS on sovereign bonds. If the default probability of a sovereign bond increases or a default occurs, parties holding CDS will either profit from the increasing value of their position or the payment of the principal amount. Since CDS prices reflect the default risk of the underlying bond, an increase in the CDS premium leads to higher risk premiums for future issues of the underlying and a decline in prices on the bond markets. Therefore, regulators and governments are concerned about the incentives of CDS traders. Possibly they speculate on default or at least try to increase the return of a bond. However, this coherence is not reflected in empirical research. A study on sovereign bonds conducted by the European Commission provides no conclusive evidence for a link between developments on the CDS market and higher funding costs for states.[92]

Prohibiting naked CDS transactions, as proposed, would have detrimental effects on the liquidity as the market is left only to hedgers. Valuing credit risks will become more difficult. It should also be considered that naked CDS transactions are at times also conducted without a speculative purpose. Proxy hedging, for example, is a technique were positions of price- or rate-correlated financial instruments are used for hedging when a direct hedge for a specific risk is not available. Furthermore, it could be possible that a ban on naked CDS may motivate traders to short sell sovereign bonds using options or futures.

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[91] See e.g. Clifton and Snape (2008), whose examinations on the London Stock Exchange (LSE) showed bid ask spreads 150% wider for banned financial stocks than for spreads in the control group. Moreover market depth deteriorated 59% for banned stocks but only 43% for unregulated stocks. The trading volume fell by 10% whereas the control group showed an increase of 50%. Also see Boehmer et al. (2008), who provide evidence for the NYSE.

[92] See Criado et al. (2010) for a study on the European market.

Impact of Increasing Transparency

Another pressing issue is the lack of transparency which may encourage market abuse and contribute to disorderly markets. Some empirical evidence does allow for such concern. A negative relationship between increased short selling activity prior to earnings announcements and the post announcement change in share price has been empirically established.[93] This seems to imply that short traders are better informed which may be interpreted as evidence for insider dealing. The Commission's proposal offers a set of measures to tackle the transparency deficiencies and its consequences. A key problem is the extent of disclosure, in particular whether short selling should be disclosed only to the regulator or to the public as well, and what exemptions should be granted. Disclosing information to the market reduces asymmetrical information between informed and non-informed traders. Hence it is argued that greater transparency contributes to more efficient price discovery.

However, as explained in the European Commission's Impact Assessment[94], market participants have expressed the concern that liquidity may suffer if non-informed traders started to use short selling strategies and perform herding. However, according to the Impact Assessment the proposal provides a relatively high threshold for public disclosure, concerns about a drastic decrease of liquidity should be mitigated. The liquidity constraining effects of the transparency requirements are furthermore mitigated by the exemption of market makers from these requirements. Unfortunately, exemptions may open new loopholes for regulatory arbitrage. Financial institutions might use exemptions to circumvent transparency requirements by disguising their activities as market making. Overall, the impact of required reporting of short sale and CDS positions should be positive. This notion is supported by the results of the ZEW survey, where 76% believe that mandatory disclosure of positions would improve financial stability.

4.7 Bank Resolution and Restructuring

An important topic in the discussion on solving the 'too big to fail' problem are measures to restructure and resolve banks that are insolvent. During the se-

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[93] See Christophe et al. (2004).
[94] See European Commission (2010e).

cond half of 2011 the Financial Stability Board (FSB) will conduct a public consultation on bank resolution procedures and before the G-20 November summit in Cannes recommendations will be published.[95] In the centre of the discussion are rules for the recovery and resolution of G-SIFIs which means that two or more countries are involved in this process of restructuring.

On the European and the national level only a few new procedures have been introduced so far or are planned for the near future.[96] For example, the Germany bank resolution is part of the Restructuring Act[97], in the United States the respective rules are part of the Dodd-Frank Act (Title II, Orderly Liquidation Authority). For the United Kingdom the Independent Banking Commission recently published their recommendations for a future law on bank restructuring and resolution.[98] On a European level the European Commission conducted several initiatives during the last 12 months.[99] A proposal of the international banking industry has also been published.[100]

A basic idea of the different proposals and rules is that banks that are classified as 'too big to fail' can at least partly be restructured or even liquidated in future financial crises. This means that in future crises there shall not be a public guarantee to rescue complete banking companies without a significant contribution of the shareholders and debt holders to covering the costs of the rescue. This aims at internalising (at least parts of) the social costs of bank failures. It also aims at reducing misaligned incentives of banks which are directed towards too risky business strategies if the bank owners and the management believe that their institution is 'too big to fail'.

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[95] See Financial Stability Board (2011).

[96] Clifford and Chance (2011) give an overview until May 2011.

[97] The Restructuring Act is part of a larger German bank restructuring framework that also includes the law on a bank restructuring fund which is financed by a bank levy.

[98] See Independent Commission on Banking (2011). They recommend to "ring-fence" the retail business of a bank from the investment banking business. Both parts should have different minimum capital requirements (10% for the retail and 17% for the investment business). This separation shall make it easier to resolve banks in periods of crises. Whereas the retail part of the business has the highest likelihood to be rescued (due to their economic importance) parts of the investment business may be easier wound down or sold to other banks due.

[99] See European Commission (2010 b,c,d).

[100] See Institute of International Finance (IIF (2011)).

In addition, the proposed restructuring processes include bail-in capital and CoCos[101], which shall increase the equity base of a bank by converting debt into equity. In the case of bail-in capital the national regulation authority decides in specific situations that (some part of) banks´ debt will be converted into equity. CoCos contain an automatic mechanism that converts the CoCos into equity.

Up to now it is still unclear which of the abovementioned proposals will become law and whether a unified international or at least European framework will be established. As rules for bank restructuring and resolution particularly aim at G-SIFIs such an internationally (or at least EU-wide) homogeneous solution is highly recommended.

4.8   Bank Taxes

Taxes which are directed towards financial markets or market participants are currently in debate amongst academics and politicians. There is now a concrete proposal from the European Commission (2011). Financial transactions taxes (FTT, Tobin tax) aim to stabilise financial markets and to increase governments' tax revenues. Other taxes that will be levied on banks (e.g. the German bank levy) are expected to finance (at least partly) the guarantee schemes ("Restrukturierungsfonds") provided by governments in order to rescue banks in periods of financial crises.

