

Bondholder Relations Activities in Germany:
Empirical Studies of the Extent and Effectiveness of
Corporate Disclosure to the Bond Market

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Steve Janner

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Betreuer und Gutachter: Prof. Dr. Heinrich Degenhart

Gutachterin: Prof. Dr. Andrea Schertler

Gutachter: Prof. Dr. Thomas Berndt

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Um die Dissertationsschrift schlüssig aufzubauen, sind die Fachartikel im Nachfolgenden entsprechend ihrer inhaltlichen Relevanz und nicht nach zeitlicher Erstellung aufgeführt. Die Struktur der Arbeit wird im einleitenden Teil des Rahmenpapiers detailliert vorgestellt. Die Kernartikel sowie das Rahmenpapier sind in englischer und der zusätzliche Fachartikel mit dem Titel „Anleihekommunikation in der Unternehmenspraxis: Ergebnisse einer Befragung deutscher Emittenten“ in deutscher Sprache verfasst.

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A. Thesis Framework: Introduction

1. Motivation and previous research

The German market for corporate bonds has experienced an unprecedented growth over the last decade (*Rudolf (2008)*). The outstanding volume of fixed-income securities issued by non-financial firms has increased to around € 220bn, which is 17 times higher than in the year 2000 (*Deutsche Bundesbank (2013)*). The reasons for this trend are manifold. They may be found in firms pursuing an optimal financing structure by flexibly combining bilateral and syndicated loans as well as capital market instruments. Particularly firms from globally competing industries are faced with a pressure of adaptation and consolidation, which increases their need for constantly available liquidity sources (*Rudolf (2008)*). Market growth is, hence, fostered by disintermediation, causing certain functions, which relationship banks have traditionally been in charge of, to be substituted by the capital market (*Hackethal (2004)*). This trend is partly due to the worrying experiences that firms had when looking for bank financing in the wake of the recent financial crisis. The introduction of the Euro currency and further harmonization of European regulations had already facilitated international investment activities (*Saß/Zurek (2003)*). Finally, the sovereign debt crises and historically low basis interest rates have led to an increasing demand in German corporate bonds.

As a growing number of German firms have seized the opportunity to issue debt securities to the market, the need arises to evaluate their attempts to provide bondholders with private corporate information. According to a bond database, set up as part of an internal research project at the Leuphana University, only slightly more than 50 percent of all German bond issuers have used the service of rating agencies in order to provide bondholders with a signal of their default risk. Beyond that, the majority of medium-sized firms opt for a rating from less established German agencies. These facts underline the importance of other communicative measures that are taken to publish corporate information to the bond market. The field of investor relations research, in the general sense, has its focus on the informational efforts that firms make towards the capital market (for seminal studies in this field see *Lang/Lundholm (1993)* and *Farragher et al. (1994)*) and is, therefore, closely related to research concerned with the effectiveness of corporate financial reporting. In contrast to most authors, I regard investor relations as more comprehensive than financial reporting and not as complementary

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to it. It comprises all means and efforts that firms use to deliver corporate information to their capital providers, including financial reporting, press communication, personal contact, and impersonal information paths. Within this context, the term of investor relations is, thereby, synonymous with corporate disclosure to the capital markets as a more abstract expression. The expanded definition, as used in this work, appears to be reasonable as it aims at incorporating all information contents issued by firms to their investors, more precisely their bondholders.

In the following, I consistently use the term bondholder relations, which is to be understood as a subdiscipline of a firm's total investor relations efforts. It is distinguished from shareholder-related disclosure, thereby recognizing differences between shareholders and bondholders due to their diverging claims and rights as well as differences in the functioning of the two markets. Generally, it depends on the actual focus of an analysis whether the topic is defined as credit(or) relations, fixed income investor relations, or bondholder relations. While credit(or) relations comprises a firm's total communication activities towards the debt side, which includes bank loans, fixed income investor relations is only marginally more extensive than bondholder relations as it not only focuses on bonds but also on other debt instruments on the capital markets, such as commercial papers and asset-backed securities, as well as on capital market-related instruments, such as bonded loans (in German: *Schuldscheindarlehen*).

The two most relevant professional organizations in Germany have long since realized the importance of bondholder relations and provided minimum standards as well as best-practice advices for their members. The *German Investor Relations Association (DIRK)* has established a 'Fixed Income Roundtable'¹ and edited several white papers concerned with fixed income investor relations or bondholder relations (e.g. *Degenhart/Schiereck* (2011), *Lowis/Streuer* (2011)). The *Society of Investment Professionals in Germany (DVFA)* also maintains a 'Bond Communication Working Group' and offers professional standards in order to "raise awareness of the urgent need for improvements to the communication of bond issuers to bond investors and analysts" (*DVFA* (2012), p. 3).

¹ See for an overview: <http://www.dirk.org/gremien/arbeitskreise> (last accessed January 14, 2014).

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Although there is also applied literature on this topic (*Deter/Diegelmann* (2003), *Grunow/Oehm* (2004), *Nolte* (2004), *Streuer* (2006), *Lowis/Streuer* (2011), and *Hasler et al.* (2013)), researchers only irregularly commit themselves to deal with the market for corporate bonds in Germany. There are, for instance, studies concerned with finding the determinants of credit spreads (*van Aobel* (2000) and *Rottmann/Seitz* (2008)) or with the effect of reporting changes on the credit spreads of German corporate bonds (*Kiefer/Schorn* (2009)). Moreover, there are theoretical works on the importance of bondholder relations and its set up (e.g. *Böhm* (2004)), but, to the best of my knowledge, there is none that empirically examines the extent of bondholder relations and its influence on the financing conditions of German firms. Only *Orens et al.* (2010) marginally consider German firms when analyzing the effect of web-based non-financial disclosure on the cost of capital, including the cost of debt, which they define as interest expenses scaled by total financial debt, as distinguished from interest paid to bondholders. Also internationally, there are only few studies concerned with corporate disclosure and the cost of debt that is issued to the bond market (e.g. *Sengupta* (1998) and *Nikolaev/van Lent* (2005)). I use these among others as precedents for my doctoral thesis.

2. Research questions

Taking information asymmetries between firms and bondholders as a basis, the empirical analyses follow various arguments from the voluntary disclosure theory as well as from principal-agency and related frameworks. I intend to examine the importance and extent of bondholder relations, the reasons for observed heterogeneity between firms, and the effectiveness of disclosure towards the bond market, among other things. In essence, most parts of the thesis follow the key assumption that bondholders demand higher premiums for opaqueness and potentially detrimental behavior on behalf of a bond issuer's management. In research on voluntary disclosure on stock markets, there are two main streams of reasoning that try to explain the mechanisms behind this (*Botosan* (1997), *Bassen et al.* (2010)). First, it is assumed that corporate disclosure reduces adverse selection problems, which increase transactions costs, the bid-ask spread more precisely, and, thereby, the yield premium (see, for instance, *Diamond/Verrecchia* (1991)). Second, disclosure is thought to reduce investors' estimation risk, thereby lowering the demanded premium over a riskless asset (*Barry/Brown* (1986)). These mechanisms may be transferred to the bond market. However, there is assumedly a slight dif-

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ference between stock and bond markets, as respects the information contents that have to be delivered to investors (*Böhm (2004)*). This is due to diverging claims and rights between bondholders and shareholders, as dealt with more fully in the individual papers, especially in the first and in the last one. Bearing these starting points in mind, I aim at answering the following research questions, which may be used as a guideline throughout the entire work:

- a) How do bond issuing firms evaluate the importance of bondholder relations? Are there systematic differences between the firms?
- b) Which instruments do firms use to communicate with private and institutional bondholders as well as with bond analysts and other intermediaries? How far do target groups diverge in importance and is there a relationship between the use of certain instruments and the importance of certain target groups?
- c) Which issuer-specific characteristics determine the level of bondholder relations?
- d) Are bond prices sensitive to corporate news? If so, in how far do corporate news categories differ in their effect on bond returns?
- e) Does the level of bondholder relations have an influence on the firms' cost of debt? Is there a difference in this regard between bondholder relations and overall investor relations or shareholder-related disclosure, respectively?

3. Research objects and data sources

I focus on bondholder relations efforts of German firms exclusively. This allows me to ignore cross-national heterogeneity in financing and disclosure practices due to historic, cultural, and legal reasons. I further include only non-financial firms in order to avoid biases potentially caused by macroprudential regulation or by common shocks having affected the financial services sector in recent years. Finally, I restrict the data sample to exchange-traded bonds so as to compare securities with homogenous features and to gather reliable capital market data. In contrast to stock markets, however, there is no single source of information that captures

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all outstanding bonds of German firms. One major reason for this lies in the complexity of data collection, caused by the large number of regular bond offerings and repayments as well as the fact that German corporate bonds are often issued to the Luxemburg exchange or other foreign places. Beyond that, research interest in this field has been comparatively low when compared to the stock market.

Therefore, it was necessary to set up a database that contained the entire population of German non-financial firms with exchange-traded bonds. This included characteristics and financial data of bond issuers, detailed bond specifications, and market data. Exact data sources for the partial analyses are specified in each of the following papers that constitute my doctoral thesis. Beyond the collection of externally provided data, a separate bondholder relations ranking had to be developed and applied to all bond issuers. This task and some parts of the data collection have been carried out as part of an independent research project, which started in September of 2010 and has since been financed by funds from the Leuphana University Lüneburg. I have set up this database with the valuable help of several student assistants and under the supervision of Professor Heinrich Degenhart. Taken together, the extensive body of data represents a fairly complete overview of the German corporate bond market from 2010 on.

4. Thesis structure

My doctoral thesis is made up of four scientific papers and a framework paper, which contains this introduction and concluding chapters. The papers are not presented in the order of their drafting date but according to their contextual contribution. The second to fourth paper in this order, which are all written in English, constitute the essential contribution to my doctoral thesis. The first paper is committed to highlight the absolute importance of bondholder relations for German firms. Taking up the results from a survey that was conducted among all corporate bond issuers, it addresses this issue in various respects, as, for example, differentiated between the placement phase of a bond and the time period thereafter. Moreover, the study is designed to deliver insights into organizational aspects inside firms as we show to which degree different departments are engaged in bondholder relations. The study's exploratory character further allows us to identify outstanding constructs among the multitude of

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manifest variables that capture the importance of communication channels and target groups in bondholder relations, each as perceived by the bond issuers. We cluster the firms in order to identify first structures in their bondholder relations behavior. Finally, we examine whether certain instruments are perceived as more important when firms focus on particular target groups. The paper, which is for once written in German, serves as an introduction into the bondholder relations topic and suggests contents for further research. The remaining papers deal with more specific aspects around the topic of transparency in the German bond market.

In the course of the second paper, presented in Section C of this thesis, firm heterogeneity in bondholder relations is examined by determining firm characteristics that influence the level of disclosure, which we measure with the help of a proprietary ranking covering contents of bondholder relations that issuers publish on their websites. After discussing the effect of observable performance, ownership, and structural firm properties against the background of the agency and related theories, various hypotheses are tested in a multiple regression analysis. The results of this analysis are supposed to help understand the reasons for cross-sectional differences in disclosure behavior towards the bond market, that is, particularly, the reasons for certain firms to stand out in bondholder relations and for others to apparently ignore this topic. This is the first attempt to empirically shed light on the motivation of firms to engage in bondholder relations.

The third paper is mainly constituted by an analysis on how economically significant price changes in corporate bonds are associated with firm-specific news. Major announcements from the year 2011 are assigned to a conclusive list of news categories and ranked according to their matching frequency with large bond returns, having filtered out macroeconomic and bond market influences. We then perform various analyses in order to get a full picture of the relationship between news announcements and the value of German corporate bonds. This kind of reverse event study approach has already been carried out for the stock market and is well received in this field. It is, however, more demanding to apply it to the bond market because of the overlapping maturity profiles of a single firm's bond portfolio, for instance. We additionally perform a conventional event study analysis in order to validate our findings. Taken together, the analyses shall provide answers to the question of whether bond prices are sensitive to (a certain kind of) corporate news.

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The last major analysis of my dissertation, presented in Section E, builds on the findings from the second and the third paper as I examine the relationship between corporate disclosure and German bond issuers' cost of debt. The level of disclosure is proxied by performance in the Internet bondholder relations ranking and in a conventional investor relations ranking, which uses subjective evaluations of fund managers and stock analysts. The latter is suitable to describe the level of shareholder-related disclosure. Examining both ranking measures for the same set of firms allows me to evaluate the relationship between bondholder and shareholder investor relations. For this purpose, I deploy both rankings as main predictors within a multiple regression model, being able to compare their effect on the cost of debt, which is measured as bond yield spreads. I devote particular attention to the potentially biasing influence of endogeneity, which is commonly encountered in this kind of model. It is the first study to analyze the relationship between disclosure and cost of public debt for German firms. Beyond that, it is the first study to apply a disclosure ranking specifically designed to capture the level of bondholder relations in general.

This work finally ends with a concluding chapter in Section F. It summarizes the results of all partial analyses against the background of the research questions that are stated above. Moreover, I identify possibilities for future research and reflect on the scientific and practical significance of my findings, as they are outlined in the section below.

5. Expected contribution to research and relevancy for professionals

In the context of my doctoral thesis, I aim at extending investor relations research by the specific aspects of bondholder relations. As pointed out above, there have been hardly any findings in this field up to now. The partial analyses are, therefore, thought to deliver new insights into the role of corporate disclosure and to close a gap between bondholder relations and financial as well as shareholder-related disclosure, which have already been examined for the German market (*Leuz/Verrecchia (2000)*, *Kiefer/Schorn (2009)*, and *Rieks/Lobe (2009)*). They aim at extending the agency, voluntary disclosure and related theories by bond-specific aspects.

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Beyond their scientific implications, the results are thought to provide professionals with evidence on the need to engage in bondholder relations, just as done on the equity side. As mentioned above, several quasi-scientific studies and contributions by practitioners have already been published. However, there is no market overview on the relevance of bondholder relations and there has only been anecdotal evidence concerning its effectiveness until now. *IR* officers, finance directors, and other firm officers that are concerned with corporate disclosure towards the bond market are observed to be at least implicitly convinced that reducing information asymmetries entails financial benefits for their firms. The analyses are thought to deliver consolidated findings that provide greater clarity and enrich professional discussions in this respect.

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B. Anleihekommunikation in der Unternehmenspraxis: Ergebnisse einer Befragung deutscher Emittenten

Die wachsende Bedeutung der Finanzierung durch Anleihen bringt neue Herausforderungen in der Unternehmenskommunikation auf der Fremdkapitalseite mit sich, die in den bisherigen Forschungsbeiträgen zu Investor Relations kaum Beachtung gefunden haben. Es gilt dabei, das komplexe und flexibel ausgestaltbare Finanzierungsinstrument der Anleihe mit allen bewertungsrelevanten Finanz- und sonstigen Unternehmensinformationen an eine anonyme Investorengruppe mit variierenden Informationsbedürfnissen und Ansprüchen zu vermitteln. Basierend auf einer strukturierten Befragung deutscher Anleiheemittenten befasst sich die folgende Studie mit der Bedeutung der Anleihekommunikation, den Nutzungsintensitäten ausgewählter Kommunikationsinstrumente und der Bedeutung üblicher Adressatenkreise der Finanzkommunikation in diesem Kontext. Die Studienergebnisse zeigen auf, dass bei der Bedeutung von Anleihekommunikation und organisatorischen Zuständigkeiten nach Kommunikationsphasen (vor und im Anschluss an die Emission des Wertpapiers) differenziert werden muss. Eine strukturerkennende Hauptkomponentenanalyse gibt Aufschluss über die Gruppierung der Kommunikationsinstrumente und der Informationsadressaten aus Emittentensicht, während eine sich anschließende Clusteranalyse die Klassifizierung der Anleiheemittenten hinsichtlich ihrer Einstellung zu Instrumenten und Adressaten ermöglicht. Abschließend kann gezeigt werden, dass die Nutzung von Kommunikationsinstrumenten in enger Verbindung mit der Bedeutung der Adressatenkreise steht.

Stichworte: Unternehmensanleihen, Investor Relations, Anleihekommunikation, Informationsadressaten, Kommunikationsinstrumente

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B. Anleihekommunikation in der Unternehmenspraxis

1. Einleitung

Die ausstehenden Anleiheverbindlichkeiten deutscher Nichtfinanzunternehmen stiegen zwischen 2000 und 2012 von € 13,6 Mrd. auf € 220,5 Mrd. (*Deutsche Bundesbank* (2013)). Auch die Zahl der deutschen Emittenten aus dem Nichtfinanzbereich hat zugenommen, nach den Erhebungen der Verfasser allein zwischen Mitte 2010 und Ende 2012 von 134 auf 225. Die verstärkte Kapitalmarktorientierung in der Fremdfinanzierung bedingt in den betreffenden Unternehmen organisatorische Veränderungen und neue kommunikative Aufgaben. Die explorativ-empirische Studie, deren Ergebnisse im Folgenden präsentiert werden, befasst sich mit der Bedeutung und Ausgestaltung der anleiheorientierten Kapitalmarktkommunikation deutscher Nichtfinanzunternehmen. Ausgangslage dieser Untersuchung ist die beobachtbare Heterogenität in Ausmaß und Qualität der Kommunikationsanstrengungen deutscher Unternehmen gegenüber dem Anleihemarkt. Es soll zunächst die subjektive Bedeutung der Anleihekommunikation für die Emittenten in den Phasen vor und nach einer Emission erfasst werden. Zur besseren Einordnung wird ein besonderes Augenmerk auf die organisatorische Aufteilung von Verantwortlichkeiten, auf die Nutzung spezifischer Kommunikationsinstrumente und auf die damit angesprochenen Zielgruppen gelegt. Abschließend wird untersucht, inwieweit ein Zusammenhang zwischen der Bedeutung der Kommunikationsinstrumente und der Bedeutung von Informationsadressaten im Anleihemarkt besteht.

Die bisherige empirische Forschung zu den Aspekten von Investor Relations konzentrierte sich auf den Aktienmarkt. Wegen der dortigen Kapitalmarktorientierung ging die grundsätzliche Forschungsarbeit zu Investor Relations zunächst von den USA und Großbritannien aus. Bedeutsam ist eine der ersten Untersuchungen von *Petersen/Martin* (1996), bei der die Autoren mit der Befragung von *CEOs* börsennotierter Aktiengesellschaften aus Florida erste Vergleichswerte zur Ausübung von eigenkapitalorientierter Investor Relations (*IR*) und zum Stand der internen *IR*-Organisation schufen. Bezogen auf europäische Unternehmen haben *Marston* (1996), *Marston/Straker* (2001) und *Marston* (2004) wesentliche wissenschaftliche Erkenntnisse zur klassischen *IR*-Tätigkeit und den Organisationsstrukturen publiziert. Eine Studie von *Laskin* (2009), in der aus einer Befragung unter *IR*-Fachleuten der Fortune 500-Unternehmen erste Verknüpfungen zwischen organisatorischen Zuständigkeiten und der Bedeutung von Informationsadressaten abgeleitet wurden, dient als Grundlage für den inhaltlichen und methodischen Ansatz der Untersuchung, deren Ergebnisse hier präsentiert werden.

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Es gab bislang kaum Untersuchungen zur Bedeutung oder Wirksamkeit einer auf die Bedürfnisse der Anleiheinvestoren zugeschnittenen Finanzkommunikation. Anleihen begründen jedoch organisations- und investorenbedingt andere Informationsbedarfe. Daher verspricht die empirische Untersuchung organisatorischer und instrumenteller Aspekte einer Finanzkommunikation, die auf die Bedürfnisse von Anleiheinvestoren zugeschnitten ist, einen wesentlichen Erkenntnisfortschritt. Diese Studie ergänzt die Untersuchung von *Degenhart/Janner (2012)* zu den unternehmensspezifischen Einflussfaktoren auf das Niveau der Anleihekommunikation – in jenem Fall gemessen anhand der entsprechenden Inhalte auf den Webseiten der Emittenten –, die einen ersten Ansatz zur empirischen Erschließung dieses Themas bildet. Im zweiten Abschnitt werden ausgehend von den Grundlagen der anleiheorientierten Kapitalmarktkommunikation die Forschungsfragen entwickelt. Im dritten Abschnitt werden Methodik und Untersuchungsobjekte dargelegt. Der vierte Abschnitt gibt erste, mithilfe deskriptiver Statistik ermittelte Untersuchungsergebnisse wieder. Die sich anschließenden Abschnitte haben das Ziel, mittels statistischer Analyse Zusammenhänge und Strukturen zu identifizieren, die einen explorativen Erklärungsansatz für die wahrgenommene Heterogenität im Ausmaß der Anleihekommunikation zwischen deutschen Anleiheemittenten liefern.

2. Grundsätzliche Überlegungen zur Anleihekommunikation und abgeleitete Forschungsfragen

Im Informationsaustausch mit dem Kapitalmarkt ist ein effektives Investor Relations-Programm unverzichtbar: Investor Relations bietet glaubhafte und nachhaltige Informationen über derzeitige und zukünftige Unternehmensaussichten, vermeidet übertriebene Erwartungshaltungen und bildet die Basis für anstehende Kapitalmarkttransaktionen (*Farragher et al. (1994)*). Dies gilt auch für die Kapitalbeschaffung mittels Anleihen. Ein vom Deutschen Investor Relations Verband herausgegebenes White Paper versorgt die Berufsszene im deutschsprachigen Raum mit einschlägigen Praxishinweisen zur Einordnung und Durchführung von Fixed Income Investor Relations, unter die auch die Anleihekommunikation fällt (*Lowitz/Streuer (2011)*). Weiterführende Expertise in Hinblick auf die gezielte Kommunikation mit Fremdkapitalgebern im Allgemeinen und Anleihegläubigern im Besonderen liefern einschlägige Praxishandbücher (*Deter/Diegelmann (2003)*, *Grunow/Oehm (2004)* und *Hasler et al. (2013)*). Darüber hinaus beschäftigte sich *Böhm (2004)* in seiner Dissertation mit den kon-

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zeptionellen und inhaltlichen Anforderungen an eine effektive gläubigerorientierte Kommunikationspolitik. Als grundlegendes Argument wird wiederkehrend vorgebracht, dass die Anleihekommunikation durch spezielle Motive und Zielsetzungen der Investoren zinstragender Finanzierungstitel geprägt ist. Anleihegläubiger erwarten die vorab vereinbarte Zinszahlung, welche eine Gewinn- und Risikopartizipation deckelt.² Die Rückzahlung des eingesetzten Kapitals erfolgt am Laufzeitende und Anleiheinvestoren genießen im Falle der Insolvenz eine Seniorität gegenüber Eigenkapital- und weiteren nachrangigen Geldgebern.

Aus dem Gleichbehandlungsgrundsatz der Kapitalmarktkommunikation ergibt sich, dass Anleiheinvestoren prinzipiell dieselben Informationen wie Aktieninvestoren vermittelt bekommen sollten. Letztlich ist das betrachtete Unternehmen als Informationsobjekt identisch und darüber hinaus sind manche Investoren sowohl auf der Eigen- als auch auf der Fremdkapitalseite desselben Unternehmens engagiert. Allerdings werden identische Informationen aufgrund der unterschiedlichen Teilhabe an den Unternehmensrisiken unterschiedlich bewertet. Aus diesem Grund verlangen beide Investorengruppen eine auf sie zugeschnittene Akzentuierung der Kommunikationsinhalte. Aufbauend auf der Annahme, dass für jeden Emittenten ein optimales Transparenzlevel gegenüber seinen Anleihegläubigern existiert, kann vermutet werden, dass die Erwartungshaltungen einzelner Investorengruppen die Informationsnachfrage des Kapitalmarktes beeinflussen und damit die Kommunikationspolitik der Unternehmen prägen. Ähnlich wie die „gänzlich andere Verteilung der Chancen und Risiken“ (Heseler (2013), S. 20) zwischen Anleihegläubigern und Eigenkapitalgebern zu unterschiedlichen Schwerpunktsetzungen in der Kommunikation führt, müsste somit auch zwischen den Informationsbedürfnissen der Adressaten im Anleihemarkt unterschieden werden können. Anleiheemittenten haben die Möglichkeit, im Rahmen einer zielgruppen- und bedürfnisorientierten Kommunikationspolitik darauf zu reagieren.

Grundsätzlich ist die klassische, auf den Aktienmarkt bezogene *IR*-Tätigkeit in einer eigenständigen Abteilung angesiedelt. Die anleihebezogenen Informationsaktivitäten gehen jedoch wegen der verschiedenen Ausgestaltungsmöglichkeiten der Instrumente und des von Aktieninvestoren abweichenden Adressatenkreises über die klassische *IR*-Tätigkeit hinaus. Die

² Hier und im weiteren Verlauf der Untersuchung wird von einer erstrangigen, unbesicherten Unternehmensanleihe ohne eigenkapitalähnliche Optionsrechte ausgegangen.

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Finanzabteilung (Finanzen/Treasury) hat notwendige Fachkenntnisse zur Strukturierung von Anleihen und kann die damit zusammenhängenden zusätzlichen Kommunikationsaufgaben erfüllen. Allerdings verfügt die *IR*-Abteilung, falls vorhanden, bereits über umfassende, für Aktieninvestoren aufbereitete Unternehmensinformationen und ausgeprägte Kommunikationskompetenzen, die auch für Fremdkapitalinvestoren nutzbar sind. Wenn möglich, erscheint eine Arbeitsteilung zwischen der Finanzabteilung und der *IR*-Abteilung daher sinnvoll, um auch bei Anleihen eine ganzheitliche Investorenkommunikation unter Kombination der verschiedenen Fachkompetenzen zu etablieren (*Lowis/Streuer (2011)*).

Die vorliegende Studie verfolgt aufgrund der Themenneuheit ein exploratives Forschungsdesign. Im Laufe der Untersuchung sollen folgende Themenschwerpunkte behandelt und Forschungsfragen beantwortet werden:

- a) Welche Rolle spielt die gläubigerorientierte Informationspolitik in der Emissions- und Folgephase für deutsche Emittenten und welche Instrumente sowie Informationsadressaten sind in der Anleihekommunikation von Bedeutung?
- b) Wie lassen sich die Unternehmen vor dem Hintergrund der Heterogenität ihrer Anleihekommunikation in Clustergruppen zusammenfassen?
- c) Welcher Zusammenhang lässt sich zwischen der Nutzungsintensität einzelner Instrumente und der Ausrichtung auf bestimmte Investorengruppen feststellen?

3. Eigenschaften der befragten Unternehmen

Die nachfolgende Auswertung basiert auf den Ergebnissen einer strukturierten, webgestützten Expertenbefragung, die im Zeitraum zwischen dem 19.01.2012 und dem 12.03.2012 durchgeführt worden ist. Die Grundgesamtheit der Untersuchung bildeten 183 deutsche Nichtfinanzunternehmen, von denen zum 01.01.2012 börsennotierte Anleihen jeglicher Ausgestaltung ausstanden. In einem ersten Schritt wurde nach geeigneten Befragungsteilnehmern auf den Unternehmenswebseiten gesucht. Die Auswahl der Experten erfolgte in dieser Reihenfolge: Beauftragte für Anleihekommunikation oder Creditor Relations laut Webseite, anschließend

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Leiter Investor Relations oder zuständige Mitarbeiter laut Webseite. Konnten keine Ansprechpartner identifiziert werden, erfolgte in einem zweiten Schritt die telefonische Abfrage beim betreffenden Unternehmen. Nach Versendung der Umfragelinks per Email wurde nach drei Wochen erneut per Email und nach weiteren drei Wochen telefonisch nachgefasst. Von 183 Unternehmen nahmen 76 an der Befragung teil und von 69 konnten die Angaben als Beobachtungen verwendet werden. Die Netto-Rücklaufquote belief sich somit auf 37,7 Prozent. Die Unternehmen konnten einmalig an der Befragung teilnehmen. Die Onlinebefragung bediente sich sowohl geschlossener als auch offener Fragen, verbunden mit der Möglichkeit zur Gewichtung und Schwerpunktsetzung. Die Eigenschaften der verwendeten Skalen werden im Verlauf der Auswertung an geeigneten Stellen beschrieben.