Financial Transaction Tax (FTT)

McCulloch and Pacillo (2011) give a comprehensive literature review on the Tobin tax. They take into account the academic research publications of at least the last 25 years and evaluate their results regarding the effects on feasibility, market volatility, and tax revenues. First, papers with a focus on theoretical analysis using a wide range of different theoretical approaches are surveyed. The effects on market volatility are rather mixed. Either an increase or a decrease in volatility might occur after the introduction of a Tobin tax. The effect particularly depends on the tax rate, market size and the type of market organisation.

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[101] CoCo is the abbreviation of Conditional Convertible Bonds.

Quite a few empirical studies analyse the effects of existing financial market taxes, as for example the impact of the UK stamp tax on the British stock market. Those studies investigating the effects of transaction costs on capital markets are of particular importance, as a financial transaction tax might be considered economically as an increase in transaction costs. The authors calculate the tax revenues worldwide for equity markets as well as for foreign exchange, derivatives and OTC markets.[102] The main benefit of a Tobin tax seems to be the generation of a high amount of tax revenues which can be used by governments. But the results on the other intended benefit, a reduction in market volatility, is rather unclear; either an increase or a decrease might occur. The introduction of a Tobin tax could also deteriorate market liquidity. To avoid this effect the tax rate should be set rather low, not in a rate of, for example, 50% of current market transaction costs but rather only up to 10% of market transaction costs. This would still lead to worldwide tax revenues of about USD 482 billion (ca. 0.8% of worldwide GDP).[103]

The recent proposal of the EU Commission is to introduce a FTT with a 0.1% tax rate on trading in stocks and bonds and 0.01% on derivatives. The Commission estimates revenues of about EUR 30 billion.[104] The proposed tax rates are actually relatively low[105] and should therefore hardly have significant negative side effects. The tax revenues are benefits for the government but costs for market participants. The incidence of a Tobin tax is yet fairly unclear. It is only clear that short term investors and traders will pay the bulk of the tax revenues. But it is uncertain whether these taxes are passed through to private investors or whether substantial parts of the costs are borne by the market intermediaries (banks, hedge funds, brokers etc.). It is also not clear if and to what extent the short-term behaviour of (some) market participants will be changed to a more long-term behaviour. This would, as a consequence, reduce the tax revenues and the incidence. Thus, the main effect of a FTT is to generate revenues for governments.

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[102] Table 9 in McCulloch and Pacillo (2011) shows the central results regarding the expected tax revenues.

[103] See McCulloch and Pacillo (2011).

[104] European Commission (2011).

[105] This is not only the opinion of European Commission (2011) but can also be derived from McCulloch and Pacillo (2011).

Financial Activity Tax (FAT), Financial Stability Contribution (FSC)

Besides financial transaction taxes there are also other bank levies which are currently being discussed, such as a financial activity tax (FAT, tax base = banks' profits and (parts of) wage bill) or a financial stability contribution (FSC, tax base = total balance sheet or parts of the balance sheet, as e.g. the total liabilities). In a study of the International Monetary Fund (IMF (2010)) the costs and benefits of such types of bank levies are investigated theoretically. KPMG (2011) gives an overview of bank levies which are currently implemented, planned or discussed.

A FAT is essentially like a specific value-added tax for the financial sector. As the financial sector is now VAT-exempt in most countries, a FAT would correct this under-taxation of financial services. A FSC, such as the German bank tax, is levied on the total balance sheet or selected parts of the balance sheet (e.g. the liabilities of a bank). In addition, in Austria, Germany and Portugal also (off-balance sheet) derivatives are included in the tax base. The main goal of both types of taxes is to generate tax revenues which can be used by governments.

Assuming a FAT rate of 5% the tax revenues would be between 0.095% of GDP for Finland and 1.16% for Luxembourg, the median tax revenue being between 0.21% and 0.25% of GDP.[106] For Germany the tax revenue is estimated to be about 0.18% of GDP. As a FAT is essentially a VAT on financial services the incidence of a FAT should be similar to the incidence of a VAT: The tax should be largely passed on to the consumers of financial services.[107] This effect is intended and helps to reduce short-term trades in all financial markets.

Regarding FSCs such as taxes based on the total balance sheet, little is known about the incidence. Looking at the international comparison of proposed FSCs in KPMG (2011) there seems to be large variation in the details of FSCs in the different countries (Austria, Cyprus, France, Germany, Hungary, Iceland, Portugal, Sweden, the UK and the US).[108] These differences refer in particular

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[106] A FAT tax rate of 5% is also proposed in European Commission (2011). For the estimates of the tax revenues see IMF (2010: 68-70).

[107] IMF (2010).

[108] With the only exception of the United States the proposed bank levies are already legally in force (see KPMG (2011)).

to the tax base, exclusions from the tax base, and the tax rate. Thus, an analysis would have to evaluate the effects and incidence of FSCs country by country.

As the characteristics of the proposed FSCs are heterogeneous, the impact of these taxes on the national banking sector should also be different. For Germany the ministry of finance expects annual revenues from the bank tax of about EUR 1.3 billion. This is about 0.053% of German GDP.[109] This is a significantly higher amount than estimated for France (EUR 0.5 billion for 2011,[110] which amounts to 0.026% of French GDP) but lower than the estimated tax revenues for the United Kingdom (about 0.073% of British GDP) or Sweden (0.12% of Swedish GDP).

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[109] See Sachverständigenrat (2010).

[110] See Legifrance.gouv.fr (2010)

Appendix

Appendix 1: Econometric details on the vector error correction model

The econometric model

The variables in the vector error correction model (VECM) are represented by the vector z. The vector in first differences, Δz_t, is explained by a combination of the lagged variables in levels z_{t-1} and differences Δz_{t-k}. Additionally, a vector D_t of deterministic variables can be included. D_t can be a vector of dummy variables to take account of possible seasonal effects. μ is a constant term and ε_t the residual of the regression.

$$\Delta z_t = \Pi(\mu, z_{t-1}) + \sum_{k=1}^{p-1} \Gamma_k \Delta z_{t-k} + \Psi D_t + \varepsilon_t \qquad \text{for} \qquad t = 1, ..., T$$

$$\text{with} \qquad \Pi = \alpha\beta'$$

$\Pi(\mu, z_{t-1})$ estimates long run relationships. It gives a combination of the variables, which represents an equilibrium or cointegration relationship. The idea of cointegration is that a variable, which does not have a constant mean in its level, may find in combination with other variables a constant reference point. For example, if GDP and credit volume continually increase during time, they individually do not have a constant reference point (or mean). However, a combination of GDP and credit volumes, e.g. their difference, may fluctuate around a constant value. In this case, we have an equilibrium between these two variables. The number of independent vectors in the matrix Π, reflected in the rank of the matrix, gives the number of cointegrating vectors. α is a matrix that reflects the short run adjustment of the left hand side variables to deviations of the variables in the cointegrating vectors from the equilibrium.

Estimating the number of cointegrating vectors

The testing procedure for the number of cointegrating vectors is of sequential nature.[111] In the first step, we test whether the rank of matrix Π is equal to

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[111] See Lütkepohl and Krätzig: Applied Time Series Econometrics (2004).

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zero. That the rank of the matrix Π is zero is consequently the null hypothesis H_0 of the test. The alternative hypothesis H_1 is then that the rank of Π is above zero. If the null hypothesis is rejected, we proceed to the next step. The rank of Π, which gives us the number of cointegrating vectors, is found if the null hypothesis cannot be rejected for the first time. The following equations illustrate the testing sequence:

$H_0(0): \; \mathrm{rk}(\Pi) = 0$ versus $H_1(0): \; \mathrm{rk}(\Pi) > 0$,

$H_0(1): \; \mathrm{rk}(\Pi) = 1$ versus $H_1(1): \; \mathrm{rk}(\Pi) > 1$,

…

$H_0(K-1): \; \mathrm{rk}(\Pi) = K-1$ versus $H_1(K-1): \; \mathrm{rk}(\Pi) = K$.

The testing sequence ends as soon as the null hypothesis H_0 cannot be rejected for the first time. Then we have found the rank of Π, which is the number of cointegrating vectors.

Table 19 shows empirical results of the procedure described above. LR gives the value of the likelihood ratio test statistic. The p-value informs whether the null hypothesis as described above can be rejected. Following the procedure described above, H_0 can be clearly rejected with a significance level of less than 1 percent for rk = 0 and rk=1. The null hypothesis of rk = 2 can be rejected with a p-value of 7,63%. The null hypothesis can no longer be rejected for the rank rk=3 against the alternative of more than 3 cointegrating vectors. Therefore we conclude that we have 3 cointegrating vectors.

Table 19: Test for number of cointegrating vectors

rk	LR	p-value
0	189.13	0
1	117.18	0.0042
2	74.39	0.0763
3	44.18	0.2845

Adjustment of all dependent variables to the vectors EC1 to EC3:

$$\Delta K = -0.210 \cdot EC1 + 0.048 \cdot EC2 + 0.002 \cdot EC3$$
$$\;\;\;\;\;\;\;{}_{(***)}$$

$$\Delta I = -0.008 \cdot EC1 - 0.070 \cdot EC2 - 0.006 \cdot EC3$$

$$\Delta r = -3.834 \cdot EC1 + 0.358 \cdot EC2 - 0.201 \cdot EC3$$
$$\;\;\;\;\;\;{}_{(**)}\;\;\;\;\;\;\;\;\;\;\;\;\;\;\;\;\;\;{}_{(***)}$$

$$\Delta S = -0.089 \cdot EC1 + 0.109 \cdot EC2 - 0.009 \cdot EC3$$
$$\;{}_{(*)}$$

$$\Delta B = -0.496 \cdot EC1 - 0.594 \cdot EC2 + 0.042 \cdot EC3$$
$$\;\;\;\;\;\;{}_{(*)}\;\;\;\;\;\;\;\;\;\;\;{}_{(***)}\;\;\;\;\;\;\;\;\;\;\;{}_{(***)}$$

$$\Delta Y = 0.003 \cdot EC1 + 0.005 \cdot EC2 - 0.003 \cdot EC3$$

$$\Delta mm = -5.012 \cdot EC1 - 1.465 \cdot EC2 + 0.002 \cdot EC3$$
$$\;\;\;\;\;\;\;\;{}_{(***)}\;\;\;\;\;\;\;\;{}_{(**)}$$

With

$$EC1 = K + 4.5 + 0.6S + 0.16B - 2.6Y + 0.01mm$$

$$EC2 = I - 2.1 - 0.2S - 0.01mm$$

$$EC3 = r - 3.6 - 0.4mm$$

Further details of the estimation results

Table 20 depicts the estimated coefficients of the lagged differences Δz_{t-k} on Δz_t. According to the Schwartz information criterion, we chose a lag length of one. The results show that there is only little significance of the variables in (t-1) on the variables in (t).

Table 20: Estimated coefficients of lagged differences

	ΔK	ΔI	Δr	ΔS	ΔB	ΔY	Δmm
ΔK(-1)	0.09	-0.082	2.466	-0.118	-0.305	-0.043	5.249***
ΔI(-1)	0.035	-0.17	-3.409*	-0.096	-0.156	0	0.151

Δr(-1)	0.001	0.01	0.093	0.006	-0.006	0.003	-0.122
ΔS(-1)	-0.024	-0.178	2.04	0.079	0.439	-0.026	0.311
ΔB(-1)	0.013	-0.042	1.415**	-0.039	-0.099	0.002	0.504
ΔY(-1)	-0.376	0.739	-4.666	-0.043	-0.466	-0.048	4.266
Δmm(-1)	-0.001	0.029***	-0.207*	0.019**	0.021	0.008**	0.338***

Notes: ***/* denotes significance at the 1 and 10-percent level. First row: dependent variable within the system. First column: first lag of each variable in the system is used as an explanatory variable.

Explanations of variables

Table 21: Description of variables

Variable	Definition	Data source
Economic Activity (Y)	GDP	Bundesbank
Credits (K)	Outstanding volumes of credit to Non-MFIs	Bundesbank
Investment (I)	Gross investment	Eurostat
Corporate surplus (S)	Gross operating surplus	Eurostat
Corporate bonds (B)	Outstanding corporate bond volumes of non-financial corporations	EZB
Credit costs (r)	Corporate bond yields with maturities above 3 years	Bundesbank
Money market rate (mm)	3-month Fibor until 1998, 3-month Euribor since 1999	Bundesbank
Securitized products (SP)	ABS and MBS issuance volumes according to originator parent	Dealogic

Notes: All variables refer to Germany if not otherwise noted. They are not seasonally adjusted, which is accounted for in the VECM by dummy variables and in the single equations by using yearly growth rates. Furthermore, all volume variables, i.e. Y, K, I, S, B and SP are deflated by the means of the GDP deflator. Due to the combination of variables in the estimations, we use nominal interest rates (r and mm) in the VECM-estimation and deflated corporate bond yields (r) in the single equation analysis.