Tabelle B-1

Herkunft der Befragten

Herkunft	IR-Abteilung ist		Total
	vorhanden	nicht vorhanden	
Finanzabteilung	10	12	22
Investor Relations	40	0	40
PR/Kommunikation	2	3	5
Sonstiges	0	2	2
Total	52 (75%)	17 (25%)	69

Die Abteilungszugehörigkeiten der Befragten, wie sie in Tabelle B-1 angegeben sind, verdeutlichen die grundlegende Heterogenität in der Organisationsstruktur und bestätigen Erkenntnisse bisheriger IR-Forschung. Es ist bereits an dieser Stelle eine maßgebliche Mitwirkung der Finanzabteilung bei der Anleihekommunikation zu beobachten, da 31,9 Prozent der Befragungsteilnehmer dort beschäftigt waren. Dies sind vor allem Unternehmen, die annahmegemäß nicht börsennotiert sind und somit auch seltener eine klassische IR-Abteilung eingerichtet haben. Sie übertragen die Aufgaben der Anleihekommunikation demnach vollständig auf andere Abteilungen. Das Antwortverhalten zeigt ferner, dass die Koordination der Anleihekommunikation in weiteren Abteilungen (PR/Kommunikation und Sonstige) angesiedelt sein kann. Das Vorhandensein einer IR-Abteilung bedeutet nicht zwangsläufig, dass die Verantwortlichen für die Anleihekommunikation auch in dieser Abteilung tätig sind. Laut den Ergebnissen kommen selbst bei Unternehmen, die eine IR-Abteilung eingerichtet haben, fast

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20 Prozent der Befragungsteilnehmer aus der Finanzabteilung. Die Abteilungszugehörigkeit kann in Teilaspekten dieser Befragung prägend sein für das Antwortverhalten, wenn die eigenen Tätigkeitsbereiche durch die Befragten überbewertet werden. Die nachfolgenden Untersuchungsergebnisse und im Besonderen die Ergebnisse der Clusteranalyse werden vor diesem Hintergrund interpretiert.

4. Ergebnisse der Befragung

Im Folgenden werden die einzelnen Themengebiete der Befragung und die empirischen Ergebnisse dargestellt. Der Abschnitt widmet sich zunächst der Frage, welche Bedeutung der gläubigerorientierten Informationspolitik in der Emissions- und Folgephase beigemessen wird. Darüber hinaus wird erörtert, welche Organisationsstruktur der Anleihekommunikation zu Grunde liegt und wie die Befragten die Bedeutung einzelner Kommunikationsinstrumente einschätzen. Die Unternehmen wurden zunächst zur Bedeutung der Anleihekommunikation befragt, indem die Befragten diese auf einer Skala von eins („keine Bedeutung“) bis fünf („sehr hohe Bedeutung“) für die zwei maßgeblichen Phasen vor der Emission und während der Anleihelaufzeit bewerten sollten. Tabelle B-2 enthält im linken Teil die deskriptiv-statistischen Ergebnisse und im rechten Teil die Koeffizienten der paarweisen Korrelation zwischen den Befragungssitems. Die Unternehmensverantwortlichen messen der Kommunikation in der Emissionsphase eine hohe bis sehr hohe Bedeutung (4,52 im Mittelwert) bei, der Folgekommunikation eine weitaus geringere (3,61). Beide Variablen sind positiv miteinander korreliert ($\rho = 0,36$).

Tabelle B-2

Bedeutung der Anleihekommunikation und eingesetzte Mitarbeiter³

	Mittelwert	Median	Standabw.	Min.	Max.	Bedeutung		VZÄ	
						Emission	Folge	Emission	Folge
Bedeutung Emissionsphase (N=69)	4,52	5,0	0,93	1	5				
Bedeutung Folgephase (N=69)	3,61	4,0	1,10	1	5	0,36 ^a			
VZÄ Emissionsphase (N=68)	3,18	2,0	3,30	0	20	0,27 ^b	0,11		
VZÄ Folgephase (N=68)	1,33	1,0	1,21	0	5	0,17	0,43 ^a	0,62 ^a	
VZÄ_{Folge}/VZÄ_{Emission} (N=67)	0,51	0,5	0,42	0	2	-0,10	0,40 ^a	-0,11	0,66 ^a

Skala: 1 („keine Bedeutung“) bis 5 („sehr hohe Bedeutung“)

³ a, b kennzeichnen statistische Signifikanz auf 1- und 5-Prozent-Niveau.

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Nach den Unternehmensangaben sind über die Befragungsgesamtheit in der Folgephase etwa halb so viele Mitarbeiter – gemessen in Vollzeitäquivalenten (VZÄ) – mit Anleihekommunikation befasst wie in der Emissionsphase. Es lässt sich zudem feststellen, dass mit dem Stellenwert der Anleihekommunikation in der Folgephase auch die VZÄ-Relation zwischen beiden Phasen steigt. An dieser Stelle ist anzumerken, dass bei der Frage nach den eingesetzten Mitarbeitern mögliche Verständnis- und Abgrenzungsunterschiede seitens der Befragten zu beachten sind. Beispielsweise kann nicht ausgeschlossen werden, dass erbrachte Dienstleistungen von Dritten eine unterschiedliche Berücksichtigung finden und mitursächlich für Disparitäten sind.

Um die Bedeutung der *IR*-Abteilung für die Anleihekommunikation zu ermitteln, werden in einem ersten Schritt nur diejenigen Unternehmen berücksichtigt, in denen eine *IR*-Abteilung vorhanden ist (52 Unternehmen). Für die Emissionsphase ergibt sich nach der oben genannten Skalendefinition ein Mittelwert von 3,79 und für die Folgephase ein etwas höherer Wert von 4,06. Den restlichen 17 Unternehmen ohne *IR*-Abteilung wurde der Bedeutungswert eins („keine Bedeutung“) zugeordnet. Dieses Vorgehen führt bei einer Auswertung über alle 69 Unternehmen zu niedrigeren Mittelwerten für die Bedeutung von *IR*-Abteilungen im Rahmen der Anleihekommunikation (3,10 in der Emissions- und 3,30 in der Folgephase) sowie zu einer höheren Standardabweichung (Tabelle B-3).

Tabelle B-3

Bedeutung der Abteilungen in den einzelnen Phasen

<i>N</i> =69	Abteilung	Mittelwert	Median	Standardabweichung
Emissionsphase	Finanzabteilung	4,49	5	1,01
	<i>IR</i>-Abteilung	3,10	3	1,75
	<i>PR</i>/Kommunikation	2,58	2	1,35
	Sonstige	2,32	1	1,59
Folgephase	Finanzabteilung	3,46	4	1,46
	<i>IR</i>-Abteilung	3,30	4	1,70
	<i>PR</i>/Kommunikation	2,39	2	1,46
	Sonstige	1,78	1	1,27
Skala: 1 („keine Bedeutung“) bis 5 („sehr hohe Bedeutung“)				

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Die Ergebnisse aus Tabelle B-3 zeigen auf, dass die Bedeutung der Finanzabteilung für die Anleihekommunikation in der Emissionsphase deutlich höher ist als die der *IR*-Abteilung. Denkbar ist, dass finanztechnische, erklärungsbedürftige Aufgaben im Vordergrund stehen, die von der Finanzabteilung übernommen werden. Es ist nachvollziehbar, dass sie technisch formelle Vertragsaspekte durch ihren regelmäßigen Verhandlungseinsatz routinierter vermitteln kann als die *IR*-Abteilung. In Bezug auf die Folgephase wächst die Bedeutung von kommunikativen Aspekten und damit auch die der *IR*-Abteilung. Eine Aufgabenteilung zwischen diesen beiden Abteilungen stellte auch *Laskin* (2009) fest, da die Finanzabteilung in den von ihm befragten Unternehmen zwar zunächst eine dominante Stellung in der Ausübung von *IR*-Aktivitäten einnahm, ihre Bedeutung aber nach Art der Aufgaben variierte.

In der bisherigen Darstellung wurden die Bedeutung der Anleihekommunikation insgesamt sowie die Bedeutung der einzelnen Abteilungen als Unterscheidungsmaße herangezogen. Um hinsichtlich des Kommunikationsverhaltens genauer zu differenzieren, können zusätzlich die externen Aktivitäten der Unternehmen betrachtet werden. Die Art der Informationsbereitstellung kann durch die Nutzungsintensität einzelner Instrumente und Kommunikationswege umschrieben und damit als Qualitätsmaß verwendet werden (dazu etwa *Kaufmann/Ridder* (2006)). Sowohl in der Aktien-*IR* als auch in der Anleihekommunikation werden persönliche und unpersönliche Instrumente der Kommunikationspolitik zur Informationsübermittlung genutzt. Persönliche Instrumente verlangen den Unternehmen ein hohes Maß an strategischer Kommunikationsfähigkeit und Verhandlungsexpertise ab und lassen sich somit qualitativ von der unpersönlichen Informationsübermittlung sowie der rein pflichtgemäßen Publizität abgrenzen. In der Befragung sollte angegeben werden, welche Instrumente der Anleihekommunikation zum Einsatz kommen und wie bedeutend sie in diesem Kontext auf einer Skala von eins („keine Bedeutung“) bis fünf („sehr hohe Bedeutung“) sind.

Gemäß *Lowis/Streuer* (2011) sollten persönliche Einzelgespräche (*One-on-One-Meetings*) in der Anleihekommunikation die mit Abstand höchste Priorität haben und dem Unternehmen ermöglichen, (potentielle) Investoren direkt von der Zuverlässigkeit und Kompetenz des Managements zu überzeugen (*Lowis/Streuer* (2011)). Die Untersuchungsergebnisse bestätigen dies insofern, als dass persönliche Anfragen und Einzelgespräche die höchsten mittleren Skalenwerte mit einer relativ geringen Standardabweichung aufweisen. Der pflichtgemäßen Pub-

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lizität mittels Geschäftsberichts wird nach der persönlichen Kommunikation die höchste Bedeutung für die Anleihekommunikation beigemessen (Tabelle B-4). Dabei ist jedoch die größere Wertestreuung auffällig. *Lowis/Streuer* (2011) betonen Akzeptanzvorteile regelmäßiger Roadshows bei Investoren mit hohem Platzierungsvolumen. Die Teilnahme an internationalen Investorenkonferenzen spielt eine wichtige Rolle, um Portfoliomanager erreichen zu können. Auf speziellen Konferenzen werden maßgeschneiderte Inhalte vermittelt, wodurch die Präsenz bei wichtigen Investoren erhöht werden kann (*Lowis/Streuer* (2011)).

Tabelle B-4

Bedeutung der Instrumente

N=69	Instrumente	Mittelwert	Median	Standardabweichung
	Einzelgespräche	4,23	5	1,05
	Persönliche Anfragen	4,07	4	1,10
	Geschäftsbericht	3,87	4	1,31
	Gruppengespräche/Konferenzen	3,78	4	1,24
	Internetkommunikation	3,75	4	1,05
	Presse	3,32	4	1,13
	Hauptversammlung	2,10	2	1,18
	Sonstige	1,17	1	0,54

Skala: 1 („keine Bedeutung“) bis 5 („sehr hohe Bedeutung“)

Die Befragungsergebnisse zeigen, dass die Anleiheemittenten den Gruppengesprächen, Präsentationen und Konferenzen eine eher mittlere Bedeutung beimessen. Mit einem Mittelwert von 3,75 wird die kontrollierte Kommunikation über Homepage, Newsletter und Verteilerlisten (Internetkommunikation) als zumindest tendenziell bedeutend eingeschätzt. Erst danach folgt die Kommunikation über Pressemitteilungen und Bilanzpressekonferenzen. Die Durchführung von Hauptversammlungen liegt mit einem Mittelwert von 2,10 und einem Median von zwei deutlich darunter.

Im Folgenden wird betrachtet, auf welche Informationsadressaten die befragten Unternehmen ihre Anleihekommunikation ausrichten. Es sollte angegeben werden, wie die Bedeutung ausgewählter Informationsadressaten auf einer Skala von eins („keine Bedeutung“) bis fünf („sehr hohe Bedeutung“) bewertet wird. Letztlich sind immer die Fremdkapitalgeber an sich das Ziel einer gläubigerorientierten Kommunikation; neben institutionellen gehören dazu auf

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dem deutschen Markt für Unternehmensanleihen zunehmend auch private Investoren (*Lowis/Streuer* (2011)). Die Ergebnisse der Befragung zeigen auf, dass institutionellen Investoren und *Buy-Side*-Analysten die höchste Bedeutung beigemessen wird (Tabelle B-5).

Tabelle B-5

Bedeutung der Informationsadressaten

<i>N</i> =69	Adressaten	Mittelwert	Median	Standardabweichung
	Institutionelle Investoren/ Buy-Side-Analysten	4,29	5	1,02
	Kreditanalysten	3,45	3	1,27
	Ratinganalysten	3,41	4	1,45
	Sell-Side-Analysten	3,33	3	1,16
	Wirtschaftspresse	2,93	3	1,12
	Privatinvestoren	2,84	3	1,40
	Kreditauskunfteien	2,14	2	1,13
	Kreditversicherer	2,12	2	1,13
	Sonstige	1,13	1	0,48

Skala: 1 („keine Bedeutung“) bis 5 („sehr hohe Bedeutung“)

Für Privatinvestoren ergeben sich demgegenüber ein weitaus niedrigerer Mittelwert und eine höhere Standardabweichung. Sie stellen folglich eine nicht für alle Befragten gleichermaßen bedeutende Adressatengruppe dar. Kapitalmarktanalysten sollten in die Kommunikation eingebunden werden, da sie mit ihrer Beurteilung als Multiplikatoren fungieren und Investoren eine Grundlage zur Investitionsentscheidung liefern (*Lowis/Streuer* (2011)). In der Auswertung wird nach *Sell-Side*-, Rating- und Kreditanalysten differenziert. Allen Analystengruppen wird dabei eine relativ hohe Bedeutung als Informationsadressaten beigemessen. Die Wirtschaftspresse wird als weitgehend gleichbedeutend mit Privatinvestoren bewertet, während Kreditversicherungen und -auskunfteien nach Ansicht der Befragten eher unbedeutend sind.

Der folgende Abschnitt soll helfen, mögliche Zusammenhänge und Strukturen im Anleihekommunikationsverhalten zu erkennen und damit einen weiteren Verständnisbeitrag über die deskriptiv-statistische Auswertung der Befragungsinhalte hinaus zu liefern. Auf Grund der mangelnden Forschungsarbeit in diesem Themengebiet ist es nicht möglich, theoretisch fundierte Hypothesen zu überprüfen. Die explorative Hauptkomponentenanalyse bietet eine gute Möglichkeit, die Variablen des Instrumentengebrauchs und der Adressatenorientierung auf

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wenige latente Konstrukte zu reduzieren und damit die komplexe Befragungsdatenmenge in einem ersten Schritt zu strukturieren. Danach gilt es zu untersuchen, inwieweit ein Zusammenhang unter den Kommunikationsinstrumenten und den Informationsadressaten existiert.

5. Strukturerkennende Datenanalyse

5.1. Hauptkomponentenanalyse

Mit Hilfe einer Hauptkomponentenanalyse (*Principal Component Analysis, PCA*) als Unterform der Faktorenanalysen kann eine Verringerung der Datenkomplexität bei bestmöglicher linearer Approximation an den ursprünglichen Datensatz erzielt werden. Die Varianz des Datensatzes wird durch latente Konstrukte in Form von Hauptkomponenten, die Zusammenhänge unter den manifesten Variablen erkennen lassen, abgebildet. Die erfasste Struktur aus Linearkombinationen erklärt und reproduziert Datenzusammenhänge zwar bestmöglich, mit der Hauptkomponentenanalyse können aber keine Kausalstrukturen erkannt werden (*Bühner (2011)* und *Harman (1976)*). Es stellt sich zudem jeweils die Frage, wie viele Komponenten verwendet werden sollen. Ein für die Komponentenextraktion häufig herangezogenes Kriterium ist das *Kaiser-(Guttman-)*Kriterium, nach dem nur Komponenten berücksichtigt werden sollen, die einen Eigenwert⁴ von größer als eins haben und damit mehr Streuung erklären als die einzelnen Ursprungsvariablen. Anderenfalls tragen die Komponenten nicht zur Verdichtung der Dimensionskomplexität bei (*Bühner (2011)*).

Mit dem *Kaiser-Meyer-Olkin-Kriterium (KMO-Kriterium)* kann geprüft werden, ob der verwendete Datensatz grundsätzlich für eine Hauptkomponentenanalyse geeignet ist. Dabei können Werte zwischen null und eins erreicht werden, wobei ein Wert kleiner als 0,5 auf einen inkompatiblen Datensatz hinweist. Dieser wäre für eine Hauptkomponentenanalyse ungeeignet, da die manifesten Variablen, welche auf eine Hauptkomponente laden, zu wenig miteinander korreliert wären (*Bühner (2011)*). Die Analysen erfüllen das *KMO-Kriterium* mit 0,73 (Instrumente) und 0,59 (Adressaten). Unter Anwendung des alternativen *Bartlett-Tests* kann die Nullhypothese nicht vorhandener Korrelationen mit Signifikanzen kleiner als ein Prozent abgelehnt werden, sodass beide Analysen den Test auf Sphärizität (*Bartlett (1937)*) bestehen.

⁴ Der Eigenwert ist die Summe der quadrierten Ladungen über alle Merkmale auf einen Faktor. Er drückt damit sinngemäß die Wichtigkeit eines Faktors aus.

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Tabelle B-6

Komponentenladungen zur Bedeutung der Instrumente

N=69	Persönlich	Unpersönlich
Geschäftsbericht	-0.08	0,58
Hauptversammlung	-0.06	0,53
Presse	0.08	0,55
Internetkommunikation	0,28	0,28
Persönliche Anfragen	0,50	0.01
Konferenzen	0,57	-0.03
Einzelgespräche	0,57	-0.04

Skala: 1 („keine Bedeutung“) bis 5 („sehr hohe Bedeutung“)

Die Hauptkomponentenanalyse zur Bedeutung der Instrumente zeigt auf, dass die Datenmenge bestmöglich auf zwei Konstrukte, welche 61 Prozent der Gesamtvarianz erklären, reduziert werden kann. Neben der pflichtgemäßen Veröffentlichung des Geschäftsberichts und der Durchführung der Hauptversammlung laden die Pressearbeit und Internetkommunikation mit einem Faktor von mindestens 0,25 auf eine gemeinsame Hauptkomponente (Tabelle B-6). Diese Kommunikationsmittel erfordern keine selbstständige, aktive Investorenansprache und gelten daher als unpersönliche Instrumente der Anleihekommunikation. Im Gegensatz dazu stehen Gruppengespräche und Konferenzen, Einzelgespräche (*One-on-Ones*) sowie persönliche Anfragen per Telefon oder Email, die aus dem Büro heraus geführt werden. Dies sind Instrumente der persönlichen Kommunikation. Gemeinsam mit der Internetkommunikation laden sie mit einem Faktor von mehr als 0,25 auf die zweite Hauptkomponente, die nachfolgend als *Persönlich* bezeichnet ist. Internetkommunikation, zu der die Kommunikation über die Homepage, webbasierte Newsletter und Verteilerlisten gehören, wirkt auf beide Hauptkomponenten mit einem identischen positiven Ladungsfaktor und kann somit den persönlichen und unpersönlichen Instrumenten gleichermaßen zugeordnet werden.

Die Analyse zur Bedeutung der Adressaten ergibt drei wesentliche Hauptkomponenten, die sich durch die Ladung der manifesten Variablen voneinander abgrenzen lassen und mehr als 75 Prozent der Gesamtvarianz erklären (Tabelle B-7). Die erste Hauptkomponente ist positiv beeinflusst durch die Bedeutung von institutionellen Investoren, *Buy-Side*-, *Sell-Side*- sowie Ratinganalysten und wird fortwährend als *Institutionen* bezeichnet. Auf die zweite Hauptkomponente (*Privat*) laden vor allem Privatinvestoren und die Wirtschaftspresse. Auf die Dritte (*Kredit*) laden die Bedeutungen der Adressaten aus dem Kreditbereich. Vor allem die

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Differenzierung nach privaten und institutionellen Adressaten ist nachvollziehbar, da sie aufgrund ihrer divergierenden Professionalität grundsätzlich an unterschiedlichen Informationsinhalten beziehungsweise an einer anderen Informationsaufbereitung interessiert sind.

Tabelle B-7

Komponentenladungen zur Bedeutung der Informationsadressaten

<i>N=69</i>	Institutionen	Privat	Kredit
Privatinvestoren	-0.08	0,73	-0.06
Institutionelle Investoren/ Buy-Side-Analysten	0,63	0.04	-0.07
Sell-Side-Analysten	0,62	0.09	-0.07
Ratinganalysten	0,43	-0.23	0.23
Wirtschaftspresse	0.12	0,63	0.13
Kreditanalysten	0.08	0.05	0,49
Kreditauskunfteien	-0.07	0.01	0,57
Kreditversicherer	-0.05	-0.01	0,60

Skala: 1 („keine Bedeutung“) bis 5 („sehr hohe Bedeutung“)

Dem gegenüber stehen Akteure aus dem bilateralen Kreditbereich. Einige Unternehmen maßen explizit den Kreditanalysten, -auskunfteien und -versicherern eine höhere Bedeutung für die Anleihekommunikation bei. Die Kommunikation mit diesen Adressaten könnte von einem bankgeprägten Hintergrund der betreffenden Unternehmen zeugen.

Tabelle B-8

Deskriptive Statistik der Score-Werte

<i>N=69</i>	Komponenten	Mittelwert	Median	Min.	Max.	Standard- abweichung
	Persönlich	0	0,42	-4,28	1,91	1,52
	Unpersönlich	0	0,09	-2,97	2,96	1,41
	Institutionen	0	0,27	-4,33	1,95	1,42
	Privat	0	-0,28	-2,62	3,71	1,56
	Kredit	0	0,06	-2,20	2,42	1,26

Skala: 1 („keine Bedeutung“) bis 5 („sehr hohe Bedeutung“)

Zum Abschluss der Hauptkomponentenanalyse werden für alle Unternehmen standardisierte Score-Werte ihrer Komponentenladungen ermittelt, welche mit einem Mittelwert von Null und einer Streuung von einer Standardabweichung die Vergleichbarkeit der Komponenten-

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ausprägungen über die Unternehmen ermöglichen. Die Hauptkomponenten *Persönlich*, *Kredit* und *Institutionen* haben eine breite Streuung und einen vom Mittelwert abweichenden Median bei den Score-Werten (Tabelle B-8). Die linksschiefe Verteilung weist auf Extremwerte hin, die vor allem für die Komponenten *Persönlich* und *Institutionen* den Mittelwert negativ vom Median abweichen lassen. Es liegen hier nahezu 60 Prozent der Befragungsergebnisse über dem Mittelwert. Dieser Aspekt muss in der weiterführenden Analyse berücksichtigt werden.

5.2. Clusteranalyse

5.2.1. Bedeutung der Instrumente

Nach der Dimensionsreduktion mittels Hauptkomponentenanalyse können die befragten Unternehmen nun selbst entsprechend ihres Instrumenteneinsatzes und ihrer Zielgruppenorientierung eingeteilt werden. Die dazu angewandte Clusteranalyse folgt der Methode nach *Ward* (1963) und damit einer hierarchisch, distanzbasierten Klassifizierung anhand der latenten Merkmale (Score-Werte), die sich aus der vorab durchgeführten Hauptkomponentenanalyse ergeben haben. Das Resultat sind Unternehmenscluster, die entsprechend ihrer Merkmalsausprägungen in sich möglichst homogen und zueinander möglichst weit abgegrenzt sind. Für ein konsistentes Clusterergebnis sollten die eingesetzten Variablen weitgehend unabhängig voneinander sein (*Bülow* (1996)). Dies ist eingehalten, da durch die vorangestellte Hauptkomponentenanalyse stark miteinander korrelierte Variablen bereits zusammengefasst worden sind. Eine Ergebnisinterpretation erfolgt vor dem Hintergrund der Komplexitätsreduktion, sodass die Analyseergebnisse lediglich als Trendaussagen zur Heterogenität in der Anleihekommunikation zwischen deutschen Nichtfinanzunternehmen zu verstehen sind. Die geeignete Anzahl an Clustergruppen – und somit das Ende der Fusionsprozesses – muss für jede Analyse individuell bestimmt werden. Als Hilfestellung lässt sich aus dem *Caliński-Harabasz-Pseudo-F-Index* der optimale Punkt der Fusion ablesen (*Caliński/Harabasz* (1974)). Auf der Stufe der hierarchischen Clusterung mit dem höchsten Wert im *Pseudo-F-Index* sollte gestoppt werden. Nach Berücksichtigung dieses Kriteriums ergab die Analyse zur Bedeutung der Instrumente vier Cluster mit einer relativ gleichmäßigen Aufteilung der Unternehmen.

Die erste Clustergruppe umfasst Unternehmen, die als zurückhaltend in der Nutzung persönlicher Instrumente charakterisiert werden können (Tabelle B-9). Laut den Analyseergebnissen weisen diese Unternehmen den persönlichen Instrumenten eine sehr niedrige (mittlerer Score-

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Wert von -2,50) und zugleich der Emissionsphase eine hohe Bedeutung zu (Skalenmittelwert von 4,38). Es ist bemerkenswert, dass sie sich dabei stark auf die Finanzabteilung verlassen (4,46 in der Emissions- und 3,62 in der Folgephase). Die Gruppe wird dominiert von Unternehmen, die keine *IR*-Abteilung haben (69 Prozent gegenüber 42 Prozent in der Befragungsgesamtheit). Ein ähnliches Resultat findet sich jedoch auch in anderen Gruppen wieder und unterstreicht das große Engagement der Finanzabteilung in der Emissionsphase.

Auch in der zweiten Clustergruppe sind Unternehmen zusammengefasst, die den Instrumenten der Anleihekommunikation im Allgemeinen eine geringere Bedeutung beimessen. Diese können hinsichtlich ihres Kommunikationsverhaltens als zurückhaltend in der Verwendung unpersönlicher Instrumente charakterisiert werden, da für sie das Instrumenten-Konstrukt *Unpersönlich* von sehr geringer Bedeutung ist (Score-Mittelwert von -1,76). Erstaunlich ist jedoch das gleichzeitig hohe Bedeutungsmaß der Finanzabteilung in der Emissionsphase (Skalenmittelwert von 4,87), obwohl 60 Prozent der Unternehmen dieser Gruppe eine *IR*-Abteilung haben. Aufgaben der Anleihekommunikation werden vor allem in der Emissionsphase unter maßgeblicher Beteiligung der Finanzabteilung durchgeführt. Mit einem Mittelwert von 2,40 weichen diese Unternehmen in ihrer Bewertung der *IR*-Abteilung für die Emissionsphase negativ vom Mittelwert der Befragungsgesamtheit (3,10) ab, sodass die Abteilung – sofern sie überhaupt vorhanden ist – in dieser Phase eine unterdurchschnittliche Rolle zu spielen scheint. Diese Beurteilung ist allerdings vor dem Hintergrund einer großen Standardabweichung zu sehen. In der Folgephase steigt die Bedeutung leicht auf 3,07 an, liegt aber weiterhin unter dem Mittelwert über alle Unternehmen der Befragung.

Die 27 Unternehmen der größten Gruppe 3 scheinen mit einem Score-Mittelwert von 1,05 vor allem persönliche Instrumente in ihrer Bedeutung stärker zu gewichten. Die Gruppe fasst Unternehmen zusammen, bei denen die Befragungsteilnehmer vorrangig aus der *IR*-Abteilung (67 Prozent gegenüber 58 Prozent aus der Befragungsgesamtheit) stammen. Diese Unternehmen können als engagierte, persönliche Kommunikatoren charakterisiert werden. Gleichwohl lässt sich beobachten, dass für sie in der Emissionsphase wieder die Finanzabteilung die höchste Bedeutung hat. In der Folgephase verändert sich diese Einschätzung zu Gunsten der *IR*-Abteilung (Mittelwert von 3,63). In Verbindung mit persönlichen Instrumenten messen diese Unternehmen erstmals der *IR*-Abteilung in der Folgephase die höchste Bedeutung bei.