Appendix 2: Impact of M&A on profitability and productivity

Explanations of variables M&A section

Variable	Definition
SIZE	Firm size measured as firm's total book assets in the respective year
DEBT	Ratio of total debt to total book assets
ROA	Return on assets calculated as the ratio of EBIT to total book assets
UTIL	Capacity utilization measured by the ratio of turnover to total book assets
GROWTH	Firm's turnover growth
HHI	Industry concentration proxied by the Herfindahl-Hirschman-Index (HHI) for each two-digit NACE Rev. 2 industry code. HHI is defined as the sum of the squares of the market shares of each company in an industry and year.
POST	Dummy variable with a value of 1 for companies involved in M&A transactions in the years after the transaction and 0 otherwise.

Table 22: Changes in firm characteristics from the pre-transaction period to the post-transaction period[112]

	M&A acquirers (Germany)				M&A targets (Germany)			
	-2 to -1	-1 to +1	-1 to +2	-1 to +3	-2 to -1	-1 to +1	-1 to +2	-1 to +3
ASSETS (No.)	234	156	112	84	465	261	137	81
Percentage change	13.10%***	28.42%***	29.60%***	19.33%***	1.58%***	7.51%***	12.61%***	10.26%***
Industry adjusted	9.98%***	21.75%***	22.66%***	6.19%**	-1.71%	0.18%***	1.22%	0.00%
Level (median) at year -1:	20,108				9,855			
DEBT (No.)	403	333	253	195	536	331	193	121
Percentage change	-2.68%***	3.39%***	5.73%***	5.75%***	0.33%	-2.87%	-1.06%	-5.24%
Industry adjusted	-0.88%***	5.86%***	10.76%***	12.08%***	1.79%***	0.34%	4.10%**	2.56%
Level (median) at year -1:	47.11%				55.10%			
ROA (No.)	396	323	237	194	460	276	166	107
Percentage change	-6.66%***	-16.23%***	-20.39%	-16.52%	-8.03%	-29.13%***	-30.21%*	-26.33%
Industry adjusted	3.10%	0.00%	-1.63%	8.99%	0.71%	-16.33%**	-14.37%	-14.68%
Level (median) at year -1:	6.77%				4.86%			
UTIL (No.)	378	314	235	189	431	252	161	103
Percentage change	-0.22%	2.20%*	4.49%**	8.69%***	2.86%***	3.86%**	4.27%*	0.93%
Industry adjusted	-0.8%	1.0%	2.21%*	4.84%***	1.62%***	0.3%	1.9%	-2.7%
Level (median) at year -1:	144.35%				161.67%			

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[112] The number of observations varies across items due to data availability. Significance levels are based on two-tailed Wilcoxon signed rank tests. ***, **, * denote significance at the 1%, 5% and 10% level, respectively.

Logit models: Firm characteristics as determinants for M&A activity

In order to identify those characteristics which are related to firms involved in M&A we estimate logit models and differentiate between the functions of the firms as acquirers or targets. Due to the binary character of the dependent variable the logit model is the best suitable. In the next step, we calculate the marginal effects after logit for the likelihood of being involved in M&A. The empirical model is based on models which have been estimated for M&A and PE transactions (see, e.g., Andrade and Stafford 2004, Opler and Titman 1993). To mitigate the impact of outliers we trim the dependent variables at the upper and lower one percentile in each logit regression as well as in the subsequent panel regressions.

$$P_{jt} = \alpha + \beta_1 SIZE_{jt-1} + \beta_2 DEBT_{jt-1} + \beta_3 ROA_{jt-1} + \beta_4 AGE_{jt-1} + \beta_5 UTIL_{jt-1} + \beta_6 GROWTH_{jt-1} + \beta_7 HHI_{jt-1} + \beta_8 D_i + \beta_9 D_t + u_{jt-1}$$

The dependent variables in the two logit regressions are dummy variables for the different functions the firms can have and are defined as follows:

1. $P_{acquirer}$=1 if a firm is an acquirer in M&A, 0 otherwise

2. P_{target}=1 if a firm is a target in M&A, 0 otherwise.

All explanatory variables for the companies involved in a transaction correspond to the year before the transaction. The characteristics of the control group equal the mean values of the variables during the analyzed time period of 2000 to 2008.

The independent variables are the same which we have presented in the descriptive analysis. Furthermore, in order to incorporate the unobserved heterogeneity of industries and to control for the time-varying unobservable effects, we include industry and year dummies in the regressions.

Table 23 presents the marginal effects on the likelihood of being involved in a M&A transaction as an acquirer or a target.[113] The dependent variable equals

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[113] All marginal effects are multiplied by 100. The robust standard errors for the marginal effects have a very low value of nearly 0, thus they are not presented. ***, **,* denote significance at the 1%, 5% and 10% level, respectively

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one if a company is involved in a M&A and zero otherwise. The marginal effects are evaluated at the sample means of the independent variables.

Table 23: Marginal effects after Logit for the likelihood of being involved in M&A

	M&A (all)	M&A acquirers	M&A targets
SIZE	0.1231***	0.02582***	0.08605***
DEBT	-0.12101***	-0.02579***	-0.07925***
ROA	-0.34689***	-0.05349**	-0.27204***
AGE	0.00788	-0.001	0.00961
UTIL	0.02979***	0.00431***	0.02463***
GROWTH	-0.00209	-0.00702	0.00242
HHI	0.05386	0.00871	0.03031
Chi^2	696.9873	257.0727	430.1804
Year/Industry FE	yes	yes	yes
No. observations	84,589	81,584	84,569

The results from the multivariate analysis confirm the descriptive statistics that the likelihood to become a merging firms increases significantly with firm's size and decreases with firm's indebtedness. The logit models provide evidence that firms are more likely to merge if their profitability is lower. Therefore, we disprove our Hypothesis 2 that acquirers chose more profitable targets. In contrast, after purchasing firms with lower returns, which could be reflected in a lower enterprise value, the buyers have more potential to realize gains after the integration and restructuring of the target. Furthermore, the results suggest that higher capacity utilization increases the likelihood of being involved in M&A.

Table 24: Panel regressions for firms involved in M&A

	DEBT					
	M&A (all)		Acquirers		Targets	
POST	0.0280**	0.0296**	0.0579***	0.0600***	0.0074	0.0086
SIZE	0.0001***	0.00008	0.0001***	0.0007	0.0007***	0.0004
Y_{t-1}		0.2742***		0.2735***		0.2732***
R^2	0.0111	0.0882	0.0113	0.0881	0.0113	0.0878
N	290,197	280,731	286,847	277,456	287,894	278,475
	ROA					
	M&A (all)		Acquirers		Targets	
POST	0.0161**	0.0184***	0.0095	0.0115	0.0219**	0.0248**
SIZE	-0.00006***	-0.00006***	-0.00006***	-0.00005***	-0.00005***	-0.00007***
Y_{t-1}		-0.03703***		-0.0399***		-0.0412***
R^2	0.0064	0.0073	0.0060	0.0072	0.0059	0.0071
N	214,079	199,321	211,068	196,428	211,875	197,187
	UTIL					
	M&A (all)		Acquirers		Targets	
POST	0.1095***	0.1125***	0.2150***	0.2170***	0.0246	0.0225
SIZE	-0.0001**	-0.00005	-0.0006**	-0.00004	-0.0001*	-0.00004
Y_{t-1}		0.0734***		0.0735***		.07244***
R^2	0.0020	0.0079	0.0020	0.0079	0.0017	0.0075
N	198,271	180,755	195,412	178,045	196,122	178,659

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Appendix 3: Company Survey on the Use of Investment Banking Products in Germany

Please enter the name of your company: _____

1. Capital Market Access:

1.1 In case your company is listed on the stock exchange, how much was your market capitalization in millions of euros at the end of 2010 (approximation)?
_____ Mio. EUR

1.2 How do you assess the benefits of capital market access for your company? Capital market access is...

	not at all beneficial	somehow beneficial	beneficial	highly beneficial
Access to equity financing	[ ]	[ ]	[ ]	[ ]
Access to debt financing	[ ]	[ ]	[ ]	[ ]

1.3 How important are investment banks for your company's access to the following financing alternatives?

	unimportant	less important	neutral	important	very important
Access to equity financing	[ ]	[ ]	[ ]	[ ]	[ ]
Access to debt financing	[ ]	[ ]	[ ]	[ ]	[ ]

1.4 Which forms of financing are most important to your company?

	unimportant	less important	neutral	important	very important
Equity financing	[ ]	[ ]	[ ]	[ ]	[ ]
Debt financing	[ ]	[ ]	[ ]	[ ]	[ ]
Credit financing	[ ]	[ ]	[ ]	[ ]	[ ]

1.5 To what extent are the following issues relevant for your company's capital structure decisions?

	not relevant	less relevant	neutral	relevant	very relevant
Market access	[ ]	[ ]	[ ]	[ ]	[ ]
Direct transaction costs	[ ]	[ ]	[ ]	[ ]	[ ]
Different reporting requirements	[ ]	[ ]	[ ]	[ ]	[ ]
Degree of complexity	[ ]	[ ]	[ ]	[ ]	[ ]
Other_____	[ ]	[ ]	[ ]	[ ]	[ ]

1.6 For the funding of which projects in your company would you consider additional equity issuance as a part of the financing mix?

	not relevant	less relevant	neutral	relevant	very relevant
R&D projects and investments in new technologies	[ ]	[ ]	[ ]	[ ]	[ ]
Long-term investments in established technologies	[ ]	[ ]	[ ]	[ ]	[ ]
Acquisitions	[ ]	[ ]	[ ]	[ ]	[ ]
Liquidity provision	[ ]	[ ]	[ ]	[ ]	[ ]
Other_____	[ ]	[ ]	[ ]	[ ]	[ ]
Other_____	[ ]	[ ]	[ ]	[ ]	[ ]

1.7 For the funding of which projects in your company would you consider additional bond issuance as a part of the financing mix?

	Not relevant	less relevant	neutral	relevant	Very relevant
R&D projects and investments in new	[ ]	[ ]	[ ]	[ ]	[ ]

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technologies					
Long-term investments in established technologies	[ ]	[ ]	[ ]	[ ]	[ ]
Acquisitions	[ ]	[ ]	[ ]	[ ]	[ ]
Liquidity provision	[ ]	[ ]	[ ]	[ ]	[ ]
Other_____	[ ]	[ ]	[ ]	[ ]	[ ]
Other_____	[ ]	[ ]	[ ]	[ ]	[ ]

1.8 For the funding of which projects in your company would you consider **additional loan financing** as a part of the financing mix?

	Not relevant	less relevant	neutral	relevant	Very relevant
R&D projects and investments in new technologies	[ ]	[ ]	[ ]	[ ]	[ ]
Long-term investments in established technologies	[ ]	[ ]	[ ]	[ ]	[ ]
Acquisitions	[ ]	[ ]	[ ]	[ ]	[ ]
Liquidity provision	[ ]	[ ]	[ ]	[ ]	[ ]
Other_____	[ ]	[ ]	[ ]	[ ]	[ ]
Other_____	[ ]	[ ]	[ ]	[ ]	[ ]

1.9 How did your company's access to the following types of financing develop over the past three year (2007-2010)? Access to financing is now...

	much easier	Somehow easier	unchanged	Somehow more difficult	much more difficult
Equity financing	[ ]	[ ]	[ ]	[ ]	[ ]
Corporate bonds	[ ]	[ ]	[ ]	[ ]	[ ]
Loan financing	[ ]	[ ]	[ ]	[ ]	[ ]

1.10 Which impact will the Capital Requirement Directive (CRD IV) have on the choice between financing via the bond market and credit financing in your company?

	trifft nicht zu	trifft weniger zu	neutral	trifft eher zu	trifft voll zu
More restricted access to the bond market	[ ]	[ ]	[ ]	[ ]	[ ]
Higher transaction costs for bond issuances	[ ]	[ ]	[ ]	[ ]	[ ]
More restricted access to credit financing	[ ]	[ ]	[ ]	[ ]	[ ]
Higher costs for credit financing	[ ]	[ ]	[ ]	[ ]	[ ]

1.11 What impact will the Capital Requirement Directive (CRD IV) have on your decision about future equity captialization?

	trifft nicht zu	trifft weniger zu	neutral	trifft eher zu	trifft voll zu
Reduction of the leverage rate (equity over debt) by reduced borrowing or repayment of current debt instruments	[ ]	[ ]	[ ]	[ ]	[ ]
Increase of equity capitalization via capital market instruments	[ ]	[ ]	[ ]	[ ]	[ ]
Increase of equity capitalization by a reduction of payouts to shareholders	[ ]	[ ]	[ ]	[ ]	[ ]
Other _____	[ ]	[ ]	[ ]	[ ]	[ ]