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Tabelle B-9

Clusteranalyse nach Instrumenten

N=69	Clusterkriterien	Strukturmerkmale (Bedeutung der ...)	Mittelwert	Δ Mittelwert, in %-Punkten	Standardabweichung
Gruppe 1: „Zurückhaltend/ nicht persönlich“ N=13	Persönlich		-2,50		1,04
	Unpersönlich		-0,52		1,40
		Emissionsphase	4,38	-0,14	0,77
		Folgephase	2,46	-1,14	1,05
		IR-Abt. bei Emission	2,77	-0,33	1,88
		Finanzabt. bei Emission	4,46	-0,03	0,78
		PR-Abt. bei Emission	2,38	-0,20	1,45
		IR-Abt. in Folge	2,31	-0,99	1,65
		Finanzabt. in Folge	3,62	0,16	1,32
	PR-Abt. in Folge	2,23	-0,16	1,64	
Gruppe 2: „Zurückhaltend/ nicht unpersönlich“ N=15	Persönlich		-0,03		0,86
	Unpersönlich		-1,76		0,63
		Emissionsphase	4,00	-0,52	1,31
		Folgephase	3,73	0,13	0,96
		IR-Abt. Emission	2,40	-0,70	1,59
		Finanzabt. Emission	4,87	0,38	0,35
		PR-Abt. Emission	2,33	-0,25	1,39
		IR-Abt. Folge	3,07	-0,23	1,62
		Finanzabt. Folge	3,87	0,41	1,25
	PR-Abt. Folge	2,07	-0,32	1,39	
Gruppe 3: „Engagiert/ persönlich“ N=27	Persönlich		1,05		0,53
	Unpersönlich		0,33		0,50
		Emissionsphase	4,70	0,18	0,87
		Folgephase	3,96	0,36	0,94
		IR-Abt. Emission	3,26	0,16	1,79
		Finanzabt. Emission	4,33	-0,16	1,18
		PR-Abt. Emission	2,48	-0,10	1,22
		IR-Abt. Folge	3,63	0,33	1,71
		Finanzabt. Folge	3,15	-0,31	1,49
	PR-Abt. Folge	2,30	-0,09	1,27	
Gruppe 4: „Engagiert/ unpersönlich“ N=14	Persönlich		0,33		1,00
	Unpersönlich		1,73		0,60
		Emissionsphase	4,86	0,34	0,36
		Folgephase	3,86	0,26	0,95
		IR-Abt. Emission	3,86	0,76	1,51
		Finanzabt. Emission	4,42	-0,07	1,28
		PR-Abt. Emission	3,21	0,63	1,42
		IR-Abt. Folge	3,86	0,56	1,51
		Finanzabt. Folge	3,50	0,04	1,74
	PR-Abt. Folge	3,07	0,68	1,64	

In der Einbeziehung der verschiedenen Abteilungen in die Anleihekommunikation unterscheidet sich die Gruppe 3 nicht wesentlich von der letzten Cluster-Gruppe, bei der die Anlei-

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hekkommunikation durch die *PR*-/Kommunikationsabteilung mitgeprägt wird (mittlerer Skalenwert von 3,21 und positive Abweichung zum Gesamtmittelwert) und bei der das Konstrukt der unpersönlichen Instrumente im Vordergrund steht. Sie scheint daher Unternehmen zu enthalten, die der Anleihekommunikation zwar eine hohe Bedeutung beimessen, sich aber eher unpersönlicher Instrumente bedienen. Neben der *PR*-/Kommunikations- hat für sie die *IR*-Abteilung, welche in 64 Prozent der Unternehmen vorhanden ist, in der Emissions- und der Folgephase einen überdurchschnittlich hohen Stellenwert für die Anleihekommunikation.

5.2.2. Bedeutung der Informationsadressaten

Die Clusteranalyse zur Bedeutung von Informationsadressaten ergibt ebenso vier Gruppen (Tabelle B-10).⁵ Die 23 Unternehmen der größten Gruppe 1 messen der Komponente *Kredit* eine relativ hohe Bedeutung bei (mittlerer Score-Wert von 1,57). Die Konstrukte *Institutionen* und *Privat* stehen hingegen nicht im Fokus dieser Unternehmen. Folglich können die Unternehmen dieser Clustergruppe als traditionell kreditorientiert bezeichnet werden. Ihre Finanzabteilung hat in beiden Phasen der Emission die größte Bedeutung in der Anleihekommunikation, obwohl 13 von 23 Unternehmen angegeben haben, dass sie eine *IR*-Abteilung unterhalten, und mehr als die Hälfte der Antwortenden (57 Prozent) – und damit so viele wie in der Befragungsgesamtheit – im *IR*-Bereich beschäftigt sind. Die Bedeutung der *IR*-Abteilung steigt in der Folgephase und liegt in beiden Phasen leicht über dem Mittelwert der gesamten Befragung.

Deutlich im Gegensatz zur Gruppe 1 stehen die Unternehmen der Gruppe 3 mit einem Mittelwert von 1,43 für die Hauptkomponente *Privat*, der somit die größte Bedeutung beigemessen wird. Kennzeichnend ist zudem der gleichzeitig hohe Stellenwert der *IR*-Abteilung, die mit Mittelwerten von 4,07 in der Emissions- und 4,21 in der Folgephase jeweils am bedeutendsten für die Anleihekommunikation ist und deutlich positive Abweichungen zum Mittelwert der gesamten Befragung aufweist. Demnach dominieren bei der Fokussierung auf Privatinvestoren und Vertreter der Presse andere Strukturmerkmale als bei der Ausrichtung auf *Kredit*. Keiner der Befragten aus dieser Gruppe ist in der Finanzabteilung beschäftigt und in den Unternehmen ohne *IR*-Abteilung (21 Prozent) stammen die Befragten aus anderen Bereichen (Presse- oder sonstige Abteilungen). Die Bedeutung der Presseabteilung in der Emis-

⁵ Es wurde sich ebenso am *Caliński-Harabasz-Pseudo-F-Index* orientiert (*Caliński/Harabasz* (1974)).

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onsphase ist für die Unternehmen der Clustergruppe 3 mit einem Mittelwert von 3,14 und einer positiven Abweichung zum Mittelwert (0,56) der Gesamtbefragung vergleichsweise hoch. Es ist zu vermuten, dass diese Einschätzung zum einen durch die Ausrichtung auf Privatinvestoren bedingt ist. Zum anderen kann jedoch auch eine überdurchschnittliche Bedeutung der Wirtschafts- und sonstigen Presse ursächlich sein, da auch diese mit einem höheren positiven Faktor auf die Hauptkomponente *Privat* laden.

Die Charakterisierung von Unternehmen aus den Clustergruppen 2 und 4 ist etwas schwieriger. In beiden Gruppen scheint die Bedeutung der Adressaten kein eindeutiges Abgrenzungskriterium zu sein. Zudem sind die Score-Werte und die Skalenwerte für die Strukturmerkmale der Gruppe 2 durch relativ große Varianzen geprägt. Es kommen einzig der Komponente *Kredit* eine leicht höhere (Score-Mittelwert von 0,42) und der Komponente *Institutionen* eine sehr niedrige Bedeutung (-1,97) zu. Darüber hinaus lässt sich keine Konsistenz in der Investorenausrichtung feststellen; keine Zielgruppe ist außerordentlich bedeutsam. Bei den Unternehmen der Gruppe 2 fällt eine Bedeutungsverschiebung von der *IR*-Abteilung (2,00 in der Emissionsphase und 2,09 in der Folgephase) auf die Finanz- und Presseabteilungen ins Auge, obwohl mit 81 Prozent mehr Unternehmen eine *IR*-Abteilung haben als in der Befragungsgesamtheit und mehr als 60 Prozent der Befragten aus dieser Gruppe in dieser beschäftigt sind.

In der Gruppe 4 sind es die *Institutionen*, denen eine leicht höhere Bedeutung beigemessen wird. Allerdings weist dieses Konstrukt eine relativ hohe Standardabweichung innerhalb der Clustergruppe auf. Darüber hinaus ist, wie eingangs erwähnt, die besondere Verteilung der Score-Werte für Institutionen, die durch negative Extremwerte verzerrt ist, zu berücksichtigen. Die Unternehmen der Gruppe 4 ähneln sich in den geringen Bedeutungsmaßen, die ihre Repräsentanten den Komponenten *Kredit* (mittlerer Score-Wert von -1,61) und *Privat* (-0,97) beimessen. Darüber hinaus sticht die hohe Bedeutung der Finanzabteilung für diese Unternehmen hervor. So lässt sich erkennen, dass ihre Bedeutung sowohl in der Emissionsphase mit 4,76 als auch in der Folgephase mit 3,67 deutlich höher ist als die der *IR*-Abteilung (3,00 und 3,05), obwohl mit etwa 62 Prozent genauso viele der Antwortenden aus dieser Gruppe in der *IR*-Abteilung arbeiten wie in der Befragungsgesamtheit.

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Tabelle B-10

Clusteranalyse nach Informationsadressaten

N=69	Clusterkriterien	Strukturmerkmale (Bedeutung der ...)	Mittelwert	Δ Mittelwert, in %-Punkten	Standardabweichung
Gruppe 1: „Kreditorientiert“ N=23	Kredit Institutionen Privat		1,57		1,09
			0,78		0,70
			0,29		0,97
		Emissionsphase	4,83	0,31	0,65
		Folgephase	4,09	0,49	0,85
		IR-Abt. bei Emission	3,13	0,03	1,82
		Finanzabt. bei Emission	4,39	-0,10	1,16
		PR-Abt. bei Emission	2,65	0,07	1,40
		IR-Abt. in Folge	3,57	0,27	1,70
		Finanzabt. in Folge	3,52	0,06	1,62
	PR-Abt. in Folge	2,61	0,22	1,59	
Gruppe 2: “Wenig Adressatenorientiert” N=11	Kredit Institutionen Privat		0,42		1,07
			-1,97		1,52
			-0,57		1,12
		Emissionsphase	4,10	-0,42	1,22
		Folgephase	3,18	-0,42	1,40
		IR-Abt. bei Emission	2,00	-1,10	1,73
		Finanzabt. bei Emission	4,91	0,42	0,30
		PR-Abt. bei Emission	2,45	-0,13	1,21
		IR-Abt. in Folge	2,09	-1,21	1,64
		Finanzabt. in Folge	4,18	0,72	1,08
	PR-Abt. in Folge	2,00	-0,39	1,26	
Gruppe 3: „Privatorientiert“ N=14	Kredit Institutionen Privat		-0,50		0,64
			-0,40		1,03
			1,43		0,53
		Emissionsphase	4,79	0,27	0,58
		Folgephase	3,79	0,19	0,97
		IR-Abt. bei Emission	4,07	0,97	1,44
		Finanzabt. bei Emission	3,93	-0,56	1,44
		PR-Abt. bei Emission	3,14	0,56	1,41
		IR-Abt. in Folge	4,21	0,91	1,42
		Finanzabt. in Folge	2,50	-0,96	1,34
	PR-Abt. in Folge	2,79	0,40	1,53	
Gruppe 4: “Wenig Adressatenorientiert” N=21	Kredit Institutionen Privat		-1,61		0,56
			0,45		1,18
			-0,97		0,92
		Emissionsphase	4,24	-0,28	1,10
		Folgephase	3,19	-0,41	1,08
		IR-Abt. bei Emission	3,00	-0,10	1,61
		Finanzabt. bei Emission	4,76	0,27	0,44
		PR-Abt. bei Emission	2,19	-0,39	1,29
		IR-Abt. in Folge	3,05	-0,25	1,56
		Finanzabt. in Folge	3,67	0,21	1,28
	PR-Abt. in Folge	2,10	-0,29	1,34	

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5.3. Zwischenfazit

Gemäß der strukturerkennenden Datenanalyse lassen sich die abgefragten Instrumente und Informationsadressaten in jeweils zwei beziehungsweise drei Konstrukten zusammenfassen. Auf diese Weise können das Kommunikationsverhalten einzelner Anleiheemittenten leichter charakterisiert und die Unternehmen entsprechend ihrer Einstellungen zum Instrumenteneinsatz und den Informationsadressaten abgrenzbaren Clustergruppen zugeordnet werden. Demnach sind die meisten Unternehmen aus der Befragung als engagiert in der Anleihekommunikation und im Einsatz persönlicher Kommunikationsinstrumente charakterisiert. Hinsichtlich ihrer Ausrichtung auf die Informationsadressaten des Anleihemarktes lassen sich hingegen weniger eindeutige Zuordnungen erkennen. Dies liegt vor allem daran, dass – wie aus den Befragungsergebnissen abgeleitet werden kann – vor allem institutionelle Investoren und Analysten für nahezu alle Emittenten eine hohe Bedeutung in der Anleihekommunikation haben. Darüber hinaus gibt es kleinere Gruppen an Unternehmen, die sich bei ihrer Kommunikation auf Privatinvestoren oder die klassische Kreditseite konzentrieren.

Die Auswertungen lassen keine eindeutige Verbindung zwischen der Ausrichtung auf persönliche oder unpersönliche Instrumente einerseits und der organisatorischen Aufgabenverteilung bei der Anleihekommunikation andererseits erkennen. Die Ergebnisse zeigen jedoch die Tendenz auf, dass es Unternehmen gibt, die zwar der Anleihekommunikation einen hohen Stellenwert einräumen, gleichzeitig jedoch den Einsatz unpersönlicher Instrumente befürworten. Demnach scheint eine Vielzahl von Unternehmen ihre Investoren und Informationsadressaten trotz vorhandener *IR*-Abteilung über traditionelle Instrumente der Finanzkommunikation, etwa über Geschäftsberichte, Hauptversammlungen, Presseberichte oder die Homepage, anzusprechen und nicht den Weg einer persönlichen Anleihekommunikation zu gehen. Die Analyseergebnisse deuten außerdem darauf hin, dass sich die Bedeutung der einzelnen Abteilungen mit der Investorenausrichtung in der Anleihekommunikation verändert. Es konnte an dieser Stelle schon gezeigt werden, dass Unternehmen, die sich stärker auf Privatinvestoren konzentrieren, auch der *IR*-Abteilung eine größere Bedeutung beimessen. Dieser und weitere Zusammenhänge zwischen der angesteuerten Zielgruppe und den dafür eingesetzten Instrumenten sollen im folgenden Abschnitt eine genauere Betrachtung erfahren.

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6. Zusammenhang zwischen Informationsadressaten und Kommunikationsinstrumenten

Es wird nun untersucht, inwieweit ein Zusammenhang zwischen der Ausrichtung der Anleihekommunikation auf bestimmte Informationsadressaten und der Nutzungsintensität einzelner Instrumente besteht. Hinweise dazu liefern die Ergebnisse paarweiser Korrelationsanalysen unter Hauptkomponenten aus den Bereichen *Instrumente* und *Informationsadressaten*, welche in Tabelle B-11 unter Angabe von *Spearman's* Rangkorrelationskoeffizienten aufgeführt sind.

Tabelle B-11

Korrelationsmatrix der Hauptkomponenten⁶

<i>N</i> =69 Instrumente	Informationsadressaten		
	Kredit	Institutionen	Privat
Persönlich	0,23 ^c	0,42 ^a	0,19
Unpersönlich	0,37 ^a	0,23 ^c	0,42 ^a

Zunächst wird deutlich, dass die Konstrukte *Persönlich* und *Institutionen* in ihren Bedeutungen moderat bis stark positiv miteinander korreliert sind, was darauf zurückgeführt werden kann, dass persönliche Instrumente vor allem in Zusammenhang mit der Kommunikation zu institutionellen Investoren, *Sell-Side*- und Ratinganalysten stehen. Demgegenüber scheinen Privatinvestoren und Kreditadressaten vor allem mittels unpersönlicher Kommunikationsinstrumente angesprochen zu werden. Trotz dieser eindeutigen Zusammenhänge ist es vor dem Hintergrund der Komplexitätsreduktion durch die Hauptkomponentenanalyse sinnvoll, in einem letzten Schritt den Zusammenhang zwischen den Einzelinstrumenten und den Investoren- und anderen Adressatengruppen zu untersuchen (Tabelle B-12).

Wie auch auf Ebene der Hauptkomponenten sind grundsätzlich keine negativen Korrelationen vorzufinden. Folglich verändert sich die Bedeutung der verschiedenen Adressatengruppen nie im umgekehrten Verhältnis zur Bedeutung einzelner Instrumente. Es ist bemerkenswert, dass es somit stets zu einem additiven Einsatz der Instrumente kommt und keine Substitutionseffekte zu beobachten sind. Jedoch sind bei der Bedeutung der Adressatengruppen Schwerpunkte zu erkennen. So ist es die Pressearbeit, die neben dem Geschäftsbericht und der Hauptver-

⁶ ^a, ^b und ^c kennzeichnen statistische Signifikanz auf 1-, 5- und 10-Prozent-Niveau.

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sammlung vornehmlich als Kommunikationsinstrument für den Austausch mit Privatinvestoren dient. Auffallend ist jedoch, dass auch die Bedeutungsmaße der Einzelgespräche und der Privatinvestoren einen statistischen Zusammenhang aufweisen. Bezüglich der Ausrichtung zu institutionellen Investoren und Analysten zeigt sich ein anderes Bild. In diesem Zusammenhang stehen Gruppengespräche und Konferenzen, persönliche Anfragen sowie der Informationsaustausch über die Homepage, Newsletter und Verteilerlisten im Vordergrund, wobei die Internetkommunikation in Relation zu allen Adressatengruppen – mit Ausnahme der Privatinvestoren – als bedeutend angesehen wird.

Tabelle B-12

Korrelationsmatrix der Instrumente und Informationsadressaten⁷

<i>N</i> =69	Privat- inves- toren	Institut. Investoren/ Buy-Side	Sell-Side- Analysten	Rating- analys- ten	Wirt- schafts- presse	Kredit- analys- ten	Kredit- auskunf- teien	Kredit- versi- cherer
Geschäftsbericht	0,24 ^b	0,14	0,13	0,17	0,31 ^a	0,26 ^b	0,23 ^c	0,22 ^c
Hauptversammlung	0,23 ^c	0,11	0,20	0,07	0,32 ^a	0,26 ^b	0,27 ^b	0,40 ^a
Presse	0,30 ^b	0,21	0,25 ^c	0,19	0,45 ^a	0,32 ^a	0,20	0,13
Internetkommunikation	0,13	0,29 ^b	0,42 ^a	0,28 ^b	0,20 ^c	0,21 ^c	0,20 ^c	0,23 ^c
Persönliche Anfragen	0,00	0,30 ^b	0,24 ^b	0,05	0,19 ^b	0,13	0,13	0,00
Gruppengespräche/ Konferenzen	0,09	0,40 ^a	0,24 ^b	0,13	0,14	0,22 ^c	0,13	0,15
Einzelgespräche	0,24 ^b	0,25 ^b	0,20	0,12	0,23 ^c	0,33 ^a	0,26 ^b	0,24

Bemerkenswert ist der starke Zusammenhang der Bedeutung von Internetkommunikation mit der Ausrichtung auf *Sell-Side*- und Ratinganalysten, zu denen sich darüber hinaus keine weitere signifikante Korrelation eines *IR*-Instrumentes aufzeigt. Der Informationsaustausch mit Vertretern der Wirtschaftspresse scheint vor allem über Geschäftsberichte, Hauptversammlungen sowie erwartungsgemäß über die Pressearbeit stattzufinden. Die Kommunikation zu *Sell-Side*-Analysten und institutionellen Investoren ist stark verbunden mit der Bedeutung von Konferenzen und Anfragen. Im Kreditbereich wird mit Einzelgesprächen, Geschäftsberichten, Hauptversammlungen und der Internetkommunikation an die etablierte, bilaterale Bankkommunikation angeknüpft.

⁷ ^a, ^b und ^c kennzeichnen statistische Signifikanz auf 1-, 5- und 10-Prozent-Niveau.

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Grundsätzlich bestätigt die detaillierte Korrelationsanalyse jene Strukturen, die bereits in der Hauptkomponentenanalyse beobachtet werden konnten. Unternehmen, die institutionelle Investoren sowie *Buy-Side*- und *Sell-Side*-Analysten für die Anleihekommunikation als wichtig erachten, verwenden eher persönliche Kommunikationsinstrumente, während bei Privatinvestoren und der Wirtschaftspresse die unpersönlichen Instrumente und Kommunikationswege im Vordergrund stehen. Die Ergebnisse dieser Studie decken sich auch in jener Hinsicht mit den Erkenntnissen von *Laskin* (2009) zur *IR*-Organisation auf dem US-amerikanischen Aktienmarkt. Er fand heraus, dass die befragten Unternehmen häufiger Roadshows durchführten und Einzelgespräche anboten, wenn sie institutionelle Investoren und Analysten in ihrer Bedeutung für die *IR*-Tätigkeit höher einschätzten. Die Bedeutungsmaße von Privatinvestoren und der Presse hingen demgegenüber stärker mit der Durchführung allgemeiner Managementaufgaben und der Kommunikation über Massenmedien zusammen. Letztere war in seiner Studie sogar negativ mit der Bedeutung von institutionellen Investoren verbunden. Im Gegensatz dazu liegt eine wesentliche Erkenntnis zur Anleihekommunikation auf dem deutschen Markt in der Feststellung, dass der Einsatz von Instrumenten nicht negativ mit der Bedeutung einzelner Informationsadressaten korreliert ist. Die Instrumente werden demzufolge stärker im Mix eingesetzt.

7. Schlussfolgerung

Ausgehend von der beobachtbaren Heterogenität in der Anleihekommunikation deutscher Unternehmen liefert die vorliegende Studie einen ersten Beitrag zur Bedeutung der gläubigerorientierten Kapitalmarktkommunikation und zur Klassifizierung der Anleiheemittenten hinsichtlich ihrer Ausrichtung auf Informationsadressaten und ihres Einsatzes unterschiedlicher Kommunikationsinstrumente. Aus den Ergebnissen einer strukturierten Befragung unter allen deutschen Emittenten aus dem Nichtfinanzbereich lässt sich im Mittel ein hoher Stellenwert für die Anleihekommunikation in der Emissionsphase ableiten. Aus den Antwortstrukturen der befragten Unternehmen konnte zum einen geschlossen werden, dass einzelne Kommunikationsinstrumente zu Konstrukten zusammengefasst werden können, welche die Unternehmen jeweils mit der Ansprache einer bestimmten Adressatengruppe verbunden sehen. Zum anderen existiert eine organisatorische Aufgabenteilung zwischen der primär für die Eigenkapitalseite zuständigen *IR*-Abteilung – falls im Unternehmen vorhanden – und der Finanzabtei-

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lung, die sich je nach Einstellung des betreffenden Unternehmens zur Bedeutung der Anleihekommunikation und einzelner Adressaten unterscheidet. Es konnte darüber hinaus festgestellt werden, dass das Vorhandensein einer *IR*-Abteilung bei den Anleiheemittenten keine eindeutige Ausrichtung auf persönliche Instrumente oder bestimmte Adressatengruppen impliziert. Diese Beobachtung geht einher mit einer hohen Bedeutung der Finanzabteilung für den gesamten Emissionsprozess und lässt grundsätzlich auf eine Funktionstrennung zwischen *IR*- und Finanzabteilung schließen. Es konnte jedoch festgestellt werden, dass der *IR*-Abteilung bei der Fokussierung auf Privatinvestoren in der Emissionsphase zumindest eine gleichwertige Bedeutung, in der Folgephase eine größere Bedeutung als der Finanzabteilung zukommt.

Die explorativen Studienergebnisse helfen beim besseren Verständnis der Zusammenhänge in der Anleihekommunikation. Sie sollten eine Basis für weiterführende, strukturprüfende Untersuchungen sein, da in diesem Kontext noch keine Schlussfolgerungen zu kausalen Zusammenhängen – etwa zwischen der Adressatenorientierung und dem Instrumenteneinsatz beziehungsweise der Abteilungszuständigkeit – gezogen werden konnten. Daher wäre es sinnvoll, in einem nächsten Schritt weitere Bestimmungsgrößen in die Analyse einzubeziehen sowie zu ergründen, welche weiteren Unternehmens- und Anleiheeigenschaften die Querschnittsheterogenität im Ausmaß der Anleihekommunikation sowie in der organisatorischen Zuständigkeit, der Orientierung an bestimmten Informationsadressaten und dem Einsatz von Instrumenten bedingen. Darüber hinaus kann es das Ziel kommender Untersuchungen sein, die Funktionstrennung zwischen den unterschiedlichen Verantwortlichen im Unternehmen unter Effektivitäts- und Effizienzgesichtspunkten zu diskutieren und zu bewerten.

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C. Internet Bondholder Relations: Explaining Differences in Transparency among German Issuers of Corporate Bonds

Bondholder relations gains importance for German non-financial firms as the debt market environment is changing significantly. Beyond an unprecedented increase in the amount of outstanding securities, there are two other effects that we observe in the German market for corporate bonds: an increasing focus on retail investors and a growing number of small to medium-sized firms entering the market. Both developments underline the need to explore bondholder relations, its implementation and effectiveness. In the course of this study, we intend to promote the understanding of why some firms disclose more to their bondholders than others. Following the information, agency, and related frameworks, we assume that Internet financial reporting helps reduce information asymmetries between bond issuers and dispersed investors. We devote this study to identifying main factors that determine cross-sectional heterogeneity. Conducting a multivariate analysis, we test hypotheses on the influence of capital market orientation, investors' informational needs, firm complexity, default risk, and family ownership. We find that all constructs, except for the default risk, are at least partly relevant in explaining the extent of information that bond issuers disclose on their websites.

Keywords: Investor Relations, Bondholder Relations, Disclosure, Bond Market, Germany

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C. Internet Bondholder Relations

1. Introduction

Disclosing investor-related information on corporate websites is, as research has shown, common practice for stock-listed firms. Considering the enormously increased importance of Germany's market for corporate bonds⁸, we devote particular attention to the communication policy of German bond issuers. Beyond the immense increase in outstanding securities that has already induced research interest in the field of German corporate bonds (e.g. *Horsch/Sturm* (2007) or *Rottmann/Seitz* (2008)), there were two further important reasons for us to focus on this market. Firstly, the current developments are particularly notable considering that the German market for debt capital has been traditionally dominated by close lending relationships between banks and corporations (*Kaufmann/Valderrama* (2008)). Secondly, German bond issuers increasingly focus on selling their bonds to private investors. This aspect adds to the significance of transparency issues as covered in this paper. We base our analysis on implications derived from the information, agency and related frameworks, which suggest a debtor's managers to engage in a behavior possibly detrimental to creditors when information on the debtor's characteristics and creditworthiness is asymmetrically distributed. By disseminating private information to their creditors, debtors may improve their funding opportunities and conditions.

Even though some researchers point at the importance of Internet disclosure for all kinds of stakeholders (*Bollen et al.* (2006)), previous studies predominantly focused on information releases to shareholders only. Beyond the fact that bondholder relations seems to be an under-researched area, we think this topic is worth being examined for the following reasons. Firstly, one has to distinguish between public and private debt when it comes to evaluating information barriers. Bond markets, as documented by *Begley/Freeman* (2004), are characterized by dispersed investors and a rare use of covenants. Bondholders usually do not have control rights or access to private information. Not all issuers opt for the service of rating agencies pooling private information into objective, credit ratings publicly available. Yet, investors strive to gather as much public information as possible to evaluate an issuer's risk of default (*Sengupta* (1998)). Secondly, after observing developments in the market, our strong impression is that issuers interpret the need for disclosure very differently. Against the background

⁸ Between 2000 and 2010, the volume of bonds issued by domestic non-financial corporations increased from € 13.6bn to € 250.8bn (*Deutsche Bundesbank* (2011)).

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of bilateral relationships that are dominating debt financing in Germany, some issuers still refrain from extensive public disclosure, while others invest a good deal of efforts in keeping their bondholders informed. We intend to interpret this heterogeneity, taking into account that it may partly be attributable to regulatory provisions. As a matter of fact, most German exchanges that maintain one of the new trading segments targeted at small to medium-sized bond issuers strive to set transparency requirements low enough to motivate firms without capital market experience but high enough to provide a transparency level that is appropriate for non-institutional investors.

The object of our research is to explain differences in web-based dissemination practices of German bond issuers, defined in this context as Internet bondholder relations (*IBR*). This approach appears reasonable since the Internet has become a dominant publication channel, just as predicted by *Deller et al. (1999)* and *Kuperman (2001)*. Due to its flexible character, we assume *IBR* to be well suitable to keep anonymous bondholders informed. Recognizing the Internet's highly competitive and cost-efficient nature (*Pang et al. (2009)*), it remains unclear why bond issuing firms do not maintain a more or less identical level of *IBR*.

Marston (1996) defines investor relations as “the link between a company and the financial community, providing information to help the financial community and investing public evaluate a company” (p. 477). Following this definition, previous studies considered Internet investor relations or financial reporting as alternative publication channels rather than as media for information that is not yet published (e.g. *Bollen et al. (2006)*). In the context of this study, we use *IBR* as a proxy for the issuers' overall disclosure, differentiating between mandatory or recommended disclosures on one side and voluntary disclosures on the other. We base our methodological approach on studies such as *Marston/Polei (2004)*, who analyze the Internet financial reporting behavior of large stock-listed firms from Germany, or *Bollen et al. (2006)*, who examine 270 stock-listed firms from six countries, one of which is Germany.⁹ We contribute to this stream of research by focusing on more heterogeneous firms. The firms we analyze do not share the common feature of being listed in a stock index but of having issued mid-term to long-term debt securities on the bond market.

⁹ Other recent studies: *Bonsón/Escobar (2006)*, *Abdesalam/Street (2007)*, *Álvarez et al. (2008)*, *Gandía (2008)*, *Kelton/Yang (2008)*, *Arussi et al. (2009)*, *Aly et al. (2010)*.

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The paper is organized as follows. In the next section, we reflect on the determinants of voluntary Internet disclosure and develop hypotheses. Our research design and sample selection criteria are described in the third section, before we present and discuss the results of our analysis. Finally, the paper draws to its completion with a section devoted to concluding remarks.