2. Derivatives

2.1 How important are derivatives for the financial success and the financial development of your company in general?

unimportant [ ]   Less important [ ]   neutral [ ]   important [ ]   Very important [ ]

2.2 Which risk categories are relevant to your company?

	not relevant	less relevant	neutral	relevant	very relevant
FX risk	[ ]	[ ]	[ ]	[ ]	[ ]
Interest rate risk	[ ]	[ ]	[ ]	[ ]	[ ]
Equity risk	[ ]	[ ]	[ ]	[ ]	[ ]
Credit risk	[ ]	[ ]	[ ]	[ ]	[ ]
Commodity risk	[ ]	[ ]	[ ]	[ ]	[ ]
Inflation risk	[ ]	[ ]	[ ]	[ ]	[ ]

2.3 Risk definition:

How do you define financial market risk? _____

In your opinion, what is an appropriate measure of financial market risk? _____

2.4 What percentage of the risk exposures arising from your company's economic activities is hedged in your company?

	Hedged percentage (in %)
FX risk	_____ %
Interest rate risk	_____ %
Equity risk	_____ %
Commodity risk	_____ %
Credit risk	_____ %
Inflation risk	_____ %

2.5 Which contracts are used in your company?

	Futures	Forwards	Swaps	Options (OTC)	Optiones (traded on the stock exchange)	Warrants
Currency indices	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Interest rate indices	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Share indices	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Commodities	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Credit risk	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Inflation indices	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

2.6 For what prupose does your company use derivatives?
   (1) Hedging of risks connected to the regular economic activity of the company or balance sheet variables
   (2) Take a view on expected market development and exhaust arbitrage opportunities

	only (1)	rather (1)	rather (2)	only (2)	both	neither
Currency indices	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

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Interest rate indices	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Share indices	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Commodities and indices	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Credit risk	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Inflation indices	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

2.7 How important is advisory by investment banks regarding derivatives vis-à-vis successful hedging of your risk positions?

unimportant [ ]   somehow important [ ]   neutral [ ]   important [ ]   very important [ ]

2.8 Which aspects are relevant to your company's decision between OTC and exchange-traded derivatives?

	not relevant	less relevant	neutral	relevant	very relevant
Availability	[ ]	[ ]	[ ]	[ ]	[ ]
Liquidity	[ ]	[ ]	[ ]	[ ]	[ ]
Structure flexibility (Underlying, Maturity, Settlement)	[ ]	[ ]	[ ]	[ ]	[ ]
Transaction costs (e.g. low bid-ask Spreads)	[ ]	[ ]	[ ]	[ ]	[ ]
Pricing transparency	[ ]	[ ]	[ ]	[ ]	[ ]
Lot size	[ ]	[ ]	[ ]	[ ]	[ ]
Other_____	[ ]	[ ]	[ ]	[ ]	[ ]

2.9 What do you consider the largest benefit of derivatives usage in your company?

	certainly no	rather no	neutral	rather yes	certainly yes
Improvement of sourcing opportunities	[ ]	[ ]	[ ]	[ ]	[ ]
More stable risk profile	[ ]	[ ]	[ ]	[ ]	[ ]
Lower refinancing costs	[ ]	[ ]	[ ]	[ ]	[ ]
Other_____	[ ]	[ ]	[ ]	[ ]	[ ]

2.10 How did the use of derivatives regarding the following risk categories change in your company over the past three years (2007-2010)?

	strongly increased	rather increased	unchanged	rather decreased	strongly decreased
FX risk	[ ]	[ ]	[ ]	[ ]	[ ]
Interest rate risk	[ ]	[ ]	[ ]	[ ]	[ ]
Equity price risk	[ ]	[ ]	[ ]	[ ]	[ ]
Credit risk	[ ]	[ ]	[ ]	[ ]	[ ]
Commodity risk	[ ]	[ ]	[ ]	[ ]	[ ]
Inflation risk	[ ]	[ ]	[ ]	[ ]	[ ]

2.11 Based on your opinion what has caused this development?_____

2.12 Is the availability of derivatives relevant for decisions on the following economic activities of your company?

	certainly no	rather no	neutral	rather yes	certainly yes
Import/Export	[ ]	[ ]	[ ]	[ ]	[ ]
Sourcing	[ ]	[ ]	[ ]	[ ]	[ ]
Capital structure (equity vs. debt)	[ ]	[ ]	[ ]	[ ]	[ ]
Capital structure (bonds vs. loans)	[ ]	[ ]	[ ]	[ ]	[ ]

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	trifft nicht zu	trifft weniger zu	neutral	trifft eher zu	trifft voll zu
Capital structure (long-term vs. short-term refinancing)	[ ]	[ ]	[ ]	[ ]	[ ]
Investments abroad	[ ]	[ ]	[ ]	[ ]	[ ]
Other_____	[ ]	[ ]	[ ]	[ ]	[ ]

2.13 Do the following statements apply to your company?

The Capital Requirement Directive will have the following impact on transaction costs and availability of derivatives for hedging purposes in your company:

	trifft nicht zu	trifft weniger zu	neutral	trifft eher zu	trifft voll zu
Reduced availability of derivatives	[ ]	[ ]	[ ]	[ ]	[ ]
Reduced availability especially of OTC derivatives and structured products	[ ]	[ ]	[ ]	[ ]	[ ]
Increased transaction costs	[ ]	[ ]	[ ]	[ ]	[ ]
Increased transaction costs especially of OTC derivatives and structured products	[ ]	[ ]	[ ]	[ ]	[ ]
As a result of the directive my company will be less willing to use derivatives	[ ]	[ ]	[ ]	[ ]	[ ]
As a result of the directive my company will be less willing to use OTC derivatives and structured products	[ ]	[ ]	[ ]	[ ]	[ ]

The prposal onCentral Counterparty Clearing will have the following impact on the use of derivatives and structured products in your company:

	trifft nicht zu	trifft weniger zu	neutral	trifft eher zu	trifft voll zu
Reduced availability of OTC derivatives and structured	[ ]	[ ]	[ ]	[ ]	[ ]
Increased transaction costs especially of OTC derivatives and structured products	[ ]	[ ]	[ ]	[ ]	[ ]
The introduction of central counterparty clearing will reduce the adequacy of derivatives for hedging purposes	[ ]	[ ]	[ ]	[ ]	[ ]
The introduction of central counterparty clearing will lead to accounting disadvantages in my company	[ ]	[ ]	[ ]	[ ]	[ ]
As a result of the proposal my company will be less willing to use structured products	[ ]	[ ]	[ ]	[ ]	[ ]
As a result of the proposal my company will be less willing to use all forms of derivatives	[ ]	[ ]	[ ]	[ ]	[ ]

Comments:_____

3. Advisory

3.1 Is M&A an integral part of your strategic corporate planning?

Yes [ ]   No [ ]

3.2 M&A Advisory:

- ___How important are M&A transactions for the financial success and the financial development of your company in general?