2. Theoretical background and hypotheses

2.1. Voluntary disclosure in debtor-creditor-relationships

Jensen/Meckling (1976) are among the first to address agency issues in debtor-creditor relationships arising from informational asymmetry between the contracting parties. They argue that in their role as agents, owner-managers have certain incentives to act for their own benefit at the expense of outside creditors. The latter in turn react to this behavior by writing covenants and monitoring managerial decisions. These costly measures are taken in order to deter agents from transferring wealth from creditors to themselves (*Aghion/Bolton* (1992)). This may be done either by increasing dividend payments to the shareholders (*Smith/Warner* (1979)), thus reducing the liability reserves, or by substituting low-risk assets for riskier investments, in whose potential surplus the creditors do not participate (*Jensen/Meckling* (1976)). In order to increase the benefits from leveraging, agents might borrow more debt capital and reduce the existing creditors' share in the firm's assets. Finally, in crisis situations, creditors face an increasing risk of underinvestment. This is the case when managers decide to forgo profitable projects whose benefits would go to the creditors in the case of default (*Myers* (1977)). Besides these ex-post dilemmas of hidden action, creditors also have to evaluate the debtor's ability to meet future obligations, both before and after the granting of credits. Lack of information impedes the evaluation and induces adverse selection problems. Bondholders, therefore, demand a premium to be compensated for their information risk. Disclosure of private information in turn helps reduce these asymmetries.

Introduced by *Spence* (1973), the signaling theory is concerned with reactions arising from information asymmetries in various markets. Applied to voluntary disclosure towards capital providers, the theory postulates that firms being of higher quality seek to stand out from the rest. However, signaling does not work without credibility. Once a signal proved wrong, fu-

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ture attempts to communicate a superior firm quality may be mistrusted by the capital markets. *Morris* (1987) finds that agency and signaling theory are both consistent and may be used as complements in explaining accounting policy choices since they are overlapping but not fully equivalent.

The decision to publish corporate information follows a trade-off between its benefits and the evolving costs. Providing outside investors with valuable information in a timely and convenient manner reduces information asymmetry and, hence, the costs of capital (*Verrecchia* (2001)). More specifically, *Sengupta* (1998) shows that bond issuers doing well in financial analyst rankings tend to enjoy lower yield spreads and interest costs. By refining *Sengupta*'s model, *Nikolaev/van Lent* (2005) are able to find an even stronger negative association. *Francis et al.* (2005) set up an international panel to analyze the connection between disclosure incentives and the cost of debt capital, among others. They report a negative correlation between disclosure and interest expenses divided by average total debt.¹⁰

On the other hand, publishing sensitive information entails direct and indirect costs (*Verrecchia* (1983)). Polling 400 executives, *Graham et al.* (2005) find that potential benefits are carefully weighed against the costs of disclosure. Setting precedents that may be unrealizable in future and provide competitors and other non-addressees with proprietary information are cited as the most important reasons for non-disclosure. Unlike most of the information that private debt holders base their decisions on, information directed at the bond market is mostly open to the public (*Armstrong et al.* (2010)). Accordingly, *Dhaliwal et al.* (2011) find that firms with poor accounting quality or low public disclosure prefer to borrow private debt rather than to issue bonds. In the following, we formulate several hypotheses on constructs potentially affecting the level of disclosure.

2.2. Hypotheses

2.2.1. Bond market orientation

Bond issuance costs increase by the level of information asymmetry between management and public creditors and the level of agency costs (*Myers/Majluf* (1984)). Firm management

¹⁰ Further studies dealing with the impact of disclosure or accounting quality on the cost of debt: *Ahmed et al.* (2002), *Bharath et al.* (2008), *Kiefer/Schorn* (2009), *Orens et al.* (2010).

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may be assumed to voluntarily disclose in order to keep information risk premiums low when anticipating or already preparing a bond offer (*Healy/Palepu (2001)*). *Lang/Lundholm (1993)* observe that firms opening themselves to the stock market tend to disclose more information. *Ettredge et al. (2002)* test this hypothesis by applying it to Internet financial reporting, confirming a positive relationship. They argue that managers may even have an incentive to disclose both favorable and unfavorable information before issuing new securities. Unlike shares, non-perpetual bonds expire after a few years and are often refinanced by the issue of new debt securities. As a consequence, the universe of bond-issuing firms is divided into issuers frequently accessing the bond market on one side and occasional issuers on the other. Particularly the former have to build a sustainable relationship with their investors to keep refinancing costs low.

While frequent issuers may reduce agency costs by constantly increasing their credibility, new bond issuers face a certain lack of investor confidence. Issuing a credit rating is a common way to gain access to the bond market. Therefore, especially first-time issuers may be assumed to rely on the signaling function of a credit rating until their reputation values are raised over time (*Diamond (1989)*). Consequently, *Faulkender/Petersen (2006)* use credit ratings as proxies for a firm's access to the public bond markets. *Boot et al. (2006)* add that "ratings may help in disseminating information to relatively uninformed investors" (p. 84) and *Sufi (2009)* finds that opaque firms may improve their access to uninformed investors when issuing ratings for syndicated bank loans. *Boot et al. (2006)* further suggest that credit ratings do not provide new information unless a firm is about to be downgraded. One major reason for this stems from the credit watch procedure, during which firms and rating agencies are implicitly contracting on giving the firm time to take corrective measures. Rating agencies thus promote the dissemination of information to the public debt market without substituting other information channels. We, therefore, interpret credit ratings as proxies for issuers' intentions to (re-)enter the public debt market and/or expand their investor base. In this context, we assume firms having deliberately decided not to issue a credit rating to be less open towards the bond market. Taken together, we conclude:

H1: The level of *IBR* disclosure is positively related to the degree of bond market orientation.

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2.2.2. Stock listing

Bondholder relations may be considered as a rather new task for German firms in contrast to shareholder relations. *Ettredge et al. (2002)* maintain that debtor-creditor relationships are of secondary importance as “information asymmetry is generally greater between managers and equity (versus debt) investors” (p. 362). *Debreceeny et al. (2002)*, by referring to the considerations of *Ball (1995)*, argue that creditors bear less investment risk than shareholders as they are given priority in the case of default. They also put that, due to rule-based governance mechanisms (*Williamson (1988)*), creditors may be deemed less reliant on voluntary disclosure from their debtors. Consequently, *Dang et al. (2010)* deduce that debt capital is less sensitive to information than equity. Beyond that, stock-listed firms have to maintain large resources to fulfill transparency requirements. They may be considered to make better use of economies of scale when introducing bondholder relations. It is, therefore, reasonable to assume stock-listed bond issuers to be more transparent than privately held ones.

H2: The level of *IBR* disclosure is higher for firms whose stock is traded on an exchange.

2.2.3. Investors’ informational needs

Up until now, we have not taken into consideration the demand side of the market for information. It appears useful to distinguish between institutional and retail investors as one may assume their demand for information access to diverge. Although the presence of institutional equity investors is found to have a positive influence on disclosure and governance proxies (*Ajinkya et al. (2005)*), this may not hold for debt investors and Internet disclosure. Institutional bondholders do not enjoy the same statutory rights as large-block shareholders so as to influence a firm’s governance. It is moreover reasonable to assume that issuers experience less pressure from bond than from equity analysts as there are fewer of them in the market. Secondly, institutional bondholders typically possess in-depth knowledge about market mechanisms and may easily gain access to corporate information either by participating in roadshows and conferences, or by maintaining permanent contact with investor relations representatives. Private investors, on the other hand, are more likely to base their decisions on information that is freely available. That is why several legal disclosure requirements have been supplemented by an exception for firms offering their securities to qualified investors only. Referring to these thoughts, *Laskin (2009)* tests in how far the importance of different public

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targets, as perceived by investor relations officers in *Fortune 500* firms, correlates with a commitment in various investor relations activities. He reports, among other things, a positive correlation between the importance of institutional shareholders and an involvement in road-shows. Moreover, though to a statistically insignificant degree, firms seem to engage less in controlled media communications when institutional investors gain importance.

H3: The level of *IBR* disclosure is negatively related to the proportion of institutional investors in the bonds.

2.2.4. Firm complexity

Under the positive accounting theory, *Watts/Zimmerman* (1978) suggest that firms with more diversified business operations suffer higher information asymmetries than those focusing on fewer lines of business. The rationale behind this assumption is that capital providers and analysts face greater difficulties when assessing more diversified firms. This ultimately leads to mispricing (*Bassen et al.* (2010)). Issuers may actively work against this by disclosing detailed information about their fields of business. This argumentation is closely connected to the assumption of larger firms suffering from higher agency costs as they are usually more complex in structures and procedures. Beyond that, large firms are in the public eye and, therefore, more likely to face higher political costs, as *Watts/Zimmerman* (1978) point out. Voluntarily disclosing better, large firms may further use economies of scale (*Ashbaugh et al.* (1999)) and, thereby, lower their marginal costs of disclosure. Accordingly, several scholars have been able to find evidence for a positive correlation between firm size and Internet disclosure for Germany (*Marston/Polei* (2004)) and other countries (e.g. *Bollen et al.* (2006), *Bonsón/Escobar* (2006), *Álvarez et al.* (2008), *Kelton/Yang* (2008)).

H4: The level of *IBR* disclosure is positively related to the degree of firm complexity.

2.2.5. Default risk

Creditors' main concern is the risk of not being refunded their investment. Voluntary Internet disclosure allows public creditors to constantly monitor a firm's performance, actions, and intentions. There are two lines of reasoning based on this fact. Lower-performing firms have a

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higher risk of failure and suffer from higher refinancing costs. This mechanism creates an incentive to disclose more in order to reduce investors' estimation risk. However, based on the signaling theory, investors may be thought to associate a lack of information with bad news about the business development. Therefore, also average-to-better performing firms may seek to stand out by disclosing more information (*Verrecchia (1983), Chambers/Penman (1984), Lev/Penman (1990)*). The motivation to send positive signals towards bondholders is offset by proprietary costs of disclosure. The more successful firms reveal about their business the more they risk losing the chance of standing out in the future. *Bollen et al. (2006)* outline that, even though they could afford it, successful firms may consciously not use all functions offered by the Internet in order not to endanger their competitive advantage.

As would be expected, the empirical evidence has been mixed so far. *Ettredge et al. (2002), Marston/Polei (2004), Bollen et al. (2006), and Kelton/Yang (2008)* do not find any or hardly any significant relationship between firm performance and Internet disclosure of stock-listed firms. On the contrary, *Richardson/Welker (2001), Aly et al. (2010), Lang/Lundholm (1993)* are able to provide evidence for a positive relationship. Some studies additionally use leverage as a proxy for firms' default risk. However, prior findings are not supporting the hypothesis of a positive relationship between leverage and level of Internet disclosure for stock-listed firms (*Debreceeny et al. (2002), Oyelere et al. (2003), Bollen et al. (2006), Aly et al. (2010)*). Without tying us down to a certain prediction, we assume:

H5: The level of *IBR* disclosure is related to the risk of default.

2.2.6. Family ownership

Considerations on wealth transfer incentives in debtor-creditor relationships are far from complete without having analyzed the influence of inside or concentrated ownership. The less atomistic an ownership structure is the more shareholders may be able to control the management and influence business decisions. This phenomenon might especially appear in firms controlled by their founding owners since their relationship with the firm is extraordinarily strong. In many cases, the founding family provides a portion of, if not the entire, top management or supervisory board, and family owners are able to exercise their rights at annual meetings. Accordingly, agency problems between ownership and management are likely to be

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mitigated so that family owners may content themselves with a lower level of disclosure (*Bushman et al. (2004)*). However, the influential power held by controlling family members may inspire them or their management representatives to secure private benefits on the expense of minority shareholders (*DeAngelo/DeAngelo (2000)*, *Anderson et al. (2003)*, *Chan et al. (2009)*). *Filatotchev/Mickiewicz (2001)* argue that this expropriation may in fact collude with the interests of outside creditors and be tolerated by them.

Contrarily, the stewardship theory maintains that managers may well be motivated to serve an organization's objectives instead of acting in a self-serving manner. *Miller/Le Breton-Miller (2006)* expand this view to family firms suggesting that their executives are "either family members or emotionally linked to the family" (p. 74). There are two related ways in which these firms constitute an exception to the ordinary view on debt-related agency issues. Firstly, researchers regularly underline the long-term involvement of family owners (*Villalonga/Amit (2006)*, *Ali et al. (2007)*, *Cascino et al. (2010)*). Shares are often passed from one generation to the next. Looking back at their own dedication to the firm's success, family owners are interested in passing on a thriving business rather than just wealth (*Casson (1999)*). This shifts the focus from shareholder value to firm value maximization allowing the goals of founding family and bondholders to converge. This effect is expected to significantly reduce agency costs of debt for family firms. Secondly, founding families have, as *Anderson et al. (2003)* point out, a strong incentive to preserve their firm's reputation. This is not only justified by the fact that their personal image is inextricably connected to the corporate reputation, but also by the long-lasting relationships that evolve between the firm's key personalities and external parties such as bondholders. Once the latter perceive a certain behavior from the firm officials, they might assume this pattern to be perpetuated in the future. Negative associations may be much more to the detriment of the firm's value than in a non-family firm, whose management and ownership change more frequently. *Anderson et al. (2003)* are able to show that family firms tend to enjoy lower agency costs of debt, as measured by bond yield spreads. *Ellul et al. (2007)* further differentiate between firms from different investor protection environments, finding that family firms enjoy lower agency costs of debt than non-family firms in a reliable legal system with high creditor rights such as Germany.

H6: The level of *IBR* disclosure is lower for family firms.

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3. Research design

3.1. Sample description

We examine all German non-financial firms having issued any type of mid-term to long-term public debt traded on the public capital market. We manually searched for quotations on all German exchanges. Since many German firms have issued their debt securities via foreign finance subsidiaries, we had to extend our data collection to these markets. We included the exchanges in Dublin, Luxembourg, and Zurich as well as the *Euronext*. These are the most important markets for German bond issuers. We examined the firms' websites between April 10 and April 30, 2011. On April 30, the population of non-financial corporate bond issuers consisted of 173 firms.

3.2. Firm-specific and financial data

Data for the subsequent analysis were collected from various sources. Information on the bonds was extracted from the *Onvista* online database, a web-based provider for detailed information on a wide range of traded securities, and the exchanges' websites. Data on the issuers were taken from the *Hoppenstedt* database, which comprises detailed profiles of more than 300,000 German firms. Financial data were collected from annual reports, which were either available on their websites or in the *Electronic Federal Gazette*. Firm-specific data were collected on the group level.

3.3. Dependent variables

Our evaluation approach follows previous work on Internet financial reporting. The checklist criteria are taken in large parts from *Bollen et al. (2006)* as well as *Marston/Polei (2004)*, who on their part refer to descriptive studies (*Geerings et al. (2003)*, *Pirchegger/Wagenhofer (1999)*). We exclude predominantly technological features. Our final checklist concentrates on the content, timeliness, presentation, and usability dimensions of Internet financial reporting. As we focus on bondholder relations, we adapted the checklist after having pre-analyzed the websites of bond issuers without outstanding shares and that we considered fulfilling a benchmark function. Our final checklist includes 50 items, all of which are measured dichotomously. They are assigned to seven categories: *Access to IR*, *Corporate information*, *Financial reporting*, *Corporate governance*, *Communication*, *Bond data*, and *Presentation*. We are

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aware that any item selection process suffers from subjectivity, which is never fully avoidable in the composition of ranking scales (*Marston/Polei (2004)*).

Following *Ettredge et al. (2002)*, we differentiate between publications required by capital market regulations and voluntary items. This is necessary as some firms are more affected by regulatory provisions than others. First of all, there are several legal norms and best practice advices that refer to the disclosure of firms whose securities are admitted to trading on the regulated market. A large proportion of bonds have been issued to market segments that are regulated either by legislative authority or the exchanges themselves. Beyond that, the German Corporate Governance Code (*GCGC*) contains the most important provisions with respect to Internet disclosure. Sections 6.4 and 6.8 of the code recommend the use of modern media such as the Internet and corporate websites for the dissemination of information. Additionally, Section 6.7 requires using an online financial calendar for the announcement of important events. According to Article 161 in conjunction with Article 3 of the German Stock Companies Act, firms whose securities are admitted to trading on the regulated stock market have to disclose any deviation from these recommendations. To all other firms, the authors of the code solely recommend to follow this comply-or-explain principle.

To account for these differences, we calculate a modified ranking score by excluding items that are required or recommended by legislative or exchange regulation. Those are publications that we assume not to be published by a large part of firms without being obliged by regulation, neither via Internet nor conventional media. This includes financial reporting, a security prospectus, a detailed factsheet, a financial calendar, conference recordings or presentations, ad hoc announcements, credit rating reports, and an English translation of the website, as it is required by the *GCGC*. Moreover, we define another scale that solely contains the category *Bond data*. It focuses on information that would not be disclosed by stock-listed firms without debt securities. By including this category, we intend to focus on information that is directed primarily to bondholders, as opposed to the other two ranking variations. The total and modified ranking scores are then used as dependent variables for estimations within the subsequent analyses.

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3.4. Regression model

In order to test our hypotheses on the determinants of *IBR* quality, we define a set of independent variables proxying for the constructs we considered above. We test for their correlation with the individual *IBR* scores by applying the following model:

$$(C-1) \quad \begin{aligned} \text{Ranking}_i &= \beta_0 + \beta_1 \text{Regulated}_i + \beta_2 \text{Frequency}_i + \beta_3 \text{Rating}_i + \beta_4 \text{Stock listed}_i \\ &+ \beta_5 \text{Lot size}_i + \beta_6 \text{Firm size}_i + \beta_7 \text{Diversification}_i + \beta_8 \text{Altman}_i + \beta_9 \text{Family}_i \\ &+ \beta_{10} \text{Subordinated}_i + \varepsilon_i. \end{aligned}$$

Ranking is the dependent variable represented by one of the three ranking scores, as measured by applying the item checklist.

3.5. Independent variables

3.5.1. Bond market orientation

Regulated is a dummy variable proxying for openness towards the bond market. It is coded as 1 if at least one bond is listed in an (exchange-)regulated segment instead of the open market, which requires a lower degree of transparency. *Frequency* is a dummy variable, coded as 1 if the firm has issued bonds since 2008. It helps distinguish between regular and occasional bond issuers as we assume the former to be more affected by agency costs of debt and thus to be more inclined to disclose better. *Rating* indicates whether or not a firm has issued a credit rating. We include ratings from both international and domestic agencies.

3.5.2. Stock listing

Stock listed is a dummy variable, coded as 1 if the firm has its shares listed on the stock market.

3.5.3. Investors' informational needs

Since the actual proportion of institutional investors is unknown even to the issuers themselves, we use a proxy. *Lot size* is a dummy variable indicating whether a firm has issued bonds with lot sizes higher than € 50'000 only. This is the threshold above which German regulatory provisions assume investors to be qualified. High lot sizes are sold almost exclusively to institutional investors such as banks, pension funds, and insurance firms.

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3.5.4. Firm complexity

Firm size is measured by the logged number of group employees (FY 2009) and represents the first measure of firm complexity. *Diversification*, as the second one, stands for the number of industries to which a firm belongs. We employ the two-digit system used by the German Federal Statistical Office, which classifies firms into 21 main industry categories.

3.5.5. Default risk

Altman is based on the *Altman Z-score* as revisited in 2002 (*Altman (2002)*). The score is calculated following the formula suited for both non-manufacturing industrials and private firms:

$$(C-2) \quad \begin{aligned} Z = & 6.56 * \textit{Working capital} / \textit{Total assets} \\ & + 3.26 * \textit{Retained earnings} / \textit{Total assets} \\ & + 6.72 * \textit{Earnings before interest and taxes} / \textit{Total assets} \\ & + 1.05 * \textit{Book value of equity} / \textit{Book value of total liabilities} . \end{aligned}$$

We calculate the score using data from 2009 annual reports. Firms with a score higher than 2.6 are considered to be in the safe zone and thus assigned a value of 1. Firms that fall below a score value of 1.1 are assigned a 0. Firms that lie between these thresholds are assigned a Z-score that has been transformed to a scale from 0 to 1 by applying this formula:

$$(C-3) \quad Z' = (Z - 1.09) / (2.61 - 1.09).$$

3.5.6. Family ownership

Family is a dummy variable, coded as 1 if the firm is predominantly under the control of its founding owners or their descendants. We apply a modified form of the *Substantial Family Influence Index (SFI)*, as developed by *Klein (2000)*. It measures the degree of family influence by taking into account the three governance components of ownership, management, and supervision. The sum of the founding family's percentage shares in each of these categories must be at least 1 in order to be considered as relevant. *Achleitner et al. (2009)* reduce the threshold from 1 to 0.5 for listed firms, which are characterized by a less concentrated ownership structure. We regard original founders, their relatives, and descendants as family members when applying the following conditions to identify founding family firms:

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$$(C-4) \quad \text{Listed: If } S_{Fam} > 0, SFI: (S_{Fam} + SB_{Fam} + MB_{Fam}) \geq 0.5;$$

$$(C-5) \quad \text{Non-listed: If } S_{Fam} > 0, SFI: (S_{Fam} + SB_{Fam} + MB_{Fam}) \geq 1;$$

where S_{Fam} equals the equity stake held by founding family members, SB_{Fam} and MB_{Fam} equal their percentages in the supervisory board and top management team, respectively.

3.6. Control variables

As indicated above, our sample of bonds is not restricted to standard bonds. It is reasonable to include a variable that separates the effect of non-standard bonds in a firm's public debt portfolio. Therefore, *Subordinated* serves as a variable controlling for the influence of subordinated and similar claims. It is a dummy variable, coded as 1 if the respective firm has issued subordinated, convertible, or other hybrid bonds. Beyond obvious structural characteristics, we also considered bonds with maturities of 30 years and more as hybrid. Moreover, we include dummy variables for all first-level industries with at least five firms in the sample in order to control for potential industry-specific effects on *IBR* disclosure.

4. Results

4.1. Descriptive statistics

Table C-1 displays the mean ranking scores per checklist category and in total. Moreover, it helps understand how we assigned checklist items to the three rankings. Their scores may be understood as aggregated values of the checklist items. We observe that all 173 bond issuers have a corporate website, on which 62 percent have set up a separate bondholder relations section.

Table C-1

Disclosure Items

N=173	Checklist item	Mean	Ranking		
			1	2	3
Access to IR	Bondholder relations website	0.62	x	x	
	IR contact opportunity	0.68	x	x	
	Individual contact details	0.50	x	x	
	FAQ	0.32	x	x	
	Order service	0.38	x	x	

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<i>N</i> =173	Checklist item	Mean	Ranking		
			1	2	3
	Mailing list	0.36	x	x	
	Use of <i>RSS</i> feeds	0.38	x	x	
	Use of social media	0.06	x	x	
	Partly translated into English	0.71	x		
	Fully translated into English	0.64	x		
Corporate information	Group portrait	0.88	x	x	
	Group structure with key data	0.26	x	x	
	Group strategy	0.50	x	x	
	Group strategy with details	0.19	x	x	
	Factsheet	0.39	x		
Financial reporting	Current annual report	0.75	x		
	Online version of annual report	0.34	x		
	Interim reports	0.63	x		
	Online version of interim reports	0.20	x		
	Time series of annual reports (2-4 years)	0.71	x		
	Time series of annual reports (≥ 4 years)	0.57	x		
	Business outlook	0.17	x	x	
Corporate governance	Corporate governance category	0.52	x		
	Management details	0.83	x		
	Management details incl. <i>CV</i>	0.58	x		
	Ownership structure	0.35	x		
Communication	Press release category	0.89	x	x	
	<i>IR</i> news category	0.58	x	x	
	Between 1 and 6 <i>IR</i> news statements within last 2 months	0.69	x	x	
	More than 6 <i>IR</i> news statements within last 2 months	0.23	x	x	
	Financial calendar	0.66	x		
	<i>AGM</i> and/or conference recordings/presentations	0.34	x		
	Ad hoc announcement category	0.54	x		
Bond data	Data on bond issues	0.58	x	x	x
	Maturity profile	0.09	x	x	x
	Finance structure	0.20	x	x	x
	Finance structure with key data	0.09	x	x	x
	Credit rating	0.35	x		x
	Credit rating with credit report	0.13	x		x
	Historical bond prices	0.12	x	x	x
	Yield spreads/ <i>CDS</i> rates	0.04	x	x	x
	List of credit analysts	0.19	x	x	x
	List of credit analysts includes credit opinions	0.08	x	x	x
	Security prospectus	0.51	x		x
Presentation	Update status	0.06	x	x	
	Referral feature	0.29	x	x	
	<i>PDF</i> download	0.09	x	x	
	1 click to <i>IR</i> contents	0.64	x	x	

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N=173	Checklist item	Mean	Ranking		
			1	2	3
	1 click to financial news	0.21	x	x	
	Print version of website	0.32	x	x	

Due to missing data, the sample is reduced to 152 firms. The median firm employs around 5,600 people and has issued 1.5 bonds with a volume of € 273m (Table C-2). The total volume of all bonds included amounts up to € 298bn. 64 percent have their stock listed and 51 percent have issued at least one bond to a premium segment. The ranking scores are spread in a large range across the sample: the maximum score equals 46 and the minimum is 1.

Table C-2

Descriptive Statistics on Ranking Scores and Independent Variables

N=152	Mean	Median	Standard deviation	Min.	Max.
Ranking scores					
Ranking 1	22.29	22.00	10.73	1.00	46.00
Ranking 2	11.57	11.00	6.13	1.00	27.00
Ranking 3	2.57	2.00	2.36	0.00	10.00
Independent variables					
Regulated	0.51	1.00	0.50	0.00	1.00
Frequency	0.78	1.00	0.42	0.00	1.00
Rating	0.58	1.00	0.50	0.00	1.00
Stock listed	0.64	1.00	0.48	0.00	1.00
Lot size	0.22	0.00	0.42	0.00	1.00
Firm size (<i>ln</i>)	8.00	8.63	2.98	1.10	13.10
Diversification	1.84	2.00	0.83	1.00	5.00
Altman	0.39	0.12	0.43	0.00	1.00
Family	0.32	0.00	0.47	0.00	1.00
Subordinated	0.46	0.00	0.50	0.00	1.00

4.2. Multivariate analysis

We test our hypotheses by running a multiple *OLS* regression analysis based on the above derived model. The sample sizes are further reduced after applying *Cook's* distance measure for detection of outliers. We define the cut-off value for the distance measure as $D_i > 4/N$. We carry out the analysis on variables both as observed and with *z*-transformed coefficients. The standardization allows us to compare the variables on their relative significance in explaining *IBR*. We calculate variance inflation factors to test for inter-correlations between the inde-

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pendent variables. We set the cut-off value to 2.50, which means that the coefficients' standard errors are inflated by less than 1.58 times compared to the uncorrelated state. We thus allow for a very low level of multicollinearity. Table C-3 indicates that our results are not likely to be much influenced by inter-correlations.

Table C-3

Variance Inflation Factors (VIF) of Independent Variables

	$VIF_{Rank. 1}$ N=149	$VIF_{Rank. 2}$ N=147	$VIF_{Rank. 3}$ N=144
Regulated	1.86	1.95	1.73
Frequency	1.23	1.23	1.30
Rating	1.45	1.49	1.48
Stock listed	1.35	1.40	1.45
Lot size	1.76	1.79	1.65
Firm size	1.60	1.62	1.58
Diversification	1.06	1.06	1.07
Family	1.20	1.22	1.20
Altman	1.04	1.04	1.04
Subordinated	1.23	1.27	1.23
Mean VIF	1.38	1.41	1.37

Table C-4 shows the results of our three regressions. The first main column contains the coefficient values for the total ranking, the remaining two refer to the modified ranking scores as described above. We observe that all statistically significant estimators have predicted signs. Although most predictions are of directional nature, we decided to use more conservative two-tailed tests of statistical significance.

It is striking how significant the impact of a stock listing is on the *IBR* scores. Since many informational items from our checklist may be used for helping both equity and bondholders evaluate the firm, it is, however, not surprising that firms being listed on the stock market disclose more. Another reason may be seen in the fact that equity investors are more reliant on financial reporting as they are residual claim holders. Although this common argument is not irrational, we need to point out that there are firms without outstanding shares which are among the best performers in our ranking.

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Table C-4
Overall Regression Results¹¹

	Hypothesis/ expected sign	Ranking 1		Ranking 2		Ranking 3	
		β	B	β	B	β	B
Regulated	H1: +	3.114 (2.63) ^a	0.146	1.738 (2.09) ^b	0.143	0.961 (2.87) ^a	0.223
Frequency	H1: +	3.913 (3.30) ^a	0.151	2.717 (3.31) ^a	0.183	0.941 (2.64) ^a	0.180
Rating	H1: +	3.221 (3.04) ^a	0.149	1.421 (1.92) ^c	0.115	1.330 (4.27) ^a	0.307
Stock listed	H2: +	12.20 (11.24) ^a	0.548	6.105 (7.90) ^a	0.477	1.170 (3.57) ^a	0.264
Lot size	H3: –	-1.880 (-1.31)	-0.072	-1.137 (-1.17)	-0.078	-0.729 (-1.78) ^c	-0.138
Firm size	H4: +	1.186 (5.83) ^a	0.330	0.631 (4.54) ^a	0.304	0.088 (1.49)	0.122
Diversifica- tion	H4: +	1.721 (3.12) ^a	0.133	1.149 (3.04) ^a	0.156	0.429 (2.64) ^a	0.164
Altman	H5: +/-	0.754 (0.71)	0.030	0.399 (0.54)	0.028	-0.397 (-1.27)	-0.079
Family	H6: –	-3.431 (-3.23) ^a	-0.151	-1.561 (-2.10) ^b	-0.120	-0.280 (-0.90)	-0.061
Subordi- nated		1.237 (1.25)	0.058	0.876 (1.29)	0.072	0.536 (1.85) ^c	0.124
Constant		-7.002 (-2.80) ^a		-5.223 (-3.01) ^a		-2.533 (-3.47) ^a	
<i>N</i>		149		147		144	
<i>R</i>²		0.793		0.706		0.584	
adj. <i>R</i>²		0.764		0.664		0.524	
<i>F</i>-statistics		27.68^a		17.04^a		9.74^a	

It is reasonable to analyze changes between the first and the remaining two regression estimations, which focus on voluntary and bond-related disclosure, respectively. Variable *Stock listed* remains statistically highly significant when explaining the alternative ranking scores. However, it loses in impact in the third calculation, unlike other variables such as *Regulated*, *Frequency*, *Rating*, and *Diversification*. The standardized coefficients reveal that changing *Stock listed* by one standard deviation impacts the *IBR* score by more than half a standard deviation in the first calculation but only by 26.4 percent in the third.

¹¹ We include dummy variables for all first-level industries with at least five firms in the sample. The table displays both standardized (B) and unstandardized (β) beta coefficients. T -statistics are displayed in parentheses. ^a, ^b, and ^c denote significance at 1-, 5-, and 10-percent levels, respectively (two-tailed tests).

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The results suggest that the influence of a stock listing is partly replaced by the requirements and expectations associated with a listing in a regulated bond market segment. *Regulated* is statistically significant in explaining total (*Ranking 1*) and bond-related disclosure (*Ranking 3*) as well as, however to a lesser extent, in explaining voluntary disclosure (*Ranking 2*). As another measure for capital market orientation, the frequency of bond issues shows a strong relationship to *IBR*. We can reject the null hypothesis of no difference between one-time/occasional and frequent/new issuers, suggesting that the latter tend to disclose more. The findings are consistent with the assumption of frequent issuers being more reliant on the bond market as a refinancing source. These firms seek to ensure investor confidence in order to avoid interest premiums for low transparency. The results further show a positive relationship between the issuance of an external credit rating and *IBR* disclosure, which is especially strong in the third calculation. We infer from these results that firms seeking a high capacity of (re-)entering the capital market tend to disclose, above all, more information concerning their debt issues.

As explained above, the need to publish private corporate information was supposed to largely depend on the target investors. We observe a latently negative relationship between the lot size dummy and the *IBR* scores, which, however, is statistically insignificant in all calculations except for the last one. This would be consistent with the null hypothesis that *IBR* disclosure is not determined by the share of institutional bondholders. The relationship would be slightly significant in the first calculation if a one-tailed test was used. Turning to complexity determinants, both the diversification of the business model and the firm size are predictive. The number of group employees seems to be an economically stronger determinant than the number of major industries a firm operates in, except for the third ranking score. Considered together, this confirms our hypothesis on the influence of firm complexity. Our results further suggest that the extent of *IBR* is not associated with default risk. This refutes our fourth hypothesis but is in line with findings from previous studies.

The results show a negative relationship between the founding family ownership and *IBR*, which is decreasingly significant in the first two estimations. As our considerations have shown, it is impossible to draw exact conclusions from this finding. Family firms might well be assumed to be less affected by debt-related agency costs first of all. Beyond this, they are

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also likely to value the trade-off between the evolving costs and benefits of disclosure systematically differently from non-family firms. An unexplained combination of these presuppositions leads to the verifiably lower ranking performance as shown and predicted by the sixth hypothesis.

Concerning the bond-specific disclosure ranking, we can further reject the null hypothesis of no difference between issuers of standard bonds and those having issued subordinated debt. The results indicate a slightly positive correlation, which is in line with our prediction that creditors demand a better transparency when possessing subordinated claims. Considered together, the disclosure we examined is driven to a large extent by stock market expectations, bond market orientation and firm complexity. The long-term experience of stock-listed firms with investor relations activities is well reflected in our rankings. However, the stock market variable loses in predictive value as we exclude non-voluntary items and eventually all items that do not directly refer to the bond issues. Stock-listed firms evidently follow a distinct trade-off pattern as they are capable to enjoy economies of scale when establishing a relationship to the bond market. While this reasoning appears impeccable, the reduction in the stock listing's influence suggests that a large part of financial disclosure found on corporate websites is directed towards the stock market rather than the bond market. Conversely, other measures (slightly) increase in value or remain stable such as having at least one security listed in an official or exchange-regulated bond segment, the frequency of bond issues, the issue of ratings, and the business diversification.

4.3. Estimation quality and restrictions

The statistics indicate that all model modifications have a strong explanatory power and goodness-of-fit. Regressing the dependent variables on fitted and squared fitted values, we value the estimations to be well specified and not biased by omitted variables. We find the assumptions on the residuals' normal distribution and homoscedasticity to be fulfilled as we conduct the *Shapiro-Wilk* and *White* procedures. With respect to the external validity of our findings, we need to point out that, because of missing data, we have not been able to include all German bond issuers in the multivariate analysis. This fact might produce selection bias when we assume the excluded firms to systematically disclose less on their websites than the

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analyzed ones. However, we cannot resolve this issue since the applied measures were essential for our analysis.

The quality of our results further depends on the internal consistency of the disclosure measures expressed by the question whether the indices truly represent the underlying construct. As noted earlier, we chose our checklist items both by adopting from well-established studies on Internet financial reporting and by scanning through bond issuers' websites. After gaining a first overview, we had a closer look at issuers that were not stock-listed and that we assumed to outperform the rest of the sample. Following the composition of the scales, we calculated *Cronbach's* alpha in order to evaluate their internal consistency. Standardized alpha values of 0.94, 0.89, and 0.77 indicate that our scales are reliable instruments to measure the construct.

4.4. Robustness test

Having noted the outstanding influence of a stock listing, it seems useful to control for the variable's influence on other coefficients. We, therefore, split the observations into subsamples, grouped by their listing status, and rerun the regression analysis without including industry dummies. Analyzing the differences in standardized beta coefficients, we find significant changes for most variables. As displayed in Table C-5, only the diversification proxy remains largely significant for both subsamples, contrary even to the *Firm size*. The degree of business diversification influences non-listed firms' disclosure behavior to a greater extent than their reference group's. Listed firms' *IBR* disclosure is heavily influenced by the fact whether or not they have issued a credit rating. Having at least one bond listed in the regulated market turns out to be statistically insignificant after the sample split.

With regard to the frequency of bond issues, the results are more ambivalent. Stock-listed frequent bond issuers are disclosing more when the first ranking scale is applied. On the contrary, non-listed issuers show a better voluntary disclosure behavior when issuing regularly. The *Altman Z*-score remains insignificant except when explaining listed firms' voluntary disclosure. Better performing listed firms may, therefore, be associated with a greater incentive to disclose beyond regulatory requirements.

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Table C-5
Regression Results for Subsamples¹²

	Ranking 1		Ranking 2		Ranking 3	
	<i>L</i>	<i>NL</i>	<i>L</i>	<i>NL</i>	<i>L</i>	<i>NL</i>
Regulated	0.111 (1.22)	0.099 (0.70)	0.034 (0.34)	0.172 (1.13)	0.192 (1.57)	0.126 (0.97)
Frequency	0.136 (2.02) ^b	0.245 (1.63)	0.088 (1.18)	0.316 (1.93) ^c	0.147 (1.65)	0.238 (1.63)
Rating	0.133 (1.89) ^c	0.296 (1.92) ^c	0.169 (2.15) ^b	0.131 (0.79)	0.381 (4.02) ^a	0.199 (1.38)
Lot size	-0.002 (-0.03)	-0.335 (-2.03) ^b	-0.034 (-0.42)	-0.235 (-1.32)	-0.075 (-0.82)	-0.203 (-1.42)
Firm size	0.541 (6.07) ^a	0.224 (1.78) ^c	0.528 (5.32) ^a	0.098 (0.72)	0.158 (1.29)	0.112 (0.95)
Diversifi- cation	0.112 (1.87) ^c	0.266 (2.11) ^b	0.153 (2.31) ^b	0.297 (2.18) ^b	0.078 (0.95)	0.509 (4.01) ^a
Altman	0.100 (1.65)	-0.121 (-0.99)	0.159 (2.34) ^b	-0.135 (-1.01)	-0.066 (-0.80)	-0.142 (-1.25)
Family	-0.149 (-2.40) ^b	-0.256 (-2.07) ^b	-0.123 (-1.78) ^c	-0.314 (-2.37) ^b	-0.086 (-0.98)	-0.228 (-1.97) ^c
Subordi- nated	0.016 (0.25)	0.401 (3.44) ^a	0.002 (0.03)	0.333 (2.68) ^b	0.134 (1.54)	0.221 (2.01) ^c
<i>N</i>	92	50	92	51	90	50
<i>R</i> ²	0.721	0.572	0.656	0.487	0.500	0.611
adj. <i>R</i> ²	0.691	0.476	0.618	0.374	0.444	0.524
<i>F</i> -statistics	23.59^a	5.95^a	17.37^a	4.32^a	8.90^a	6.99^a

Being a family firm turns out to be an economically stronger determinant for non-listed firms. This finding is in line with the assumption that family firms strictly adhere to a pecking order when choosing (re)financing sources. Family firms having taken the step to publicly offer their shares may, therefore, converge with non-family firms concerning their disclosure trade-off pattern. The split results further show that non-listed firms having issued hybrid forms of publicly traded debt may be considered as disclosing significantly more than issuers of standard bonds. One can reasonably point out that the degree of *IBR* disclosure depends on the fact whether a firm has shares outstanding, issued subordinated bonds, or has stayed private.

¹² The table displays standardized beta coefficients. *T*-statistics are displayed in parentheses. ^a, ^b, and ^c denote significance at 1-, 5-, and 10-percent levels, respectively (two-tailed tests). *L* stands for the listed and *NL* for the non-listed subsample.

5. Conclusions and implications

The objective of this paper is to explain heterogeneous disclosure of investor-related information among German non-financial bond issuers. To our knowledge, there have only been few studies examining the openness of firms towards their public creditors so far. Our means of research is the information disseminated via corporate websites. We measure the disclosure levels by applying a list of items accounting for both informational and presentational features. Our analysis is based on the assumption that Internet financial reporting potentially reduces information asymmetries and, consequently, debt-related agency costs. Following the trade-off perspective of voluntary disclosure, we further assume bond issuers to possess individual optimum disclosure levels leading to the observed heterogeneity.

We conduct a multivariate analysis to test various hypotheses linking the level of Internet disclosure with firm characteristics that might affect either the cost or the benefit side of the trade-off calculation. We investigate all 173 German non-financial corporate bond issuers, of which 152 are included in our in-depth analysis. Our study yields several results suggesting the existence of factors that clearly determine *IBR* quality. It confirms that predominantly stock-listed firms tend to disclose information better, even after controlling for filings or features that are required or recommended by regulation. Regulatory aspects, nonetheless, turn out to be very influential. Accordingly, we observe that the disclosure of information related to bond issues is determined largely by the fact whether a firm has bonds listed on the (exchange-)regulated market or not. Applying other measures of bond market orientation, we observe frequent bond issuers and those having issued a credit rating to perform better in all our ranking. Variables proxying for the complexity of firm business also turn out to be consistent over the various calculations.

The findings we presented in the course of this study are valuable for both scholarly and practical work. Firstly, we show that it is reasonable to follow the implications of agency and voluntary disclosure theories when explaining heterogeneity in bondholder relationship management among firms. Secondly, we deliver evidence that helps evaluate the influence of transparency requirements set by regulators as we observe that the regulatory impact is reflected in the amount of information bond issuers provide on their website. Thirdly, we provide evidence that German firms may well be assumed to voluntarily disclose towards their

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public creditors. In contrast to research attempts examining firms that are listed on a stock index, we examine an exceedingly heterogeneous sample. This allows us to test a diverse set of hypotheses on voluntary disclosure and to observe that firm characteristics are strong determinants.

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D. Are Economically Significant Bond Returns Explained by Corporate News? An Examination of the German Corporate Bond Market

We examine the association between bond prices and corporate news for non-financial firms that are listed in the prime segment of the German stock market. Focusing on economically significant bond returns, we provide an overview of the various news categories that influence bondholders in their assessment of an issuer's default risk. This approach allows us to draw direct comparisons with respect to size and time of impact. Our results point out that (1) there is a strong relationship between economically significant changes in bond prices and corporate news, (2) earnings announcements and financing issues prevail in our analyses, and (3) on average, around half of the significant bond returns may be found within a period of one day before to one day after an event. This is considerably less compared to the findings of related studies on the stock market. We additionally carry out a conventional event study analysis as an alternative approach to our main analysis.

Keywords: Abnormal Bond Returns, Bond Market, News, Event Study

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D. Are Economically Significant Bond Returns Explained by Corporate News?

1. Introduction

According to data provided by the German Federal Bank, public debt of German non-financial firms has increased from € 13.6bn to € 220.5bn between 2000 and 2012 (*Deutsche Bundesbank* (2013)). Established issuers dedicate themselves nearly as thoroughly to bondholder relations as to traditional stock-related investor relations, while emerging issuers frequently struggle to find out if an increase in transparency improves their financing capabilities. It has not yet been established to what extent corporate news announcements differ in their effect on debt value. We aim to provide a contribution to help solve this issue as our exploratory study examines the link between economically significant price changes and multiple firm-related news categories for corporate bonds.

We pursue a particular approach with our main analysis in three respects. First, price reactions following information generating events are well documented for the stock market.¹³ We extend literature for the barely considered German corporate bond market, thereby accounting for its growing significance. Second, there has been, to the best of our knowledge, no study so far considering several news categories in event studies on public corporate debt.¹⁴ Third, we reverse the standard approach of event study analysis due to signs of low liquidity and low information sensitivity in the corporate bond market and look for news announcements that may be associated with significant returns we identify in our study. As our reverse approach has never been used for bond event studies, we mainly refer to *Ryan/Taffler* (2004), who conduct a similar analysis on the relationship between economically significant stock returns and various corporate news categories. The authors find out that announcements published in relevant newspapers influence the market for securities not only by approving established information but also by rendering new information that leads to significant price movements. It remains unclear whether the situation on the bond market is similar. In addition to the reverse approach, we perform a conventional analysis, examining bond returns around predefined announcement dates, in order to validate our main results.

¹³ For an extensive review of event studies on diverse markets see *Corrado* (2011). *Cichello/Lamdin* (2006) and *Kothari/Warner* (2007), for instance, provide an overview of event studies focusing on stock markets.

¹⁴ Seminal studies considering the impact of single event categories on bond prices include *Handjinicolaou/Kalay* (1984), *Warga/Welch* (1993), and *Billett et al.* (2004).

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Our sample includes news announcements from the year 2011 that are assigned to nine main categories and 55 subcategories. The results indicate that almost all of them may be associated with economically significant abnormal returns, albeit to a varying extent. Our analysis, therefore, underlines the important role that publicly available news has for price mechanisms in bond markets. Authors of conventional event studies have to assume that a given event is precisely isolated from any other and that its effect can be clearly filtered out. We present an approach that delivers insights into the relationship between multiple event categories driving prices on the bond market. This allows us to show which specific categories should get greater recognition in future research because of their relevance in driving investor decisions. Besides conventional, well surveyed information generating events, including earnings announcements, M&A transactions, or changes in external credit ratings, our analysis highlights event types that have not been considered in literature, yet. For instance, eight percent of all significant price changes are explained by announcements on restructuring plans, labor issues, firms' marketing and product development efforts as well as day-to-day operations. According to our alternative, conventional analysis, predominantly earnings announcements induce statistically significant bond returns in absolute values, both on the level of individual and main categories. Other important news categories are *Credit rating up*, *Labor issue*, *Operational performance*, and *Purchase announcement (concrete)*, some of which have been regularly examined in previous research.

Our paper is structured as follows; in Section 2, we are concerned with related literature; Section 3 provides the data and research design of our main empirical analysis; in Section 4 we present and discuss our results from this analysis; in Section 5, we perform the conventional event study analysis as an alternative approach; Section 6 concludes, sums up the implications of our study and poses further research questions.

2. Study concept and prior research

On capital markets, investors face a large range of information with content about the performance and constitution of firms. It is crucial for them to know what kind, how fast, and to what extent the release of new information induces price movements. There are less studies answering these questions for debt securities than for equity securities, possibly caused by the

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fact that shares are more frequently traded, making the bond market less interesting for this kind of research. Furthermore, data availability is worse for bonds than for stocks. Following *Easton et al. (2009)*, investments on stock markets are more often carried out for speculation while there are more risk-averse investors with a longer investment horizon engaged on the corporate bond market. This is caused by several factors, the most predominant of which might be found in debt securities' suitability for the matching of assets and liabilities. Pursuing a rather pragmatic investment approach, bondholders, who are mainly institutional, keep portfolio changes to a minimum, reducing the market liquidity as a consequence. Following *Dang et al. (2010)*, debt is less sensitive to information than equity due to its maturing, senior character and due to fixed par values, resulting in less volatile prices. For this reason and in order to cope with the illiquidity issue, we solely focus on economically significant price movements in our main analysis as these strongly indicate a transition to information sensitivity. We consequently reduce the possibility that observed movements were driven by an "occasional frenzy unrelated to concrete information", as *Roll (1988, p. 566)* describes the outcome of his attempt to distinguish between the determinants of stock price movements. We are able to concentrate on separating firm-specific information from other factors that determine bond returns. Unlike the authors of former bond event studies, we choose to match information generating events to abnormal returns and not vice versa. In an alternative analysis, we additionally apply the conventional event study approach by examining the bond returns around the predefined event dates for all sample events. Combining the results of both analyses, we can find out to what extent corporate news is associated with price changes and which kind of news is prevailing.

Our approach further allows us to examine whether there are lags between the release of news announcements and observed price changes. On the one hand, liquidity of securities has been shown to positively influence market efficiency by stimulating arbitrage activities (*Chordia et al. (2008)*), especially when new information arrives on the market (*Chung/Hrazdil (2010)*). This reasoning would suggest that bonds were priced less efficiently than shares. On the other hand, institutional investors, who dominate bond trades, may be assumed to have deeper market insights and resources allowing them to react quickly and comprehensively to new information. Especially for stock markets, an enormous amount of research highlights the link between corporate news and market price changes. In summary, *Kothari/Warner (2007)* con-

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clude an approximately efficient pricing of new informational content. Regarding the corporate bond market, *Bessembinder et al. (2009)* report a growing number of studies that analyze abnormal returns around information releases to the market in highly ranked journals. In a comparative study and performing an intraday analysis, *Hotchkiss/Ronen (2002)*, for example, find that high yield bonds are priced as efficiently as the underlying stocks. Nevertheless, findings in this field are still relatively scant when compared to stock market research.

To the best of our knowledge, previous studies concerned with the corporate bond market solely focus on one or few event categories in order to test a theoretically justified influence on market prices. For the sake of a clear focus, those analyses mainly consider event categories whose market price implications may be clearly distinguished from the constant noise. The majority of studies are dedicated to the influence of external credit rating changes, which serve as direct proxies of a firms' creditworthiness (e.g. *Hite/Warga (1997)*, *Steiner/Heinke (2001)*), mostly confirming a strong announcement effect for downgrades and none or smaller effects for credit rating upgrades. There is also a field of research that analyzes how (sovereign) debt prices adapt to the announcement of macroeconomic news (e.g. *Balduzzi et al. (2001)*) or changes in sovereign ratings (e.g. *Cantor/Packer (1996)*). *Elliot et al. (2009)* are among the first to consider the role of accounting earnings for bond trades and returns, finding a strong correlation. Another stream of research is committed to assessing wealth impacts of irregular firm actions that potentially affect both bondholders and shareholders. *Dhillon/Johnson (1994)* compare the reactions in the stock and bond market after dividend changes and find opposing reactions implying wealth transfer effects. This is in contrast to *Handjinicolaou/Kalay (1984)*, who find positive bond price reactions to the announcements of unexpectedly large dividends, which confirms that those announcements are a signal of positive firm performances. *Billett et al. (2004)* consider the impact of mergers and acquisitions on bondholder wealth. *Easton et al. (2009)* focus on market reactions subsequent to seasoned equity offerings and *Maxwell/Stephens (2003)* on stock repurchases. Some studies widen the focus of interest to include potentially less dominant event categories. *Maxwell/Rao (2003)*, for instance, are concerned with wealth transfers from bondholders and shareholders and information signaling when corporate spin-offs are announced. *Adams/Mansi (2009)* find impacts of *CEO* turnover announcements.

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Many studies, however, fail to explain the relevance of confounding events and the potential bias they might cause. This is a fundamental challenge for all studies that analyze security price changes around predetermined announcement dates and which we approach by taking three different measures. Firstly, it is well documented that tests using monthly abnormal bond return data suffer from lower power when compared to analyses based on daily returns (*Brown/Warner (1985), Bessembinder et al. (2009)*). By using daily data, we are able to reduce the problem of potentially confounding events. Secondly, inverting the analysis approach, we are better able to control for this issue. After having calculated economically significant bond returns for our main analysis, we determine the events that may be associated with them. Therefore, it is, thirdly, one of the core ideas of this study not to focus on one assumingly dominating event but rather to consider several event categories.

There have been some studies considering multiple event categories released for the stock market beyond *Ryan/Taffler (2004)*. *Thompson et al. (1987)*, for example, use firm-related news published in the 'Wall Street Journal Index' and determine the frequency of events in 12 different news categories. *Pritamani/Singal (2001)* divide their event sample into seven types of announcements. The authors stress the importance of earnings (divided into forecasts and actual earnings), financing, and M&A/restructuring news, having a very substantive content, as well as of analyst recommendations. In addition to these categories, they also examine market price changes for *General business* and *Miscellaneous* information. We use this selection as a reference for our classification, modify it, and enhance the number of categories to nine main and 55 subcategories for a more specific assignment of information content.

In order to emulate the information access of professional investors, we use data from *Bloomberg*, a database offering comprehensive information for traders and distinguished for its special focus on debt securities. Latest research focusing on several event categories predominantly uses broad news sources. *Antweiler/Frank (2004)*, for instance, employ a large sample of Internet messages and *Sprenger et al. (in press)* pick Twitter announcements to analyze the efficiency of news on stock markets. Earlier literature had to operate with news sources published in paper form that may be suspected of a much slower information flow, potentially causing a misallocation between information and price movements. Using computational da-

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tabases, information processing has been tremendously accelerated and thus a reassessment of market reactions to financial information seems appropriate.

3. Methodology of main analysis and data

3.1. Sample characteristics

Our study covers the entire year of 2011. For the purpose of consistency, we selected our sample firms on the basis of similar firm and bond characteristics. First of all, we excluded financial firms since their equity and debt values had been largely affected by the financial crisis and the subsequent sovereign debt crisis. We further considered only issuers that were listed in the prime segment of the German stock market. Our sample, therefore, consists of firms from the main German stock indices *DAX*, *MDAX*, *SDAX*, and *TecDAX*. We employed this criterion in order to restrict our sample to firms sharing a similar orientation towards the capital market. Having listed shares on an official market, a bond issuer may reasonably be assumed to be in the focus of capital market analysts and the financial press. Secondly, we restricted our bond sample to straight bonds, thus eliminating securities with subordinated features, non-fixed payments, or conversion rights. The final sample includes 51 firms with a total of 252 exchange-traded bonds. The bond master data has been collected manually from all German exchanges. Since many German firms have issued their debt securities via foreign finance subsidiaries, we had to extend our data collection to these markets. We included the exchanges in Dublin, Luxembourg, and Zurich as well as the *Euronext*. These are the most important markets for German bond issuers. Daily bond prices and the stock market capitalization were extracted from *Bloomberg* database.

Table D-1

Descriptive Statistics on the Firm and Bond Samples

	<i>N</i>	Mean	Min.	Max.	Median	Std. dev.
Market capitalization (mean over year, bn €)	51	14.71	0.25	77.13	7.53	18.30
Maximum number of bonds outstanding	51	4.76	1.00	22.00	2.00	5.58
Issued volume (mean over year, bn €)	51	3.36	0.15	17.27	0.80	4.87
Volume per issue (mean over year, bn €)	51	0.59	0.09	1.66	0.50	0.34
Credit rating issued	51	0.75	0.00	1.00	1.00	0.44
Credit rating score (<i>Aaa=1, C=21</i>)	38	9.11	3.00	17.00	9.00	3.26

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Table D-1 contains the descriptive statistics for all 51 bond issuers we included in our sample. The mean market capitalization of these firms, serving as a proxy for firm size, is largely heterogeneous, with the highest equaling € 77.13bn and the lowest being € 0.25bn. The statistics show that few very large firms skew the distribution to the right. Also the figures on the total outstanding bond volume and mean issue volume per firm show a strong heterogeneity, ranging from € 0.15bn to € 17.27bn and from € 0.09bn to € 1.66bn, respectively. This underlines the importance of corrective measures undertaken further below. *Credit rating issued* stands for the share of credit-rated firms in our sample. We considered the three major rating agencies *Moody's*, *Standard & Poor's*, and *Fitch*, with priority for *Moody's*. In case there is no rating determined by *Moody's*, we use the equivalent rating score by *Standard & Poor's* or *Fitch*, in that order. 75 percent of the firms in our sample have an external rating from at least one of these agencies. These 38 bond issuers received a mean rating of Baa2 for the period considered (as at January 1, 2011), which is regarded as a lower medium investment grade. The credit rating scores are almost normally distributed across the sample, the highest being Aa2 and the lowest Caa1. This finding is important because numerous studies observe a positive correlation between return size and firm risk, proxied by the rating scores. As described further below, we address the issue of differing price sensitivities in the process of determining abnormal bond returns.

3.2. Calculation of bond returns

We apply a tiered approach to identify economically significant abnormal bond returns. First of all, we calculate actual holding-period returns that are defined as continuously compounded returns based on clean bond prices. We use clean prices (without accrued interest), as distributed by *Bloomberg* and other databases as well as exchange places, because they are frequently used in bond event studies and not found to affect test statistics when short event periods are employed (*Bessembinder et al. (2009)*):

$$(D-1) \quad R_i = \ln\left(\frac{P_t}{P_{t-1}}\right).$$

We ignore the first 21 trading days following the issue date and the last 21 trading days before maturity due to return biases that might occur in these time periods. As we are focusing on the influence of firm-specific news, we need to deduct market-related price changes from overall

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returns. Thus, we determine a premium holding period return (PR) for bond i by subtracting the return of a matched treasury security (TR) from the corresponding corporate bond return (BR):

$$(D-2) \quad PR_i = BR_i - TR_i.$$

We use the closest modified duration to match corporate bond returns with those of an equivalent treasury security (German Bund). On average, the treasury's duration deviates from the sample bond's duration by 0.06 years.

As the descriptive firm analysis has shown, our sample firms differ considerably in the number of outstanding securities. *Bessembinder et al. (2009)* describe three approaches to deal with firms having issued several bonds. Using the *Representative Bond Approach*, a single bond, the most frequently traded one for instance, is selected in order to avoid interdependence of returns. We do not consider this method, first implemented by *Handjinicolaou/Kalay (1984)*, as it ignores the implications of differing bond characteristics, such as the maturity and coupon payments, on the return sensitivity of bonds. It is, moreover, nearly impossible to determine one security that is well representative for a firm's public debt portfolio. Under the *Bond Level Approach*, as used by *Warga/Welch (1993)* or *Cook/Easterwood (1994)*, all bonds are treated as individual observations. This causes problems concerning the assumption of independence between sample observations. Although this approach uses the maximum of information content, the unequal weighting of firms is problematic as firms with a large bond portfolio have a greater impact on the results.

The *Firm Level Approach*, promoted by *Bessembinder et al. (2009)* and used in this work, treats each firm as a portfolio of bonds (e.g. *Elliot et al. (2009)*, *May (2010)*). This method produces stable results by using various observations for each firm and by preventing cross-correlation of bonds. Furthermore, the informational content is at a relatively high level since the value of all bonds is considered. We weight the returns of all bonds by their specific market value in relation to each firm's total market value of standard bonds. This increases the impact of bonds with higher issue volumes or market prices, which are likely to be traded more often, so that market prices are consequently less influenced by illiquidity (*Ami-*

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hud/Mendelson (2006), *Bao et al.* (2011)). This approach provides one value-weighted return per day:

$$(D-3) \quad PR_k = \sum_{i=1}^N PR_i \cdot w_i,$$

where w_i depicts the weight of bond i 's market value within a portfolio of N bonds for firm k .