Not important [ ]   somehow important [ ]   neutral [ ]   important [ ]   very important [ ]

- Does your company have an in-house M&A devision?

No [ ]   Yes [ ],   Number of employees: _____

3.3 In welchen Bereichen sehen Sie Vorteile einer **externen M&A-Beratung** (z.B. Investmentbanken, M&A Boutiquen) im Vergleich zu einer **unternehmenseigenen M&A-Abteilung**?

	externe M&A vorteilhaft	externe M&A eher vorteilhaft	neutral	interne M&A eher vorteilhaft	interne M&A vorteilhaft
Strategieberatung	[ ]	[ ]	[ ]	[ ]	[ ]
Unternehmensbewertung	[ ]	[ ]	[ ]	[ ]	[ ]
Wirtschaftsprüfung/Steuerberatung	[ ]	[ ]	[ ]	[ ]	[ ]
Kommunikationsberatung	[ ]	[ ]	[ ]	[ ]	[ ]
Finanzierungsberatung	[ ]	[ ]	[ ]	[ ]	[ ]
Transaktionsabwicklung	[ ]	[ ]	[ ]	[ ]	[ ]
Sonstiges _____	[ ]	[ ]	[ ]	[ ]	[ ]

In which areas do external M&A advisors (i.e. investment banks, M&A boutiques) have a comparative advantage as compared to a company-own M&A department?

	external M&A favourable	external M&A rather favourable	neutral	internal M&A rather favourable	internal M&A favourable
Strategy advisory	[ ]	[ ]	[ ]	[ ]	[ ]
Company valuation	[ ]	[ ]	[ ]	[ ]	[ ]
Audit/tax consulting	[ ]	[ ]	[ ]	[ ]	[ ]
Communication advisory	[ ]	[ ]	[ ]	[ ]	[ ]
Financial advisory	[ ]	[ ]	[ ]	[ ]	[ ]
Transaction processing	[ ]	[ ]	[ ]	[ ]	[ ]
Other_____	[ ]	[ ]	[ ]	[ ]	[ ]

3.4 Which core competences of external M&A advisors (i.e. investment banks, M&A boutiques) are beneficial to your company as compared to a company-own/internal M&A department?

	External M&A favourable	External M&A rather favourable	neutral	In-house M&A rather favourable	In-house M&A favourable
Detailed knowledge about transaction procedure of M&A transactions	[ ]	[ ]	[ ]	[ ]	[ ]
General knowledge about the market microstructure	[ ]	[ ]	[ ]	[ ]	[ ]
Knowledge about (potential) transaction targets	[ ]	[ ]	[ ]	[ ]	[ ]
Extensive information at a company level (i.e. better corporate databases, better valuation models)	[ ]	[ ]	[ ]	[ ]	[ ]
Better negotiation skills	[ ]	[ ]	[ ]	[ ]	[ ]
Other_____	[ ]	[ ]	[ ]	[ ]	[ ]

3.5 Do you agree with the following statement: From your point of view, your company's last significant M&A transaction has been successful.

agree	Rather agree	neutral	Rather disagree	disagree	no M&A transaction
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

3.6 How important is advisory of investment banks regarding the following activities for your company?

	Unimportant	Less important	neutral	Important	Very important
Risk management	[ ]	[ ]	[ ]	[ ]	[ ]
Rating Advisroy	[ ]	[ ]	[ ]	[ ]	[ ]
Pension obligation financing	[ ]	[ ]	[ ]	[ ]	[ ]
Advisory on syndicated bank loans	[ ]	[ ]	[ ]	[ ]	[ ]
Corporate bond issuance	[ ]	[ ]	[ ]	[ ]	[ ]
Equity issuance	[ ]	[ ]	[ ]	[ ]	[ ]
M&A	[ ]	[ ]	[ ]	[ ]	[ ]
Other:_____	[ ]	[ ]	[ ]	[ ]	[ ]

3.7 How did advisory of investment banks change regarding the following activities during the last three years (2007-2010)?

	Strongly increased	Rather increased	unchanged	Rather decreased	Strongly decreased
Risk management	[ ]	[ ]	[ ]	[ ]	[ ]
Rating Advisroy	[ ]	[ ]	[ ]	[ ]	[ ]
Pension obligation financing					
Advisory on syndicated bank loans	[ ]	[ ]	[ ]	[ ]	[ ]
Corporate bond issuance	[ ]	[ ]	[ ]	[ ]	[ ]
Equity issuance	[ ]	[ ]	[ ]	[ ]	[ ]
M&A	[ ]	[ ]	[ ]	[ ]	[ ]
Other:_____	[ ]	[ ]	[ ]	[ ]	[ ]