3.3. Determination of economically significant abnormal returns

We calculate an abnormal bond return (AR) by subtracting the expected bond return (ER) of firm k from the value-weighted PR on a daily basis:

$$(D-4) \quad AR_k = PR_k - ER_k.$$

Bessembinder et al. (2009) give a detailed overview regarding the advantages and disadvantages of both the mean-adjusted and the matching portfolio approaches for calculating ER s. Although especially the latter may be suitable for larger sample sizes of comparable bonds, there is evidence that the mean-adjusted method produces reliable results over all sample sizes. We employ a mixed version of both approaches as we see an advantage in accounting for time-series and cross-sectional price differences for our objective. The choice of an appropriate estimation period appears to be arbitrary having analyzed former event studies on bond returns. Short periods bear the risk of much noise in returns whereas it is reasonable to assume that the yield spreads of corporate bonds remain rather constant over a period of few days or weeks. We employ an estimation period of 42 trading days (around two months), which may be considered as a medium length in the context of an event study (*Bessembinder et al.* (2009)). The period ends on the fourth day before the return date (t_0) so that the event itself is less likely to influence the estimation data. The ER of firm k on the return date corresponds to the mean PR within the estimation period:

$$(D-5) \quad ER_k = \frac{1}{42} \sum_{t=-45}^{-4} PR_{k,t}.$$

In order to control for changing price sensitivities of the bonds, we standardize all abnormal returns using their standard deviation over the respective estimation period. As this relates

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each abnormal return to the *ARs*' variation, the comparability across firms is increased immensely. We then subtract the cross-sectional mean of all *SARs* for each trading day and divide by the cross-sectional standard deviation. This helps to mitigate market-wide price effects and further increases the chance to identify returns that are explained by firm-related events. We, thereby, include the advantages of the matching portfolio approach.

In a next step, we determine all returns that are significantly abnormal on the firm level. Following *Ryan/Taffler (2004)*, we define economically significant returns (*ESARs*) to be more than two standard deviations above and below each firm's mean standardized abnormal returns, yielding around the top 4.5 percent of abnormal returns (high level of significance). Additionally, we filter out *SARs* that are more than one standard deviation higher or lower than the mean value, excluding slightly more than 71 percent of all *SARs* in our case. Using this lower significance level, we include return observations that show a smaller difference to the sample mean than when applying the high level and may, therefore, be regarded as economically less significant. To prevent overlapping return windows, we adjust for *ESARs* that follow each other too closely. Therefore, we keep only the highest *ESAR* within a seven-day-window. We achieve this using an incremental loop that starts with *ESARs* within a window of two trading days. Having deleted the lower returns within this window, the distances between the remaining *ESARs* of each firm are re-measured and the highest return within three days is kept. These steps are repeated until there is a minimum gap of seven trading days between all *ESARs*. As a result, the mean absolute value of all *ESARs* is 2.41 at the high significance level and 1.75 at the low level (Table D-2). This shows that we filter out strong market reactions as the mean sample *SAR* is exactly 0.

Table D-2

Descriptive Return Statistics

	Significance level	<i>N</i>	Mean	Min.	Max.	Median	Std. dev.
<i>ESAR</i>	High	334	2.41	0.92	6.72	1.93	1.31
	Low	910	1.75	0.48	6.72	1.46	1.07
Number of <i>ESARs</i> , by firm	High	51	6.55	1	13	7.00	2.71
	Low	51	17.84	2	24	20.00	5.34

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3.4. Event classification and matching procedure

Having identified all *ESARs*, we match the bond data with the event data sample. We use the *Bloomberg* database to extract major news announcements in English linked to our sample firms and published in 2011. These messages had either been issued by a *Bloomberg* analyst or distributed via the *Bloomberg* newswire. Given the real-time character of this database, there are fewer distortions on the flow of information as they might arise when using news published in newspapers.

Following *Antweiler/Frank* (2004) and *Sprenger et al.* (in press), we use the help of a linguistic classification algorithm to assign each announcement to a specific news category. At first, we manually classify 1,000 randomly selected announcements from our event data set in a dual control process to compose a training sample containing all default news categories. As mentioned above, we define the categories following earlier research by *Thompson et al.* (1987), *Pritamani/Singal* (2001), and *Ryan/Taffler* (2004) and amend the universe of categories if needed. Building on that, we classify the remaining event messages with the help of the data mining software *Weka* using a Multinomial Naïve Bayesian classifier.¹⁵ Lastly, we improve the reliability by applying another manual control process for messages that have been assigned to a category with less than 95 percent matching probability.

We keep only the first announcement in case the same news appears on several consecutive days. Moreover, we reduce the number of announcements from the main category *M&A* to news that is supposed to be fundamental to the market. We, therefore, drop all announcements, which do not convey a change in the procedure of a firm takeover. Purely stock-related messages and announcements, which do not directly affect the respective firm or cannot be assigned to any specific category, are excluded as we believe them not to be of specific content. After these adjustments, there are 4,401 news messages left, yielding about 86 events per firm and 82 per category (Table D-3). Both ratios show a high variation as there is one firm with 431 and one with seven messages as well as categories containing 349 at maximum and two messages at minimum. The 54 categories containing at least one announcement (category *Executive pay cut* contains none) are aggregated to nine main categories: *Board/management*, *Earnings/revenue/prices*, *Analyst forecasts/ratings*, *Financial issues*, *General business*, *Con-*

¹⁵ For deeper insights into *Weka* data mining software see *Hall et al.* (2009).

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tracts, *M&A*, and *Jurisdiction & government authorities* (see Table D-12 in the Appendix for a detailed category description).

Table D-3
Descriptive Statistics on the Event Sample

	<i>N</i>	Mean	Min.	Max.	Median	Std. dev.
Events per firm	51	86.29	7	431	49	103.23
Events per category (categories without content excepted)	54	81.50	2	349	50	86.25

Announcements published on non-trading days are manually assigned to the first trading day immediately following. To establish the link between events and abnormal returns, we use a return window of seven days. This includes the day of the *ESAR* ($t = 0$), the three trading days before t_0 ($t = -3, \dots, -1$), and the subsequent three days ($t = 1, \dots, 3$). Using a return window of more than one day appears reasonable in order to account for informational inefficiencies after the announcement and for information leakages or event anticipation before the official publication date.

We have to make further adjustments after merging the return and the event data sets since multiple assignments of events have still not been ruled out. At first, we delete all announcements whose classifications are undoubtedly not in line with the signs of the corresponding *ESARs*. This applies for instance when a message classified in the category *Earnings forecast up* is associated with a negative *ESAR*. In case of several events per return window, we give priority to announcements from the main categories *Earnings/revenue/prices*, *Analyst forecasts/ratings*, and *Financing issues*. This step is in accordance with earlier research, which identifies those events as main drivers and proxies of a firm's creditworthiness. If none of the announcements within the return window belongs to one of these main categories, we only keep the closest event to t_0 and announcements from the main categories *Board/management*, *M&A* and *Market/competition*. As mentioned above, these event categories have found their way into bond event studies since they have been important enough to influence bondholders' wealth. For this reason, we do not sort their announcements out applying the distance measure, but we do also not prioritize them as highly as announcements from the three categories above. Finally, we manually check for messages that occur on the same date. We give priority

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to those announcements which are supposed to be trigger events or, if the announcements are independent of each other, to the ones that we assume to have a stronger impact on bond returns. A trigger event may be seen, for instance, in earnings reports as these often induce further announcements such as decisions on dividend payments or external rating changes. We would give priority to an earnings report in this specific case, thereby strictly following the approach of *Ryan/Taffler* (2004).

4. Results of main analysis

4.1. Overall explanatory power

Before we examine how significant price changes may be associated with corporate news releases, we evaluate the overall explanatory power of our sample. As displayed in Table D-4, we generate outcomes similar to the results of *Ryan/Taffler* (2004), who document that, on the stock market, 65 percent of highly abnormal returns are explained by corporate news. Around three of five significant price changes may be explained by the release of firm-related announcements in our case, irrespective of which significance level is applied for detecting strong abnormal returns. The findings show that corporate news has a significant impact on bond market prices in this regard. It is unclear whether the remaining *ESARs* are predominantly driven by noise, non-observed information leakages, or factors that are unrelated to firm fundamentals, such as industry or macroeconomic impacts. We can almost rule out the latter since we have tried to isolate firm-related price changes and include announcements concerning the industry. Our results further reveal a relationship between the share of explained returns and firm size, which is also in line with earlier research on stock markets (e.g. *Grant* (1980), *Atiase* (1985)). We use stock market capitalizations (as of December 30, 2011) to classify into groups of larger (above the median market capitalization of € 5.3bn) and smaller firms (equal to or less than the median). While there is a strong relationship for larger firms, significant returns are much less associated with corporate news for the rest of the sample. This may be due to the fact that public information is less available or gathered by investors for smaller firms. Moreover, a certain kind of publications, such as stock or bond analyst reports, is made more often for large- to mid-cap than for small-cap firms.

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Our findings suggest that market participants rely substantially on corporate news when negotiating prices for bond trades. This implies that it is reasonable to carry out fundamental research based on publicly available corporate information. As pointed out earlier, we see a need for further analysis of all news releases, simultaneously. Having reversed the analysis approach (by assigning news announcements to returns instead of the other way round), we may now compare the explanatory power of individual news categories.

Table D-4
Share of *ESARs* Explained by Firm Events

Classification	Significance level	Explained by firm events	Share explained, in percent
All firms	High	201	60
	Low	538	59
Market capitalization > median	High	147	75
	Low	398	75
Market capitalization ≤ median	High	54	39
	Low	140	37

4.2. Explanatory power of news categories

Investors and bond issuers strive to know exactly what kind of news drives market prices. Table D-5 displays the 15 most influential categories of our analysis, each one inducing at least three percent of all *ESARs* when the high significance threshold is applied. Columns 3 and 4 contain each category's proportion of the total number of *ESARs* for both significance levels, describing the possibilities of an assignment of events to returns. Market participants, who observe a significant change in bond prices, are better aware of the probability that it is associated with a certain information release.

The results of our analysis suggest that announcements related to the market or industry of a firm most often have a large impact on bond returns. Including the categories *Earnings report undefined*, *Debt issue*, *Earnings report down*, and *Earnings report up*, information delivered by announcements from the top five categories drives 22 percent of all significant returns at the low and 25 percent at the high significance level. Thus, within the period of our study, a quarter of very large price movements in the German corporate bond market have been asso-

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ciated with news that is connected to a firm's financial performance and debt financing activity, directly impacting its creditworthiness, as well as market related news.

The figures in column 5 of Table D-5 describe to which extent the categories' explanatory power differs between the two levels of significance we apply for detecting major price changes. This helps identify categories whose messages drive returns at the extreme ends of the distribution rather than returns that are in excess of the low significance threshold. The results show large differences between the two subsamples as the share of explained returns is smaller when the low significance level is applied for the 15 most frequent categories. Only announcements concerning a firm's restructuring issues, such as news about the closure of a business line, revenue forecasts, and undefined earnings reports tend to drive highly significant returns less often than lower price changes.

Table D-5
15 Most Influential Categories¹⁶

Category ID	Category name	Share of all announcements driving ESARs, in percent		Deviation, in pps.
		High	Low	
14	Market/competition	5.5	5.0	-0.5
2c	Earnings report down	5.0	3.3	-1.7
4a	Debt issue	5.0	4.8	-0.2
2e	Earnings report undefined	5.0	5.2	0.2
2d	Earnings report up	4.5	3.7	-0.8
7b	Restructuring	4.0	4.6	0.6
10	Joint venture/cooperation	4.0	2.6	-1.4
2a	Earnings forecast down	4.0	3.3	-0.7
2b	Earnings forecast up	4.0	3.2	-0.8
4j	Ownership increase	3.5	2.2	-1.3
1b	Appointment of executive	3.5	2.2	-1.3
13a	Government authorities negative	3.0	2.0	-1.0
11f	Purchase completed	3.0	2.6	-0.4
3a	Stock analyst forecast down	3.0	2.4	-0.6
2g	Revenue forecast up	3.0	3.7	0.7
Total		60.0	50.8	

¹⁶ This table reports the 15 individual news categories that are most often associated with ESARs when the high significance level is applied. The shares listed in columns 3 and 4 are calculated by dividing the number of influential announcements from each category by the total number of explained ESARs (201 for the high and 538 for the low significance level, respectively).

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The categories *Joint venture/cooperation* and *Restructuring* have received little attention in previous literature. Our results show that it may be worthwhile for future research to widen the focus of interest. While financial results (both forecast and reported figures) are regularly found to induce strong market reactions, announcements referring to external credit ratings are not among the most frequent in contrast to other event categories that so far have received little attention in literature. However, the proportions displayed in Table D-5 do not reveal much about the events' relative power of explanation since they are defined as absolute frequencies. Categories containing more news announcements from the outset may dominate smaller ones, even though their content might be less substantive. Comprising 274 announcements, Joint venture/cooperation is among the largest categories within our original sample (see Table D-12 in the Appendix). This fact may have caused its announcements to frequently occur among the drivers of significant returns.

Table D-6
Main Categories (Absolute)¹⁷

Main category	Share of all announcements driving ESARs, in percent	
	High	Low
Earnings/revenue/prices	31.3	31.0
Financing issues	17.4	14.9
M&A	13.4	14.7
General business	8.0	10.2
Analyst forecasts/ratings	7.5	8.9
Contracts	6.0	5.2
Market/competition	5.5	5.0
Board/management	5.5	5.0
Jurisdiction & government authorities	5.5	5.0
Total	100	100

Table D-6 summarizes the frequencies on the level of main categories. As expected and highlighted above, most announcements that are associated with extraordinary price changes (around a third) reveal earnings or revenue figures. A firm's financial performance thus takes great priority over all remaining issues. Financing and M&A news, taken together, account

¹⁷ This table reports how often each main category's announcements are associated with *ESARs*. The shares are calculated by dividing the number of influential announcements from each main category by the total number of explained *ESARs* (201 for the high and 538 for the low significance level, respectively).

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for almost the same share of announcements. Comparing our results to those of *Ryan/Taffler* (2004), we can conclude that especially analyst activity is of much less importance on the bond market. Even *General Business* announcements, addressing labor, operational, and restructuring issues as well as product development and marketing news, explain a slightly larger amount of returns. As pointed out above we excluded sell and buy recommendations for the stocks of our sample firms since we assumed little impact on bond prices from these events as they occur very often without providing specific information on a firm's fundamentals. The influence of performance data, M&A news, and financing issues in our case is analogous to the findings of *Ryan/Taffler* (2004). News concerning the non-financial aspects of a firm's business tends to be more important for bondholders than for shareholders as they are hardly mentioned in their study.

For a deeper investigation and as a supplement to previous research, we additionally focus on the categories' relative explanatory power, defined as the proportion of each main category's announcements that induce significant returns. The results are illustrated in Table D-7 below. We use this aggregation level in order to avoid the problem of small sample sizes for some of our subcategories. The table lists frequencies of announcements in relation to the total number of announcements in their main category. Analyzing this relative frequency unveils the probability that a certain news release induces significant changes in bond prices. This interpretation differs from the conclusion we had drawn based on the results in Table D-5.

Again, we find that performance data relatively often lead to economically significant returns, but they are dominated by financing transactions and analyst activity. Earnings news thus loses in significance when we use the relative ratio instead of absolute frequencies. While 31.3 percent of all significant returns may be explained by announcements from this main category, we find that, for the high significance level, only 6.9 percent of these events have a strong impact on bond prices, more than the average across all categories but considerably less than the share of financing transactions. The same applies to announcements from *General Business* and *Contracts*. This confirms that the explanatory power of certain news categories, as displayed in Table D-6 above, is largely influenced by the original number of announcements in these categories. Consequently, announcements from these three main categories are found to have a higher influence on bond prices absolutely than when related to the

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total number of announcements from this main category. Changes concerning the markets in which a firm operates and contractual matters are less often found to be associated with significant bond returns than the average. Bondholders seem to take news on a firm's individual performance more seriously than changes in its market environment. The top three main categories contain information that has a direct impact on a firm's income, cash reserves, or future cash flows. As bondholders have no upside potential, they attach a greater value to these firm-related determinants of credit risk than to more abstract changes in the firm environment.

Table D-7

Main Categories (Relative)¹⁸

Main category	Share of all announcements from this main category, in percent	
	High	Low
Financing issues	10.1	23.1
Analyst forecasts/ratings	7.9	25.4
Earnings/revenue/prices	6.9	18.3
Board/management	6.5	16.5
M&A	6.0	17.3
Market/competition	4.3	10.0
Jurisdiction & government authorities	2.6	6.3
General business	1.9	6.9
Contracts	1.8	4.5
Mean	5.3	14.0

In summary, the analysis of absolute frequencies helps us identify news announcements that are of extraordinary importance for investors from the overall perspective. We find that, on the subcategory level, significant returns are most often associated with market-related news, earnings reports, and announcements of debt issues, while the remaining categories are rather close to each other. The list of categories whose announcements drive at least three percent of all significant returns (on the high level) is dominated by financial performance updates. Consequently, news about a firm's financial results accounts for the greatest proportion of all 201 (538) influential announcements, followed by financing transactions, such as debt and equity issues or repurchases, and a firm's inorganic growth plans. These three main categories make

¹⁸ This table reports each main category's share of announcements that are associated with *ESARs*. The shares are calculated by dividing the number of influential announcements from each main category by the total number of announcements in the main category.

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up to 62 percent of all announcements that drive significant returns. Having related the frequencies to the overall number of announcements in each main category, we find that commonly examined events most probably lead to economically significant abnormal bond returns.

4.3. Temporal relationship between event occurrence and market reaction

Apart from the question of which categories explain most significant price movements on bond markets, this event study is designed to determine the temporal relation between events and abnormal bond returns. Table D-8 displays the proportion of announcements published on each of the trading days around the *ESAR* (t_0). The results show that 20 percent of all events are assigned to the return date. This means that only a fifth of all returns occur on the same date as the news arrives in the market, much less than the share of 58 percent which is reported by *Ryan/Taffler* (2004). Another 35 percent of all announcements occur on the trading day before the *ESAR* or one day after. The comparative study on the UK stock market documents a slightly lower share of around 27 percent. Nonetheless, we find significant bond price movements to occur less contemporaneous with news releases than large stock returns. It should be noted that a small proportion of observations on the day before the return (t_{-1}) may be due to announcements which are released late in the evening (Central European Time). However, this issue is much less serious for bond than for stock market research because the majority of debt securities are traded over the counter, all over the world, and thus independently of fixed trading hours.

Announcements from *Board/management* and *Contracts* as well as legal issues coincide less often with a significant return on the same date than average, in contrast to financing transactions and industry-specific news (*Market/competition*). The latter are least often issued before a significant return occurs (26 percent), whereas price reactions very often lag behind for legal issues and management changes. Almost a third of analyst opinions and credit rating changes are found two or three trading days before the corresponding return, considerably more than the mean value across all event categories. This contradicts stock market-related research, which suggests that well-informed investors use methods similar to those of analysts so that they are well able to anticipate changes in a firm's creditworthiness. Besides, analysts, who inform certain clients beforehand, are argued to induce pre-disclosure market reactions (*Bau-*

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man et al. (1995)). Alternatively, analysts' recommendations as well as other infrequent event types, such as management changes and legal issues, may be regarded as more surprising for investors than, for instance, the publication of financial statements (Ryan/Taffler (2004)). This reasoning would be in line with our findings.

Bond prices from our sample change slightly more often after an event was published than before. Nonetheless, around 38 percent of all significant returns occur before an announcement is publicly made, implying a certain degree of information leakage. Most notably, important contract conclusions and negotiations drive returns before they are actually published. Interestingly, earnings forecasts or reports are not found to drive bond prices more often before they are published than afterwards. This category conveys information that may be anticipated by well-informed or interested investors. Ball/Brown (1968), Grant (1980), and Atiase (1985) put forward that previous (interim) reports contain information which serves as indication of later results. However, our results do not support this reasoning.

Table D-8
Occurrence of News Events¹⁹

Main category	Date/time period					
	$t_{<0}$	t_0 (ESAR)	$t_{>0}$	$t_{-1,0,1}$	t_{-3}	t_3
Board/management	52	11	37	63	19	7
Earnings/revenue/prices	42	20	38	49	15	10
Analyst forecasts/ratings	44	17	40	48	10	6
Financing issues	35	35	30	61	6	9
General business	38	22	40	47	11	11
Contracts	39	11	50	57	18	11
M&A	44	25	30	53	15	9
Jurisd. & govern. auth.	52	15	33	52	19	11
Market/competition	26	26	48	63	11	4
Mean	41	20	38	55	14	9

While 55 percent of all announcements are assigned to a period of one trading day before or after the price change, 14 percent are at the negative and nine percent at the positive ends of our return period. Basically, our results show that the relationship between event occurrence

¹⁹ The table reports the shares of news announcements that are published on the respective dates or within the respective time periods. Values are expressed as percentages and differences are due to rounding.

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and significant return may be described as ambiguous. Following our approach, there is no clear pattern for all news categories regarding the efficiency of value adjustment to new information content. Furthermore, it becomes clear that the selection of event periods is crucial for the quality of event study results.

We change the point of view and define the announcement date as t_0 now. Table D-9 displays the temporal deviation of abnormal returns' from the publication date t_0 for all observations. Regardless of the significance level, we obtain a mean absolute time lag of approximately 1.5 trading days. Prices adjust, on average, shortly before or after each event. The mean real time lag is slightly negative for both significance levels, confirming that, on average and across all categories, news arrives in the market shortly before bond prices change.

Table D-9
Descriptive Statistics on the Date Differences²⁰

Significance level	<i>N</i>	Mean	Min.	Max.	Median	Std. dev.
High	201	1.46	0	3	1	1.10
Low	538	1.47	0	3	1	1.07

4.4. Relative importance of news categories

While having compared event announcements according to their absolute and relative frequencies, we have not yet figured out whether the magnitude of price changes differs across the categories. Table D-10 provides a descriptive overview of the main categories, having applied a low significance level. Main categories are sorted by the median absolute spread between *ESARs* and each firm's mean *SAR*. Accordingly, legal issues and governmental actions, having a very low overall (Table D-6) as well as relative explanatory power (Table D-7), lead to the highest median spread and announcements from *General business* to the lowest, which is in accordance with their relative frequency. Announcements concerning financial figures, financing transactions, and M&A plans have no extraordinarily large influence on returns, even though they were found to dominate the event sample by numbers. Their median returns are lower than 1.3 whereas legal issues induce a median absolute spread as high as 1.7 units of standard deviations over the respective estimation periods and across

²⁰ The table summarizes the differences between announcement dates and the dates with an *ESAR*. Values are expressed in trading days.

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all sample firms. We use both a parametric *t*-test and the non-parametric *Wilcoxon* rank-sum procedure in order to test for statistically significant differences between each category's and the remaining categories' levels of returns. The rank-sum test seems appropriate as normal distribution may not be given in this context. The last column of Table D-10 contains the probability that the same or even larger rank differences may be found under the null hypothesis. As we see, the main category *Jurisdiction & government authorities* may be considered statistically most influential in terms of return sizes. Legal issues, in contrast to events associated with *General business*, occur irregularly and often constitute (the prevention of) an extraordinary burden, as do governmental/legislative actions. Announcements that occur regularly or are easy to anticipate, such as analysts' recommendations, earnings releases, or financing transactions, tend to drive comparatively low returns on average.

Table D-10

ESARs by Main Categories

Main category	<i>N</i>	Positive returns, in percent	Mean return spread	Median return spread	Standard deviation	Wilcoxon rank-sum: Prob($Z > z $)
Jurisd. & govern. auth.	27	33	1.73	1.73	0.76	0.0417
Market/competition	27	26	1.72	1.46	1.13	0.2322
Board/management	27	37	1.52	1.42	0.89	0.9236
Contracts	28	68	1.65	1.42	1.08	0.4899
Analyst forecasts/ratings	48	65	1.69	1.40	1.08	0.3676
Earnings/revenue/prices	167	63	1.56	1.24	1.06	0.3938
Financing issues	80	35	1.67	1.23	1.15	0.9082
M&A	79	43	1.49	1.14	1.00	0.3834
General business	55	33	1.36	1.05	0.72	0.1531

Beside absolute values, Table D-10 also displays the share of positive return spreads in the third column. It is noticeable that nearly all main categories show a clear tendency towards either positive or negative returns. The great majority of *ESARs* associated with news on order contracts, financial figures, and by analyst opinions or rating changes are positive while a corporate debt portfolio tends to decrease in value when other news is revealed. This is due to the fact that *Financing issues* is dominated by announcements of bond sales, which, at least partly, increase a firm's total debt and, consequently, its default risk. A similar reasoning may be applied for analyst activity since credit rating upgrades have outnumbered downgrades in the period of our study and for order contracts which typically increase a firm's revenues. We

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also document that bondholders tend to be more sensitive to a deterioration of the market situation as these announcements are more often associated with negative than with positive large abnormal returns.

5. Alternative analysis using the conventional event study approach

Applying our reverse event study approach, we have been able to examine the relationship between economically significant bond returns and corporate news announcements so far. However, our analysis has not permitted us to determine the probability of error. We have eliminated the majority of all influences that are not firm-specific, but there is still an indeterminable probability of a false assignment. Under the conventional approach, all events to be examined have to be identified in advance so as to test whether they are associated with abnormal returns. By relating a category's mean abnormal return to the standard deviation under the parametric test procedure, it is possible to determine the statistical significance of the price effect. While this approach offers better assurance, it is prone to include a large amount of market noise (*Ryan/Taffler (2004)*), which is especially detrimental when illiquid debt securities are examined. As opposed to our main analysis, we now use a rank test, which is proposed by *Corrado (1989)*, in order to evaluate the statistical significance of the size of cumulative returns from the event windows. This non-parametric test procedure is not bound to the assumption of normal distribution among returns and the resulting t -values are less affected by changes in the variance (*Corrado (1989)*). Absolute values of returns for each news announcement are ranked according to their size across the total period, which is composed of estimation period and event window ($t = -45, \dots, +3$). Higher returns are assigned a higher rank and the maximum is 49, which equals the number of trading days in the total period. The ranks are then scaled by the number of trading days plus one. Subtracting 0.5 yields rank differences U :

$$(D-6) \quad U_{k,t} = \frac{\text{rank}(|PR_{k,t}|)}{50} - 0.5,$$

where $|PR_{k,t}|$ stands for the absolute value of firm k 's value-weighted mean of premium holding period returns, as defined following Equations D-2 and D-3, on each trading day t within the total period. The corresponding t -value, which has been established by *Corrado (1989)*,

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for each (main) news category is calculated by dividing the mean of rank differences that are cumulated over the event period ($t = -3, \dots, +3$) by the standard deviation $S(U)$:

$$(D-7) \quad T = \frac{\frac{1}{\sqrt{N}} \sum_{k=1}^N \sum_{t=-3}^{+3} U_{k,t}}{S(U)},$$

where the standard deviation is defined following the works of *Campbell/Wasley* (1993) and *Steiner/Heinke* (2001):

$$(D-8) \quad S(U) = \sqrt{\frac{7}{49} \sum_{t=-45}^{+3} \left(\frac{1}{\sqrt{N}} \sum_{k=1}^N U_{k,t} \right)^2}.$$

Table D-11 contains results for all news categories whose announcements induce bond returns that prevail in our alternative analysis. We exclude 19 categories with 30 or less degrees of freedom. From the remaining, eight are found to contain announcements with statistically significant absolute bond returns in the event period. The table displays the number of announcements and the mean cumulative rank differences per category. The last column contains the t -values, as defined under Equation D-7, and the statistical significance is indicated by letters in superscript.

Table D-11

Categories with Statistically Significant Influence²¹

Category ID	Category name	N	Mean cumulative rank difference	T -value
2a	Earnings forecast down	66	0.257	2.850 ^a
2b	Earnings forecast up	91	0.110	1.442 ^c
2c	Earnings report down	80	0.304	2.343 ^b
2d	Earnings report up	124	0.245	2.454 ^a
3a	Credit rating up	33	0.220	1.571 ^c
5	Labor issue	143	0.100	1.662 ^b
7a	Operational performance	268	0.068	1.385 ^c
11a	Purchase announcement (concrete)	95	0.115	1.461 ^c

²¹ a, b, and c denote significance at 1-, 5-, and 10-percent levels, respectively.

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The variety of categories is dominated by news announcements from the main category *Earnings/revenue/prices*. The results suggest that news on a firm's profitability, be it forecasts or reported figures, regularly influences bond returns in absolute values. This is in accordance with the findings from our main analysis as the earnings categories are also among the 15 categories that are most often associated with economically significant returns and listed in Table D-5. Together with earnings announcements, news concerning changes in a bond issuer's credit rating and M&A activities, which are contained in the categories *Credit rating up* and *Purchase announcement (concrete)* and which are found to be driving absolute bond returns higher than the mean rank according to the alternative analysis, have regularly been part of previous event studies involving corporate bonds, as outlined in Section 2. We further discover that *Earnings/revenue/prices* is the only main category that induces bond returns that are ranked above the mean over the total period around the event date. However, under our alternative approach, only returns from *Earnings forecast down* and *Earnings report up* are statistically significant at the level of one percent. Their mean cumulated rank differences are 0.257 and 0.245, respectively (the maximum rank difference is 0.48).

The reverse approach, as carried out in our main analysis further above, helps us rank news announcements according to the frequency of their occurrence. The results of our alternative analysis reveal that the conventional event study approach is suited for testing the influence of a specific kind of event on bond returns. Comparing the results of both analyses has shown that earnings announcements are dominating, irrespective of the approach that is used. However, the conventional approach, as applied by us, has certain drawbacks. First, it is not possible to consistently avoid event clustering for a single firm and cross-sectionally. This is the greatest advantage of the reverse approach we applied when associating economically significant returns with news announcements. Second, market-wide effects, which are not influenced by corporate news, have not been eliminated in contrast to our main analysis. Consequently, the alternative analysis is to be understood as a kind of validity test.

6. Conclusions

This exploratory study investigates the association between corporate bond prices and firm-related news. Our data sample contains 51 non-financial firms listed in the prime segment of

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the German stock market having issued a total of 252 bonds. In our main analysis, we choose to identify significant bond returns, defined as the largest 4.5 percent and 29 percent of abnormal price movements, before associating them with announcements published within a window of three trading days before and after the return date. Using this approach allows us to cope with all limitations that may be caused by low market liquidity and low information sensitivity. We assign the announcements to 55 news categories, which themselves are aggregated to nine main categories. Following former literature considering multiple event categories for the stock market, this study appears to be the first with a similar approach for debt securities. Our results indicate that the explanatory power of corporate news on the bond market is similarly strong as on the stock market in that we document a share of 60 percent of economically highly significant bond returns to be explained by firm events. There are, however, differences in the news categories' relative importance as measured in different ways.

First, there are only few news categories that clearly prevail when absolute frequencies are examined; financial results most of all. Performance data also dominate on a higher aggregation level, closely followed by financial issues and M&A announcements. The frequently assessed event category *Analyst forecasts/ratings* lags behind. Second, financing issues and analyst activity, directly addressing changes in a firm's creditworthiness, are most likely to be associated with economically significant returns. Third, we find that only a fifth of all returns occur on the announcement date and 55 percent between one trading day before and after the news release. Finally, the majority of categories show a clear tendency towards positive and negative market price changes. Most notably, announcements concerning a firm's day-to-day operations largely induce a decrease in bond prices whereas contractual issues, earnings releases, and analyst activity most often result in positive returns. On average, legal issues and government actions lead to the highest among the large bond returns, announcements from *General Business*, including operational issues concerning the labor force, products and their marketing, daily operations as well as restructuring issues, to the lowest.

In addition to the reverse approach, we carry out a conventional event study analysis to examine bond price behavior around all announcements that were published for the sample firms in 2011. According to this analysis, predominantly earnings announcements, alongside with news on a firm's M&A activities, credit rating upgrades, as well as operational and personnel

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matters, induce statistically significant bond returns in absolute values. On the level of main categories, we discover only the size of bond returns associated with announcements from *Earnings/revenue/prices* to be statistically significant. Taken together, our analyses deliver insights in the role of publicly announced firm events for the valuation of debt securities by German non-financial firms. Future research may use our approach and expand upon our findings by investigating price determinants in bond markets over a longer time period or cross-nationally. Beyond that, it could make sense to conduct an analogous analysis for the German stock market in order to draw direct comparisons.

7. Appendix

Table D-12

Overview of the Event Categories

Main category	Category ID	Category name	N	Category percentage	Main category percentage
Board/ management	1a	Appointment of executive (e.g. "Allianz Extends Contract of Chief Diekmann Until End of 2014")	45	1.02	
	1b	Executive leaving (e.g. "Air Berlin Chief Quits after Slashing Routes as Losses Mount")	106	2.41	
	1c	Executive pay cut (n/a)	0	0	
	1d	Executive pay raise (e.g. "Linde's Chief Reitzle Gets 12% Pay Increase as Profit Jumps")	7	0.16	
	1e	Executive other (e.g. "Daimler Says Zetsche's Contract 'Not on the Agenda' Currently")	12	0.27	3.86
Earnings/ revenue/ prices	2a	Earnings forecast down (e.g. "E.ON May Lose About 1.5 Billion Euros on Gas Business Dow Says")	69	1.57	
	2b	Earnings forecast up (e.g. "BASF Sees First-Quarter Sales Ebit Higher Than Previous Year")	100	2.27	
	2c	Earnings report down (e.g. "Allianz Profit Falls 45% on Japan Lower Investment Gains")	90	2.04	
	2d	Earnings report up (e.g. "Brenntag Reports Increase in Full-Year Operating Ebitda")	141	3.20	
	2e	Earnings report undefined (e.g. "BASF Says May 6 Outlook 'Still Valid'")	77	1.75	
	2f	Revenue forecast down (e.g. "Lufthansa Will Restrict Winter Season Capacity Growth to 4%")	25	0.57	
	2g	Revenue forecast up (e.g. "Continental to Increase U.S. Production with Illinois Expansion")	137	3.11	
	2h	Revenue report down (e.g. "MAN SE 3Q Sales Revenue Miss Ests. Co. Confirms Forecast")	32	0.73	

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Main category	Category ID	Category name	N	Category percentage	Main category percentage
	2i	Revenue report up (e.g. "BMW Says June Car Sales in China Rise 41% to 21158 Vehicles")	191	4.34	
	2j	Price changes (e.g. "K+S Raises Granulated Potash Price to EU375 from EU363")	51	1.16	20.74
Analyst forecasts/ ratings	3a	Stock analyst forecast down (e.g. "BASF Earnings Highly Likely to Fall Next Year Bernstein Says")	43	0.98	
	3b	Stock analyst forecast up (e.g. "BASF May Report "Strong" 2Q Reiterate Outlook WestLB Says")	75	1.70	
	3c	External credit rating down (e.g. "Moody's Investors Service Downgrades RWE's Senior Unsecured Debt)	18	0.41	
	3d	External credit rating up (e.g. "S&P Raises Outlook on Carmaker Daimler Keeps at 'BBB+/A-2')	35	0.80	
	3e	External credit rating neutral (e.g. "Moody's Says Volkswagen's Ratings Unaffected by Offer for MAN SE")	18	0.41	4.30
Financing issues	4a	Debt issue (e.g. "Allianz Issues EU500 Million of Convertible Subordinated Bonds")	154	3.50	
	4b	Debt repurchase (e.g. "Kabel Deutschland to Repay Payment in Kind of EU200 Million")	14	0.32	
	4c	Dividend down (e.g. "EON to Consider Reduction of Dividend Guarantee Rheinische Says")	4	0.09	
	4d	Dividend up/unchanged (e.g. "Deutsche Boerse NYSE Approve Dividend of EU2 Per Holdco Share")	49	1.11	
	4e	Equity issue (e.g. "Heidelberger Druck Decides Capital Increase of EU2.35 Million")	15	0.34	
	4f	Equity repurchase (e.g. "SAP Considers More Share Buybacks in View of Cash Flow")	8	0.18	
	4g	Director share dealing (e.g. "Lanxess Stock Drops as Chief Sells 9.88 Million Euros in Shares")	2	0.05	
	4h	Capital structure (e.g. "RWE May Need a EU4-6b Capital Increase SocGen Says")	32	0.73	
	4i	Ownership reduction (e.g. "Daimler Investor Aabar May Reduce Stake with Bond Offering")	28	0.64	
	4j	Ownership increase (e.g. "Bavaria Would Consider German State Purchase of EADS Stake")	40	0.91	7.87
General business	5	Labor issue (e.g. "Bayer Extends Job Guarantees for Workers in Germany to End 2015")	144	3.27	
	6	Product development (e.g. "BASF to Raise Research Spending in 2011 Focus on Batteries")	142	3.23	
	7a	Operational performance (e.g. "BMW Production Stable Through This Week after Japan Earthquake")	270	6.13	
	7b	Restructuring (e.g. "Air Berlin to Eliminate Eight Planes from Fleet to Reduce Costs")	349	7.93	
	8	Marketing (e.g. "MAN Starts China Brand in Race with Daimler for Top Truck Market")	54	1.23	21.79
Contracts	9a	Orders (e.g. "Airbus Won Orders for 32 Planes in January Delivered 33 Jets)	344	7.82	

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Main category	Category ID	Category name	N	Category percentage	Main category percentage
	9b	Other contract (e.g. "Nordex Seeks Lower Prices from Suppliers, FT Deutschland Reports")	46	1.05	
	10	Joint venture/cooperation (e.g. "Sarkozy Wants Dassault-EADS Cooperation La Tribune Says")	274	6.23	15.10
M&A	11a	Purchase announcement (concrete) (e.g. "Continental AG Said in Talks to Buy Modi Rubber Stake: WSJ Link")	98	2.23	
	11b	Selling announcement (concrete) (e.g. "RWE EON Preparing to Sell Stake in Urenco Handelsblatt Says")	67	1.52	
	11c	Purchase announcement (abstract) (e.g. "Fresenius Seeks Acquisitions for 'Aggressive' Growth Welt Says")	56	1.27	
	11d	Selling announcement (abstract) (e.g. "ThyssenKrupp to Fund Emerging-Market Growth with Asset Sales")	12	0.27	
	11e	M&A denial (e.g. "Continental AG Chief Says Not Working with Schaeffler on Merger")	64	1.45	
	11f	Purchase completed (e.g. "Deutsche Boerse Acquires Assets of Kingsbury International")	67	1.52	
	11g	Unit sold (e.g. "K+S Completes Sale of Compo Garden-Fertilizer Unit to Triton")	36	0.82	
	11h	Stake rise in unit (e.g. "BMW's Stake in SGL Carbon Exceeded 15% as of Dec. 20")	29	0.66	
	11i	Stake decrease in unit (e.g. "Daimler Offers Half its EADS Stake to German Government FT Says")	9	0.20	
	11j	Merger announcement (e.g. "Deutsche Boerse NYSE Euronext Confirm Advanced Merger Talks")	13	0.30	10.24
Jurisdiction & government authorities	12a	Jurisdiction negative (e.g. "Daimler Loses Bid for Review of Argentine Rights Case Ruling")	37	0.84	
	12b	Jurisdiction positive (e.g. "SAP Wins Delay in \$1.3 Billion Judgment Awarded to Oracle")	17	0.39	
	12c	Jurisdiction neutral (e.g. "Deutsche Post Appeals Court Ruling on E-Postbrief Advertising")	16	0.36	
	13a	Government authorities negative (e.g. "Daimler Says Offices Searched by European Union Authorities")	158	3.59	
	13b	Government authorities positive (e.g. "Cartel Office Finds No Systematic Manipulation of Power Prices")	143	3.25	
	13c	Government authorities neutral (e.g. "RWE Seeking European Commission Funds for Carbon Capture Plant")	57	1.30	9.73
Market/competition	14	Market/competition (e.g. "German Auto Sales Rose 17% in January to 211,100 Units VDA Says")	281	6.38	6.38
Total			4,401	100.00	100.00

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E. Do Bondholder Relations Efforts Pay Off for German Firms? An Empirical Approach

This study investigates the link between corporate disclosure and cost of debt on the German corporate bond market. With a large number of medium-sized bond issuers emerging over the last few years, transparency considerations have become increasingly important. Until now, there has been mainly anecdotal evidence among German bond issuers on whether an increase in disclosure is actually perceived by market participants and, consequently, reflected in lower yield spreads. In contrast to previous studies in this field, I use a very specific bondholder relations measure in addition to a conventional disclosure index. This enables me to examine the relationship between informational efforts directed at the bond market and disclosure that is primarily targeted at shareholders, as respects their influence on bond values. Using an exhaustive list of firm- and bond-related control variables, the bivariate and multivariate findings confirm a strong negative relationship between disclosure and cost of debt, nearly irrespective of which ranking variable is used. Applying various alternative estimations, I find these results to be robust to potential endogeneity biases.

Keywords: Bondholder Relations, Investor Relations, Cost of Debt, Yield Spreads

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E. Do Bondholder Relations Efforts Pay Off for German Firms?

1. Introduction

The German market for corporate bonds experienced a rapid growth in size and coverage by media and scholars. Between 2000 and the end of 2012, the volume of bonds issued by domestic non-financial corporations increased from € 13.6bn to € 220.5bn (*Deutsche Bundesbank* (2013)). This development gives rise to the link between corporate disclosure and cost of public debt, which I examine in this study. The sample includes frequent German bond issuers, mostly excelling in investor relations, as well as more inexperienced firms. Scholarly literature maintains that corporate disclosure has a positive effect on both equity and debt values as it reduces information asymmetry and, hence, estimation risk and agency costs for investors. While there is a substantial body of research focusing on stock markets, insights into disclosure effects on bond markets have been comparatively scant until now.

The results of my analysis are thought to add to the limited findings related to the effect of disclosure on a firm's cost of public debt. *Sengupta* (1998) was the first to analyze the relationship between corporate disclosure quality and cost of debt. He uses evaluations published by the *Association for Investment Management and Research* as a main predictor and the yield to maturity as well as total interest cost of new debt issues as dependent variables. Performing a pooled *OLS* regression, he finds a change of one point in the disclosure ranking (maximum of 100 points) to reduce the bond yield by 1.2 basis points and total interest cost by 2.1 basis points. *Nikolaev/van Lent* (2005), having improved his estimation model, document that an increase of one percentage point in their total disclosure rank reduces the bond yield by 40 basis points. Subsequent studies employ different other transparency proxies, such as accounting disclosure (*Francis et al.* (2005)), change to international financial reporting (*Kiefer/Schorn* (2009)), web-based non-financial disclosure (*Orens et al.* (2010)), or analyst coverage (*Mansi et al.* (2011)), and confirm a reduction in the cost of debt when transparency is increased.

This study is the first to focus on German bond issuers, complementing similar research on the stock market (*Leuz/Verrecchia* (2000), *Rieks/Lobe* (2009)). Moreover, it unprecedentedly concentrates on bondholder relations (*BR*) as distinct from overall investor relations (*IR*) activities or those directed at shareholders, respectively. I employ a new disclosure ranking, developed by *Degenhart/Janner* (2012), which captures *BR* efforts of German non-financial

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firms. Its use allows more consistent conclusions on the effect of disclosure that is exclusively targeted at bondholders. Theory implies that bondholders and shareholders diverge in their informational needs. On the other hand, both kinds of disclosure transmit the same firm-specific data and, according to the view of *IR* professionals, there are only slight differences in the emphasis that is placed on certain contents. Following these assumptions, I will compare the *BR* measure to a conventional *IR* ranking, which uses the evaluations of fund managers and stock analysts. The research focus is, hence, expanded to include the question whether a change in the *BR* ranking has a different effect on the cost of debt than a similar change in the *IR* ranking, capturing shareholder-related contents.

The empirical results confirm a strong negative relationship between corporate disclosure and cost of debt, proxied by the yield spread of bonds. Taken together, the findings suggest that German bond issuers benefit from increased efforts in communicating with their bondholders and information intermediaries, regardless of firm size, default risk, or other firm- and bond-specific characteristics. They also show that the performance in either of the two rankings exerts a comparable influence on the cost of debt. There is a strong correlation between both ranking scores for the same sample firm observations and the specific *BR* ranking has only a slightly larger effect on the cost of debt. Corporate managers may thus consider interest cost reductions when reviewing the costs and benefits of their voluntary disclosure. The remainder of this study is organized as follows. The next section deals with the theoretical background and develops hypotheses. The third section describes the data input and defines the model variables. The fourth section presents empirical results and discusses their implications. Finally, the paper is summarized against the background of its practical and scholarly relevance.

2. Development of hypothesis and further research questions

The *IR* profession builds on information asymmetries and conflicts potentially arising from the separation of ownership rights and pecuniary claims from the control over a firm's assets. Based on this, the main task of *IR* is to provide corporate information that enables investors as well as financial and information intermediaries to make proper investment decisions or advices (*Bassen et al. (2010)*). In order to meet this requirement, disclosure must be made as promptly, consistently, and substantially as possible (*Byrd et al. (1993)*, *Farragher et al.*

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(1994)). Fulfilling these criteria entails various direct and indirect costs. On the other side, offering private information reduces an investor's estimation risk (*Barry/Brown* (1986), *Botosan* (1997)) or enhances market liquidity (*Diamond/Verrecchia* (1991)), depending on the theoretical model that is applied. In either way, disclosure is assumed to influence a firm's cost of capital (*Healy/Palepu* (2001), *Bassen et al.* (2010)). Trading off between costs and benefits of disclosure, firm managers have to determine an optimal level of disclosure (*Verrecchia* (1983), *Healy/Palepu* (2001)). As shown below, this level may be affected by the extent of agency issues and by the informational needs of specific recipients that are targeted.

Bondholders and shareholders of the same firm differ in the nature of their claims and rights. In a levered scenario and under certain restrictive but relaxable assumptions (*Merton* (1974)), owners may be described as being long in a European call option with a strike price equaling the face value of their firm's debt (*Black/Scholes* (1973)). Shareholders will choose to redeem (by exercising the option) only if the firm value exceeds the debt value. If the asset value falls below the face value of debt, shareholders will decide to forego their option and let the firm default. Bondholders are short in this call option and hold a claim on the firm assets, which they receive in case of default. Hence, they risk losing an amount as high as the difference between the face value of debt and the asset value. As compensation, bondholders receive predefined payments at predefined dates and have no upside potential beyond these.

While enjoying fixed payments in the standard scenario, bondholders may not directly influence the use of their funds. Firm managers are primarily accountable to shareholders so that creditors are faced with a risk of detrimental managerial behavior in addition to the estimation risk, which they have to deal with anyway. As *Black* (1976) puts it, "there is no easier way for a company to escape the burden of a debt than to pay out all of its assets in the form of a dividend, and leave the creditors holding an empty shell" (p. 7). Increased dividend payments benefit shareholders up to certain point, but they reduce the means for investments and prevent the firm from accruing reserves, which is detrimental to bondholders. Firm managers may also dilute creditors' claims by issuing additional debt securities without earlier notice. Moreover, they may strive for higher returns by investing in projects with more volatile cash flows (*Smith/Warner* (1979)). Bond values would decline in such a case, if a substitution had been unknown to their investors at the date of issue. Finally, the management may decide to

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forego profitable projects. This is particularly the case when the firm value is already lower than the face value of debt (*Myers (1977)*).

These hidden intentions and actions add to the challenge of assessing a firm's creditworthiness due to information asymmetries. Bondholders seek mitigation by writing covenants and requesting information in the form of credit ratings or corporate disclosure. *Degenhart/Janner (2012)* document that only 58 percent of all German firms had issued a credit rating in 2011, giving rise to the importance of corporate disclosure. Irrespective of how wide the information gap is, (the risk of) detrimental behavior increases the yield premium demanded by bondholders. The results of studies concerned with the influence of governance mechanisms confirm this relationship. Various authors consider the degree of corporate governance (*Klock et al. (2005)*, *Blom/Schauten (2008)*), institutional ownership and related measures of shareholder control (*Bhojraj/Sengupta (2003)*, *Cremers et al. (2007)*, *Elyasiani et al. (2010)*), founding family ownership (*Anderson et al. (2003)*), CEO power (*Liu/Jiraporn (2010)*), and political rights (*Qi et al. (2010)*), finding a negative relationship to the cost of debt. Besides, the perceived quality of corporate governance may be assumed to influence a firm's need to voluntarily disclose to their bondholders, which relates this topic to the research focus of my study. Following the arguments on voluntary disclosure that I laid out in the beginning, firm managers may reduce the yield premium by helping bondholders evaluate the risk of default and by disclosing their intentions and actions. This leads to the key hypothesis of this study.

Hypothesis: A firm's cost of public debt is negatively associated with its level of disclosure.

The allocation of rights and risks, as outlined above, also concerns the informational needs of shareholders and bondholders. Put simply, shareholders are keen to evaluate their management's ability to increase the firm value by investing in projects that offer profitable growth opportunities. Bondholders, on the other hand, focus on their downside risk since they have no upside potential. As a consequence, most bond issuers have split up their capital market communications, establishing *BR* as a subfield of general *IR*. Prior research has dealt with informational needs of certain participants in the market for information, such as fund managers and analysts (e.g. *Eccles/Mavrinac (1995)*, *Barker (1998)*). It has built on the assumption that firm managers determine the level of disclosure by considering the demand from individ-

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ual target groups. However, so far no study has addressed the differences in demand between shareholders and bondholders.

Professionals argue that bond-related disclosure and stock-related disclosure use the same capital market story. They may, however, differ in the content priorities and in the level of efforts that are made to reach a specific target group (e.g. *Lowis/Streuer* (2011)). This point of view is comprehensible given that informational needs diverge due to differences in rights and claims. Both groups of investors appreciate different emphases in information content. However, only one set of firm data is used for disclosure, irrespective of which capital market segment it is directed at. Thus, it is unreasonable to separate information contents that are made public anyway. Moreover, the principle of equal treatment for participants in the capital market forces firms to be careful with the prioritization of content. As pointed out above, there have been no scientific findings on this topic until now. While the main focus of this study is on the effect of corporate disclosure on the cost of debt, I will also look at the relationship between *BR* and overall *IR*, which is dominated by disclosure directed at shareholders. The key hypothesis is, therefore, amended by the following research questions:

- a) How strong is the relationship between the firms' *BR* efforts and their *IR* activities, capturing shareholder-related disclosure?
- b) Do *BR* efforts and overall *IR* activities, capturing shareholder-related disclosure, exert a comparable influence on the cost of debt?

3. Data and variables

3.1. Firm sample

The overall research period covers seven years for stock and balance sheet data (2005 to 2011) as well as disclosure ranking and bond data (2006 to 2012). The reason for this temporal deviation is explained in the sections below. The collection process has run through two steps. First of all, websites of German exchanges as well as other European places (Amsterdam, Dublin, Luxemburg, and Zurich) were scanned for bond entries of firms with headquarters in Germany. I then collected firm data, bond yields, and sensitivity measures from the

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Bloomberg database, being noted for its special focus on debt securities. In total, I found 220 German non-financial firms to have issued public debt between 2006 and 2012. This firm sample is reduced for three reasons. First, the *IR* measure is only available for around 200 firms with shares listed in one of the major German stock market indices. Second, the firm sample composition is influenced by restrictions on the bond data. I only keep senior bonds with fixed coupon payments and without conversion or any other kind of embedded options. For the sake of comparability, market values of long-term bonds, having a remaining time to maturity of more than ten years, are not included. Prices and yields for the first 30 days and the last year of a bond's life are ignored in order to eliminate the influence of biased values. Firms without bonds that fulfill the outlined criteria are deleted. Third, certain firms are not included in the analysis because their bond, stock, or balance sheet data are not available. The final sample consists of 45 stock-listed firms.

3.2. Cost of debt

Cost of debt is the dependent variable. It is essential to control for factors that influence bond yields, other than disclosure. First of all, the return of an equivalent government bond portfolio is deducted from each bond's yield to maturity. Consequently, cost of debt is defined as the yield spread over the risk-free rate of return, which is proxied by the current yields to maturity of exchange-traded German government bonds with corresponding maturities. These data are collected from statistics provided by the German Federal Bank. Corporate bonds are individually assigned to one of ten maturity intervals with a length of one year.

Instead of focusing on new issues, as done by *Sengupta* (1998) and *Nikolaev/van Lent* (2005), I consider a firm's total portfolio of outstanding bonds. Therefore, I apply the approach of *Klock et al.* (2005), which entails the challenge of defining one single value in case of several outstanding bonds per firm. Following *Bessembinder et al.* (2009), the firm level approach appears to be the best choice as it integrates all debt securities of a firm, but not as individual observations. Hence, it avoids severe problems caused by correlation between observations and overweighting of firms with a large amount of bonds. Individual yield spreads are weighted by their specific market value in relation to each firm's total market value of standard bonds. This increases the impact of bonds with higher issue volumes or market prices, which are likely to be traded more often, so that yields are less influenced by illiquidity (*Ami-*

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hud/Mendelson (2006), *Bao et al.* (2011)). The approach, as used in this analysis, provides one value-weighted mean yield spread (*YS*) for each firm's bond portfolio:

$$\text{E-1} \quad YS_k = \sum_{i=1}^N YS_i \cdot w_i,$$

where w_i depicts the weight of bond i 's market value within a portfolio of N bonds for firm k . The value-weighted mean yield spreads are then transformed into logged values because they suffer from a high positive skewness (see Table E-3 in the subsequent section). The dependent variable is denoted by *Spread*. It is a value from the first trading day of July in the following year (e.g. the *Spread* value for 2011 is from July 2, 2012). The same applies to all bond-specific but not to the firm-specific control variables, as introduced further below. This deviation is important in order to capture the temporal causality between disclosure and cost of debt and to avoid a simultaneity bias (*Sengupta* (1998), *Nikolaev/van Lent* (2005)).

3.3. Level of disclosure

As pointed out above, I use two different disclosure measures throughout the analysis. The first ranking is specifically linked to the context of *BR*. It has been developed to evaluate bondholder-related activities of German firms (*Degenhart/Janner* (2012)) and covers Internet bondholder relations (*IBR*), consisting of 50 items that are usually found on corporate websites and deemed to be relevant for bond market participants. The total ranking has been further divided into two sub-rankings, one of which covers items that are voluntarily disclosed while the other includes information that is thought to be relevant only for bondholders (details on bond issues, for instance). It is sufficient to use the total ranking as it is highly positively correlated to the sub-rankings ($\rho = 0.98$ and $\rho = 0.88$ for the year 2011, respectively). Assessing web-based activities is more objective and better reproducible than the traditional approach. It, however, captures only a part of a firm's total efforts. Under this research project, representatives from all 183 German non-financial firms with exchange-traded bonds issued as at January 1, 2012, were asked to fill out a questionnaire. It covered the importance of *BR* in general and of various *BR* instruments and target groups in particular. A link to the online questionnaire was sent out on January 19, 2012, and two reminders followed in the weeks after. In total, 69 firms participated in the survey. The results, which are dealt with more fully in the first paper of this thesis, enable me to assess the *IBR* measure's representa-

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tiveness in this context. For this purpose, I summarize the scale values, which illustrate the importance of *BR* instruments as surveyed, in Table E-1 below. On average, roadshow one-on-ones are by far most (mean scale value of 4.23 on a five-point scale) and annual general meetings least important (2.10), apart from other instruments. Web-based communication (*Website, newsletters, mailing lists*) has a mean scale value of 3.75 and lies thus in the middle.

Table E-1
Significance of Bondholder Relations Instruments

<i>N</i> =69 Instruments	“How do you rate the following instruments in terms of their importance for bondholder relations?”				
	Mean	Median	Standard deviation	Min.	Max.
Roadshow one-on-ones	4.23	5	1.05	1	5
Phone and e-mail enquiries	4.07	4	1.10	1	5
Annual reports	3.87	4	1.31	1	5
Group sessions, presentations, conferences	3.78	4	1.24	1	5
Website, newsletters, mailing lists	3.75	4	1.05	1	5
Press communication	3.32	4	1.13	1	5
Annual general meetings	2.10	2	1.18	1	5
Other	1.17	1	0.54	1	3

(Scale: 1 = not at all important; 5 = very important)

Table E-2 displays to which degree the importance of Internet communication instruments is correlated with the importance of general *BR*, other *BR* instruments and target groups, as stated by the survey respondents. The results suggest *IBR* to be a powerful proxy for general *BR*, both before and after the security is placed. As respects their significance, Internet communication instruments are more closely related to communication efforts in the placement phase than any other instrument. They show moderate/strong positive correlations to all other instruments, except to annual general meetings. Surprisingly, there is no significant relationship between the importance of *IBR* and private investors. Professional market participants have better access to private information due to their insights and firm contacts so as to be considered less reliant on the information a firm discloses on its website. The survey results refute this assumption as the significance of Internet disclosure increases when, for instance, sell-side analysts are valued higher. Taken together, the bivariate correlations indicate that *IBR*, as captured by the ranking of *Degenhart/Janner* (2012), reasonably represents a firm’s total efforts in *BR*. It is included as an explanatory variable in the analysis, denoted by *BR quality*.