Comments:_____

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98-09	Marian Beise, Birgit Gehrke, u. a.	Zur regionalen Konzentration von Innovationspotentialen in Deutschland
98-10	Otto H. Jacobs, Dietmar Harhoff, Christoph Spengel, Tobias H. Eckerle, Claudia Jaeger, Katja Müller, Fred Ramb, Alexander Wünsche	Stellungnahme zur Steuerreform 1999/2000/2002.
99-01	Friedhelm Pfeiffer	Lohnflexibilisierung aus volkswirtschaftlicher Sicht.
99-02	Elke Wolf	Arbeitszeiten im Wandel. Welche Rolle spielt die Veränderung der Wirtschaftsstruktur?
99-03	Stefan Vögele Dagmar Nelissen	Möglichkeiten und Grenzen der Erstellung regionaler Emittentenstrukturen in Deutschland – Das Beispiel Baden-Württemberg.
99-04	Walter A. Oechsler Gabriel Wiskemann	Flexibilisierung von Entgeltsystemen – Voraussetzung für ein systematisches Beschäftigungsmanagement.
99-05	Elke Wolf	Ingenieure und Facharbeiter im Maschinen- und Anlagenbau und sonstigen Branchen – Analyse der sozialdemographischen Struktur und der Tätigkeitsfelder.
99-06	Tobias H. Eckerle, Thomas Eckert, Jürgen Egeln, Margit Himmel, Annette Hügel, Thomas Kübler, Vera Lessat, Stephan Vaterlaus, Stefan Weil	Struktur und Entwicklung des Oberrheingrabens als europäischer Wirtschaftsstandort (Kurzfassung).
00-01	Alfred Spielkamp, Herbert Berteit, Dirk Czarnitzki, Siegfried Ransch, Reinhard Schüssler	Forschung, Entwicklung und Innovation in produktionsnahen Dienstleistungsbereichen. Impulse für die ostdeutsche Industrie und Perspektiven.
00-02	Matthias Almus, Dirk Engel, Susanne Prantl	The „Mannheim Foundation Panels" of the Centre for European Economic Research (ZEW).
00-03	Bernhard Boockmann	Decision-Making on ILO Conventions and Recommendations: Legal Framework and Application.
00-04	Otto H. Jacobs, Christoph Spengel, Gerd Gutekunst, Rico A. Hermann, Claudia Jaeger, Katja Müller, Michaela Seybold, Thorsten Stetter, Michael Vituschek	Stellungnahme zum Steuersenkungsgesetz.
00-05	Horst Entorf, Hannes Spengler	Development and Validation of Scientific Indicators of the Relationship Between Criminality, Social Cohesion and Economic Performance.
00-06	Matthias Almus, Jürgen Egeln, Dirk Engel, Helmut Gassler	Unternehmensgründungsgeschehen in Österreich bis 1998. ENDBERICHT zum Projekt Nr. 1.62.00046 im Auftrag des Bundesministeriums für Wissenschaft und Verkehr (BMWV) der Republik Österreich.
00-07	Herbert S. Buscher, Claudia Stirböck, Tereza Tykvová, Peter Westerheide	Unterschiede im Transmissionsweg geldpolitischer Impulse. Eine Analyse für wichtige Exportländer Baden-Württembergs in der Europäischen Währungsunion.
00-08	Helmut Schröder Thomas Zwick	Identifizierung neuer oder zu modernisierender, dienstleistungsbezogener Ausbildungs- berufe und deren Qualifikationsanforderungen
		Band 1: Gesundheitswesen; Botanische/Zoologische Gärten/Naturparks; Sport
		Band 2: Werbung; Neue Medien; Fernmeldedienste; Datenverarbeitung und Datenbanken
		Band 3: Technische Untersuchung und Beratung; Architektur- und Ingenieurbüros; Unternehmens- und Public-Relations-Beratung
		Band 4: Verwaltung von Grundstücken, Gebäuden und Wohnungen; Mit dem Kredit- und Versicherungsgewerbe verbundene Tätigkeiten; Wirtschaftsprüfung und Steuerberatung; Messewirtschaft
		Band 5: Vermietung beweglicher Sachen ohne Bedienungspersonal; Gewerbsmäßige Vermittlung und Überlassung von Arbeitskräften; Personen- und Objektschutzdienste; Verkehrsvermittlung; Reiseveranstalter und Fremdenführer
00-09	Wolfgang Franz, Martin Gutzeit, Jan Lessner, Walter A. Oechsler, Friedhelm Pfeiffer, Lars Reichmann, Volker Rieble, Jochen Roll	Flexibilisierung der Arbeitsentgelte und Beschäftigungseffekte. Ergebnisse einer Unternehmensbefragung.

06-05 ZEW: Thies Büttner, Thomas Cleff,   Innovationsbarrieren und internationale Standortmobilität. Eine Studie im Auftrag der IG BCE,
Jürgen Egeln, Georg Licht,   Chemieverbände Rheinland-Pfalz und der BASF Aktiengesellschaft.
Georg Metzger, Michael Oberesch,
Christian Rammer
DIW: Heike Belitz, Dietmar Edler,
Hella Engerer, Ingo Geishecker,
Mechthild Schrooten, Harald Trabold,
Axel Werwatz, Christian Wey

07-01 Christoph Grimpe   Der ZEW-ZEPHYR M&A-Index – Konzeption und Berechnung eines Barometers für weltweite
Fusions- und Akquisitionstätigkeit.

07-02 Thomas Cleff, Christoph Grimpe,   The Role of Demand in Innovation – A Lead Market Analysis for High-tech Industries in the EU-25.
Christian Rammer

07-03 Birgit Aschhoff, Knut Blind,   Schwerpunktbericht zur Innovationserhebung 2005. Bericht an das Bundesministerium für
Bernd Ebersberger, Benjamin Fraaß,   Bildung und Forschung (BMBF).
Christian Rammer, Tobias Schmidt

08-01 Matthias Köhler, Gunnar Lang   Trends im Retail-Banking: Die Bankfiliale der Zukunft – Ergebnisse einer Umfrage
unter Finanzexperten

08-02 Margit A. Vanberg, Gordon J. Klein   Regulatory Practice in the European Ttelecommunications Sector. Normative Justification and
Practical Application

08-03 Matthias Köhler   Trends im Retail-Banking: Ausländische Banken im deutschen Bankenmarkt

08-04 Matthias Köhler, Gunnar Lang   Trends im Retail-Banking: Outsourcing im deutschen Bankensektor

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Florian Seliger, Torben Schuber

08-06 Christian Rammer, Anja Schmiele   Schwerpunktbericht zur Innovationserhebung 2006. Internationalisierung von Innovations-
aktivitäten – Wissensgewinn und -verlust durch Mitarbeiterfluktuation

09-01 Christian Rammer   Schwerpunktbericht zur Innovationserhebung 2008. Innovationspartnerschaften –
Nicola Bethmann   Schutz und Verletzung von intellektuellem Eigentum

10-01 Thomas Niebel   Der Dienstleistungssektor in Deutschland – Abgrenzung und empirische Evidenz.

11-01 Christian Rammer   Bedeutung von Spitzentechnologien, FuE-Intensität und nicht forschungsintensiven Industrien
für Innovationen und Innovationsförderung in Deutschland.

11-02 Christian Rammer, Jörg Ohnemus   Innovationsleistung und Innovationsbeiträge der Telekommunikation in Deutschland.

12-01 Michael Schröder, Mariela Borell,   The Role of Investment Banking for the German Economy.
Reint Gropp, Zwetelina Iliewa,   Final Report for Deutsche Bank AG, Frankfurt/Main
Lena Jaroszek, Gunnar Lang,
Sandra Schmidt, Karl Trela