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Table E-2

Representativeness of an *IBR* Measure²²

N=69		Correlation of importance of website, newsletters, mailing lists with the importance of ...						
General BR	During the bond placement	After the bond placement						
	0.40 ^a	0.31 ^b						
Instruments	Annual reports	Annual general meetings	Press communication	Phone, e-mail enquiries	Group sessions, presentations	Roadshow one-on-ones	Other	
	0.33 ^a	0.19	0.41 ^a	0.37 ^a	0.36 ^a	0.33 ^a	-0.02	
Target Groups	Private investors	Institutional investors	Sell-side analysts	Rating analysts	Business press	Credit analysts	Credit reporting agencies	Credit insurers
	0.13	0.29 ^b	0.42 ^a	0.28 ^b	0.20 ^c	0.21 ^c	0.20 ^c	0.23 ^c

The second disclosure variable contains scores from a former ranking that had been annually published by the *Society of Investment Professionals in Germany (DVFA)* and the journal *Capital* until 2011. Over the years, the ranking has consistently followed the conventional approach of asking fund managers and stock analysts about their impressions on the overall *IR* efforts of around 200 firms having listed their shares in one of the major German stock indices. From 2000 on, firms have been assigned a score between 0 and 500. Within this period, the ranking process has been scientifically supported and the *IR* scores have already been used in stock-related analyses (*Leuz/Verrecchia (2000), Rieks/Lobe (2009)*). In the subsequent analysis, the explanatory variable, which is based on this ranking, is denoted by *IR quality*.

BR quality and *IR quality* scores are defined in different ways, which is why I normalize them using their empirical minimum (18 for *BR quality* and 143 for *IR quality*) and maximum values (46 and 456, respectively). The two disclosure measures also differ in their temporal coverage, as *BR quality* is available for the years 2011 and 2012, while *IR quality* covers the years 2006 to 2011. However, they have to be applied to the same sample of observations in order to make the results comparable. This can be done by extending the *BR quality* values over the preceding years, but only when the over-time variance is not too high. Examining the original sample of 59 firms, I find that the overall probability of a year-to-year change in *BR quality* is very low. Only eight firms have experienced a change of at least five points in their ranking performance between 2011 and 2012, which corresponds to 10 percent or more of the

²² The table shows *Spearman*'s rank correlation coefficients. ^a, ^b, and ^c denote significance at 1-, 5-, and 10-percent levels, respectively.

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maximum score. Movements occur mainly in the midfield of the ranking distribution. The findings suggest that it is justifiable to employ a constant value for years that are not covered by *BR quality*. Provided that there is a value for *IR quality*, I use mean percentage scores of each firm over the years 2011 and 2012 for the missing years from 2005 to 2010. Similarly, I use the firms' mean *IR quality* score over the preceding years for 2012 as there are no values for this year. Single missing values in the years before 2011 are replaced by taking the mean of the two scores from the preceding and the subsequent year. Since *BR* and *IR* rankings have been generated in the first quarter of each year, I assign their values to the preceding year. This approach yields 194 firm year observations for 45 firms in the final sample. The sample is reduced by two observations with negative market-to-book ratios (see next section).

Table E-3

Summary Statistics for Cost of Debt and the Disclosure Measures

<i>N</i> =192	Mean	Median	Standard deviation	Min.	Max.
Spread, <i>bps.</i>	204.11	107.49	457.23	20.99	4,341.60
Spread (<i>ln</i>)	4.82	4.68	0.81	3.04	8.38
<i>BR quality, absolute</i>	35.51	37.00	5.49	18.00	46.00
<i>BR quality, normalized</i>	0.63	0.68	0.20	0.00	1.00
<i>IR quality, absolute</i>	338.04	337.93	52.16	142.90	455.90
<i>IR quality, normalized</i>	0.62	0.62	0.17	0.00	1.00

Table E-3 displays summary statistics for the dependent variable and both main predictors. The median yield spread is 107 basis points, lying between the values of comparable studies (*Klock et al. (2005), Qi et al. (2010)*). *Rottman/Seitz (2008)* present lower values for German corporate bonds, which is due to a slightly different calculation method and the fact that they analyzed a time period (1996 to 2003), during which only very large and, thereby, less risky firms had issued bonds in Germany. As outlined above and shown by the statistics in Table E-3, logged yield spreads are less skewed than absolute values. What is more, the two rankings are better comparable when their values are normalized. The mean (median) *BR quality* and *IR quality* ranking scores are around 0.63 (0.68) and 0.62 (0.62), respectively. Having quartile coefficients of dispersion (interquartile range divided by the median) of 37 and 36 percent, both measures are found to have a similar, moderate dispersion. It is considerably increased by the normalization, which is advantageous for the regression analyses to be carried out.

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3.4. Control variables

I use a broad variety of firm- and security-specific determinants, other than corporate disclosure. Beyond the basic model of Sengupta (1998), I include variables jointly determining corporate disclosure and cost of debt, as suggested by *Nikolaev/van Lent* (2005) and others, in order to capture a firm's optimal level of disclosure. Connected to this, I deal with the omitted-variable bias, potentially causing endogeneity, in the post-estimation analyses. Firm-specific control variables are measured at the end of each year t , bond-specific control variables at $t + 0.5$, as explained above. Table E-4 lists the definitions of all control variables.

Table E-4

Definition of Control Variables

Variable	Definition
Beta	Stock beta
Return volatility	Standard deviation of a firm's return on equity (earnings before taxes divided by the book value of total equity) over the preceding five years
Loss	<i>Dummy</i> : 1 if net income is negative, 0 otherwise
Return on sales	Earnings before interest, taxes, depreciation, and amortization divided by sales
Leverage	Ratio between long-term debt and total assets
Asset	Total assets (natural logarithm)
Capital intensity	Ratio of a firm's gross plant, property, and equipment to total assets
Market-to-book	Stock market capitalization divided by book value of equity
Lot size	Value-weighted mean lot size of a firm's bond issues (natural logarithm)
Free float	Share of equity free float
Offer	<i>Dummy</i> : 1 if a firm offers at least one bond in the current or the subsequent year, 0 otherwise
Issue size	Mean size of a firm's bond issues (natural logarithm)
Duration	Sensitivity of a bond's value to yield changes (value-weighted mean)
Convexity	Curvature of a bond's price-yield curve (value-weighted mean)

Particularly the default risk, which is supposed to make up a large part of the yield spread (see *Driessen* (2005) and see *Rottmann/Seitz* (2008) for an exemplary study on German corporate bonds), has to be factored out. *Sengupta* (1998) argues that including the credit rating induces high multicollinearity since disclosure behavior is typically accounted for when a credit rating is assigned. Beyond that, not all firms have been issued a credit rating so that applying this measure would further reduce the firm sample. I employ two alternative measures instead. The applied beta, as offered by *Bloomberg*, captures the systematic, non-diversifiable market risk of a firm (also used by *Bhojraj/Sengupta* (2003), *Crabtree/Maher* (2005), and *Orens et al.* (2010) in similar contexts). Additionally, the standard deviation of a firm's return on equity

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over the preceding five years is applied as an accounting measure (following *Mansi et al. (2011)*). It may also be regarded as a proxy for performance stability (*Kross et al. (1994)*).

Beside performance stability, the current firm performance is a strong determinant of default risk and may be considered as related to disclosure. However, the relationship's direction remains unclear, even though numerous empirical studies have been carried out to examine whether better performing firms are more likely to disclose more in order to stand out or to disclose less in order to conceal from competitors (see *Degenhart/Janner (2012)* for a more detailed discussion). I include a dichotomous variable, which takes the value 1 in case of a loss, and 0 otherwise. Negative net income indicates low creditworthiness so that these firms may be assumed to have higher cost of debt. Beyond that, I use return on sales as an indicator of operating performance. I assume firms with a higher margin to enjoy a lower yield spread accordingly. Finally, I use firm leverage as a proxy for financial constraint, which is expected to positively influence *Spread*. *Sengupta (1998)* and *Nikolaev/van Lent (2005)* additionally include the interest coverage ratio, measuring a firm's ability to meet its debt obligations. I do not use this variable because it overlaps with firm leverage and performance indicators.

Firm size, as proxied by total assets, is relevant for both the extent of disclosure activities and a firm's cost of debt. Larger firms are able to use economies of scale in their external relations (*Ashbaugh et al. (1999)*) and their costs associated with the publication of private information tend to be lower since they are in the center of public attention anyway (*Watts/Zimmerman (1978)*). Moreover, the size of a firm comes along with business complexity, which in turn increases an investor's difficulty to determine the default risk and potential agency conflicts. In order to mitigate this, larger/more complex firms assumedly seek to be more transparent (*Bassen et al. (2010)*). Higher complexity (e.g. in terms of industry classification, as defined by *Degenhart/Janner (2012)*) also means better diversification, which is beneficial for investors as it reduces a firm's total risk and, consequently, the yield spread (*Nikolaev/van Lent (2005)*, referring to *Fama/French (1992)*, *Fama/French (1993)*).

Orens et al. (2010) use capital intensity as a proxy for entry barriers of the industry that a firm operates in and define it synonymously to asset tangibility. Firms in capital-intensive industries supposedly feel less pressure by potential competition and are less reluctant to disclose to

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the public than firms from industries with lower entry barriers. Moreover, capital intensity is frequently associated with financing needs (*Leuz/Verrecchia (2000), Cohen (2008)*), suggesting that firms with a higher ratio are more dependent on external financing. On the other hand, it may be assumed to reduce information asymmetries related to firm strategy and investment opportunities and, thereby, the need to disclose. Using capital expenditure, as a related variable, *Nikolaev/van Lent (2005)*, hence, predict a negative influence on the cost of debt. Following them, I also use the market-to-book ratio as a proxy for growth perspectives that increase information asymmetries (*Francis et al. (2005)*, referring to *Nagar et al. (2003)*). However, a high ratio is also a signal for future financial stability, which in turn reduces *Spread*. Empirical evidence confirms this relationship (*Chen/Zhao (2006)*). Firm observations with negative market-to-book values are eliminated from the sample due to negative equity.

Nikolaev/van Lent (2005) claim that it is important but nearly impossible to consider the influence of investor sophistication on the optimal level of corporate disclosure. *Degenhart/Janner (2012)* use the denomination level of bonds to proxy for bondholder sophistication. Firms normally issue bonds with lot sizes of € 1,000 or less in order to include private investors, who are less sophisticated than institutional bondholders. The authors predict a negative relationship between lot sizes and the level of disclosure, which they discover to be statistically weak. As respects the cost of debt, unsophisticated bondholders are assumed to be more uncertain about the content of disclosure, about whether or not a firm discloses all relevant information, and the reasons for non-disclosure so as to expect a higher return (*Verrecchia (2001), Nikolaev/van Lent (2005)*, who refer to *Dye (1985), Jung/Kwon (1988), Dye (1998)*). On the other hand, the tradability of bonds decreases with their denomination level. I, therefore, assume bondholders to demand a higher illiquidity premium. Hence, the direction of the relationship between the denomination level and *Spread* remains unclear.

Due to the facts that all sample firms are stock-listed and bondholders benefit from public disclosure to shareholders, it is reasonable to additionally include a sophistication proxy from stock market research. The degree of institutional ownership is frequently employed to capture shareholders' inside knowledge. *Degenhart/Janner (2012)* use family ownership, which is a similar governance variable with strong implications for the degree of *BR*. However, the data sources did not provide sufficient statistics for the research period of my analysis. That is

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why I use the free float of shares instead, which proxies for the dispersion of a firm's shareholder structure. *Leuz/Verrecchia* (2000) argue that the free float is well suited for German firms since they do not have the same level of institutional ownership as US-American firms, for instance. The degree of free float increases information asymmetries between shareholders and firm management so as to positively affect the need to publicly disclose. Beyond that, agency conflicts arising from dispersed ownership evidentially increase the cost of debt (*Anderson et al.* (2003)) so that I assume a positive relationship between *Free float* and *Spread*.

Nikolaev/van Lent (2005) further suggest the use of a bond offer variable. Firms preparing a security issue may be assumed to intensify their disclosure activities in order to reduce information asymmetries. The authors base their arguments on the thoughts of *Myers/Majluf* (1984) and several studies that empirically confirm this effect for debt and/or equity securities (*Lang/Lundholm* (1993), *Frankel et al.* (1995), *Healy et al.* (1999)). *Degenhart/Janner* (2012) discover that frequent bond issuers tend to provide significantly more bondholder-related information on their websites than irregular bond issuers. Referring to *Myers/Majluf* (1984), *Nikolaev/van Lent* (2005) further argue that regular security offers are a signal for positive firm performance, thereby reducing the default premium that is demanded by bondholders.

Bond yield spreads are also affected by market liquidity. Apparent determinants of a bond's tradability are its currency and its issue size. The currency effect is no longer relevant since I have considered only Euro-denominated securities. I then use the natural logarithm of a firm's mean issue size as a control variable for economies of scale in underwriting (*Sengupta* (1998)) and for market liquidity. It is expected to negatively influence the yield spread. Finally, I consider the interest rate sensitivity of each sample bond, following *Klock et al.* (2005). Most typically, a bond's duration is applied to measure its risk associated with yield changes. *Bloomberg* calculates effective duration by using option-adjusted spreads and shifting the entire yield curve. This approach is more precise for callable bonds than conventional duration measures. Longer durations are expected to induce higher yield spreads. Convexity captures the curvature of the price-yield curve as it is the second derivative of the bond price with respect to yields. This measure is, in contrast to the linear duration line, better applicable to account for sensitivity to large yield changes. Some researchers and professionals suggest that the risk effect of bond convexity entails higher returns (traditional view). It is, however, more

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accepted in recent literature that convexity, being beneficial as bonds with higher convexity gain more/lose less in price when yield rates drop/rise (*Grantier (1988)*), is priced by investors and return is lowered (equilibrium view). Accordingly, *Lacey/Nawalkha (1993)* discover an insignificant or negative relationship between convexity and bond returns over different time periods. Another advantage of the convexity measure is that it captures early redemption. Negative values mostly indicate that the issuer will call the bond with high probability. I use the *Bloomberg* convexity measure based on option-adjusted spreads in this analysis.

Table E-5

Summary Statistics for the Control Variables

N=192	Mean	Median	Standard deviation	Min.	Max.
Beta	0.96	0.94	0.21	0.46	1.64
Return volatility	0.11	0.08	0.11	0.01	1.00
Loss	0.08	0.00	0.28	0.00	1.00
Return on sales	0.16	0.14	0.09	0.02	0.55
Leverage	0.35	0.35	0.11	0.01	0.88
Asset, bn €	52.37	25.23	59.11	0.98	262.96
Asset (ln)	23.89	23.95	1.43	20.71	26.30
Capital intensity	0.57	0.57	0.30	0.00	1.56
Market-to-book	1.90	1.71	1.08	0.29	11.37
Lot size, €	5,914.94	1,000.00	12,089.49	608.81	50,000.00
Lot size (ln)	7.53	6.91	1.25	6.41	10.82
Free float	0.73	0.76	0.24	0.10	1.00
Offer	0.77	1.00	0.42	0.00	1.00
Issue size, bn €	0.77	0.75	0.38	0.15	2.00
Issue size (ln)	20.33	20.44	0.54	18.83	21.42
Duration	4.00	4.00	1.08	1.57	7.38
Convexity	0.21	0.21	0.18	-0.98	0.70

Table E-5 summarizes the characteristics of all control variables. The median *Beta* is slightly less than 1, defined as the market value. Only 8 percent of all firm observations report a loss. This figure is close to those reported by *Nikolaev/van Lent (2005)* but considerably smaller than in *Orens et al. (2010)*. The median firm has total assets worth € 25bn, implying that the sample is dominated by (very) large firms. The variable is skewed to the right because of few extraordinarily large firms so that logged values are used instead. About 77 percent of all cases have offered a bond in the respective or subsequent year and the median issue size is around € 750m. This implies that conventional benchmark bonds are predominant. The median lot size is € 1,000 and nearly 71 percent of all observations have this exact value.

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4. Empirical results

4.1. Bivariate analysis

At the beginning of the empirical analysis, I examine bivariate relationships between all variables. This is thought to deliver first insights into direction and size of the disclosure effect when control variables are not included. On the other hand, it helps me identify sources of multicollinearity between predictors. Table E-6 contains *Spearman's* rank correlation coefficients for the relationships between all model variables. First of all, both disclosure measures show a significant negative correlation with cost of debt, but they differ in effect size. *BR quality* is found to have a relationship with *Spread* ($\rho = -0.49$) which is stronger than the influence of *IR quality* ($\rho = -0.33$). Ignoring potential effects induced by control variables, these findings imply that corporate disclosure negatively affects the cost of debt, irrespective of whether researchers use a ranking that captures the quantity of bondholder-specific materials on corporate websites or a conventional *IR* ranking, which is based on the opinions of fund managers and stock analysts. Accordingly, both variables are moderately to strongly correlated with each other ($\rho = 0.43$). Hence, firms that disclose more debt-related contents via their website tend to be perceived as more dedicated to *IR* by fund managers and stock analysts. These findings are comprehensible in view of the theoretical elaborations on how firms exercise an overall, integrative communication strategy towards the capital market rather than different standards. They provide a first answer to the research questions formulated above.

Spread is moderately to strongly related to the majority of control variables, predominantly to firm size (*Asset*) and to the mean issue size. As expected, some of the control variables jointly determine cost of debt and its main predictors, *BR quality* and *IR quality*, which is an indication for the complex relationship between disclosure and cost of capital. For example, firm size has a strong negative relationship with *Spread* but is positively associated with *BR quality*. Larger firms, however, do not tend to perform better in the *IR quality* ranking. Interestingly, I find both risk proxies (*Beta* and *Return volatility*) to be unassociated with cost of debt and the disclosure rankings. It is worth noting, however, that effect sizes and directions may change in a multiple regression setting due to various interdependencies among the predictors. Moreover, it is important to include time dummies to control for crises and other extraordinary causes that influence yield spreads.

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Table E-6
Correlation Matrix²³

<i>N</i> =192	Spread	<i>BR</i> quality	<i>IR</i> quality	Beta	Return volatility	Loss	Return on sales	Leverage
<i>BR</i> quality	-0.49 ^a							
<i>IR</i> quality	-0.33 ^a	0.43 ^a						
Beta	0.11	-0.06	0.00					
Return volatility	0.12	0.01	-0.07	0.22 ^a				
Loss	0.29 ^a	-0.14	-0.25 ^a	0.13	0.11			
Return on sales	-0.22 ^a	-0.01	0.02	-0.22 ^a	-0.14 ^b	-0.35 ^a		
Leverage	0.01	0.04	-0.06	-0.04	-0.10	0.02	0.29 ^a	
Asset	-0.52 ^a	0.46 ^a	0.07	0.15 ^b	-0.15 ^b	-0.14 ^b	0.09	0.15 ^b
Capital intensity	-0.10	0.15 ^b	0.16 ^b	0.06	0.06	0.03	0.00	0.45 ^a
Market-to-book	-0.40 ^a	0.32 ^a	0.39 ^a	-0.09	-0.08	-0.25 ^a	0.20 ^a	-0.23 ^a
Lot size	0.09	0.21 ^a	0.05	0.21 ^a	0.14	0.17 ^b	-0.09	0.11
Free float	-0.29 ^a	0.27 ^a	0.15 ^b	0.11	0.19 ^a	-0.04	0.16 ^b	-0.05
Offer	0.24 ^a	-0.16 ^b	-0.02	0.02	-0.03	0.03	0.05	0.06
Issue size	-0.58 ^a	0.51 ^a	0.15 ^b	0.20 ^a	-0.08	-0.16 ^b	0.09	0.21 ^a
Duration	-0.16 ^b	-0.03	0.09	-0.22 ^a	-0.06	-0.15 ^b	0.16 ^b	0.09
Convexity	-0.25 ^a	0.00	0.06	-0.20 ^a	-0.10	-0.18 ^b	0.20 ^a	0.13
	Asset	Capital intensity	Market- to-book	Lot size	Free float	Offer	Issue size	Duration
Capital intensity	0.12							
Market-to-book	0.04	-0.27 ^a						
Lot size	0.14 ^b	0.19 ^a	-0.11					
Free float	0.03	0.09	0.22 ^a	0.14				
Offer	-0.07	0.06	-0.19 ^a	0.24 ^a	-0.01			
Issue size	0.82 ^a	0.18 ^b	0.09	0.17 ^b	0.11	-0.09		
Duration	-0.10	0.15 ^b	0.08	-0.23 ^a	0.04	0.10	-0.05	
Convexity	0.02	0.23 ^a	0.01	-0.22 ^a	0.10	0.10	0.06	0.90 ^a

Continued below.

4.2. Multivariate analysis

To examine the relationship between corporate disclosure and the cost of debt, I deploy a pooled, multiple *OLS* regression with the following model structure in a first step:

$$\begin{aligned}
 \text{Spread}_{i,t+0.5} = & \beta_0 + \beta_1 \text{BR / IR quality}_{i,t} + \beta_2 \text{Beta}_{i,t} + \beta_3 \text{Return volatility}_{i,t} \\
 & + \beta_4 \text{Loss}_{i,t} + \beta_5 \text{Return on sales}_{i,t} + \beta_6 \text{Leverage}_{i,t} + \beta_7 \text{Asset}_{i,t} + \beta_8 \text{Capital} \\
 \text{(E-2)} \quad & \text{intensity}_{i,t} + \beta_9 \text{Market - to - book}_{i,t} + \beta_{10} \text{Lot size}_{i,t+0.5} + \beta_{11} \text{Free float}_{i,t} \\
 & + \beta_{12} \text{Offer}_{i,t} + \beta_{13} \text{Issue size}_{i,t+0.5} + \beta_{14} \text{Duration}_{i,t+0.5} + \beta_{15} \text{Convexity}_{i,t+0.5} + \varepsilon_{i,t}.
 \end{aligned}$$

²³ The table shows *Spearman's* rank correlation coefficients. ^a and ^b denote significance at 1- and 5- percent levels.

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OLS analyses by default require the regression errors to be independent. However, since there are various observations for most firms, individual errors may be correlated over time when pooled *OLS* is applied. I use cluster-robust standard errors to control for this. The original sample size of 192 observations is reduced after applying *Cook's* distance measure for detection of outliers. The cut-off value for the distance measure D_i is defined as $D_i > 4/N$. I further control for common aggregate shocks to the corporate bond market by including year dummies (with 2010 as the reference year containing the largest number of observations). Results from the pooled *OLS* regressions for both main predictors are given in Table E-7.

Table E-7
Results of Pooled OLS Regression²⁴

	Expected sign	(1) Coeff. T-value	(2) Coeff. T-value	(3) Coeff. T-value	(4) Coeff. T-value
BR quality	–	-0.620 -2.59 ^a		-0.543 -2.19 ^b	-0.482 -1.74 ^b
IR quality	–		-0.519 -1.94 ^b	-0.215 -0.84	-0.134 -0.52
Beta	+	0.346 1.91 ^b	0.417 2.40 ^b	0.331 1.79 ^b	0.393 2.09 ^b
Return volatility	+	0.997 3.66 ^a	0.861 2.50 ^a	0.973 3.05 ^a	0.974 3.04 ^a
Loss	+	0.669 6.10 ^a	0.519 3.42 ^a	0.625 4.64 ^a	0.631 4.57 ^a
Return on sales	–	-0.665 -1.54 ^c	-0.681 -1.42 ^c	-0.712 -1.62 ^c	-0.559 -1.35 ^c
Leverage	+	1.703 5.10 ^a	1.556 4.41 ^a	1.736 5.05 ^a	1.901 5.13 ^a
Asset (<i>ln</i>)	–	-0.018 -0.39	-0.056 -1.04	-0.028 -0.59	-0.036 -0.74
Capital intensity	–	-0.387 -2.71 ^a	-0.306 -1.87 ^b	-0.369 -2.16 ^b	-0.428 -2.39 ^b
Market-to-book	–	-0.074 -1.97 ^b	-0.087 -1.78 ^b	-0.061 -1.48 ^c	-0.079 -1.97 ^b
Lot size (<i>ln</i>)	+/-	0.074 2.91 ^a	0.054 2.06 ^b	0.074 2.84 ^a	0.067 2.62 ^b
Free float	+	-0.272 -1.71	-0.324 -1.84	-0.288 -1.74	-0.332 -1.92
Offer	–	0.070 1.31	0.119 2.10	0.084 1.61	0.108 1.85
Issue size (<i>ln</i>)	–	-0.466 -3.97 ^a	-0.446 -3.34 ^a	-0.466 -3.88 ^a	-0.522 -4.20 ^a
Duration	+	0.143 4.87 ^a	0.147 3.96 ^a	0.139 4.47 ^a	
Convexity	+/-	-0.739 -5.13 ^a	-0.682 -3.44 ^a	-0.723 -4.73 ^a	
Constant		13.656 9.15 ^a	14.213 8.78 ^a	13.989 9.18 ^a	15.573 9.23 ^a
N		174	180	176	175
adj. R²		0.823	0.800	0.824	0.817
F-statistics		75.09	102.14	96.88	92.68
Year dummies		Yes	Yes	Yes	Yes

All estimations show a negative relationship between ranking scores and bond yield spreads, which is statistically significant at a level of one percent for *BR quality* (first estimation).

²⁴ *T*-statistics are calculated using cluster-robust standard errors. ^a, ^b, and ^c denote significance at 1-, 5-, and 10-percent levels, respectively (one-tailed tests for variables with directional predictions, two-tailed tests otherwise).

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With regards to *IR quality*, the null hypothesis of no negative effect can be rejected on a statistical level of five percent (second estimation). Similarly, its economic significance is marginally lower. An improvement of one percentage point reduces the mean yield spread by around 0.62 percent when *BR quality* is applied and 0.52 percent for *IR quality*. Varying the two predictors by one standard deviation would result in a yield spread change of 12.4 and 8.8 percent, which corresponds to around 25 and 18 basis points, respectively. Conducting the estimation with another *BR* ranking score from *Degenhart/Janner* (2012), which has been developed to capture website contents that are exclusively interesting for bondholders, yields similar results (coefficient of -0.686 with statistical significance at a level of one percent).²⁵ When the estimations are limited to the years for which original ranking data was available (without the extended periods), both disclosure variables are significant at a level of one percent with higher coefficients (-0.843 for *BR quality* and -0.608 for *IR quality*).

Conducting a good communication towards bondholders exerts only a slightly larger influence on the cost of debt than *IR* performance, as perceived by fund managers and stock analysts. The coefficient estimates of both variables are close to each other. Bearing in mind that the rankings have been generated by different methods, it is not reasonable to interpret marginal differences in their economic significance. However, when using the two ranking variables together, as done in the third estimation, *IR quality* loses all of its explanatory power, while the effect of *BR quality* remains strong. In this setting, the specific *BR* measure dominates the conventional *IR* ranking. Nonetheless, it is worth noticing that corporate disclosure negatively influences the cost of debt, irrespective of whether the focus lies on bondholder-specific information contents or on fund managers' and stock analysts' opinions. This is an answer to the second research question and a confirmation for the view that is shared by a large part of *IR* professionals.

The remaining predictors' influence differs only slightly between the estimations. Dominant variables are *Return volatility*, *Loss*, *Leverage*, the measures of bond price sensitivity, and *Issue size*. The coefficients of almost all control variables show signs as predicted in the preceding section and displayed in the second column of Table E-7. Only *Free float* and *Offer*

²⁵ I did not use this sub-ranking because its variation is low and because it has a very high correlation to *BR Quality*, as already noticed above.

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have an opposite than expected sign. Both variables influence a firm's level of disclosure by measuring shareholders' inside knowledge and the need for disclosure due to regular bond offerings, respectively. Firms offering at least one bond in the respective year or the following do not have lower but higher yield spreads. This is consistent with the findings of *Nikolaev/van Lent* (2005), who report a positive but statistically and economically insignificant relationship. The results further imply that *Spread* is reduced by a higher *Free float*. The positive effects of inside ownership are seemingly offset by other (corporate governance) mechanisms. The coefficient signs for *Lot size*, used as a measure of bondholders' sophistication, are positive. Lower market liquidity due to high denominations outweighs the sophistication effect. Alternatively, private investors, who are attracted by lower lot sizes, may be thought to overvalue a firm's creditworthiness and management reliability so as to reduce their return expectations.

In the fourth estimation, I exclude *Duration* and *Convexity* for a robustness test. Both variables are calculated using bond yields and thus prone to cause endogeneity as yields are simultaneously included on both sides of the regression equation. Excluding the sensitivity measures slightly decreases the influence of both disclosure measures, but the signs and sizes of the remaining coefficients are virtually unaffected. Taken together, the regression model has a high goodness of fit since the adjusted coefficients of determination from all estimations are larger than 80 percent. The regression diagnostics confirm that the models are well specified and that all assumptions concerning the predictors and residuals are fulfilled. Variance inflation factors show that the ranking variables are not influenced by multicollinearity. Together with the sensitivity measures, only firm size (*Asset*) and the mean volume of bond portfolio (*Issue size*) exceed the conservative inflation threshold of 2.50 in all estimations. Centering these variables does not sufficiently reduce the correlation between them. Excluding *Issue size*, instead, increases the negative influence of firm size, both statistically and economically. The same applies to *Issue size* when I rerun the estimations without the variable *Asset*.

4.3. Endogeneity in the relationship between disclosure and cost of debt

Nikolaev/van Lent (2005) examine biases arising from endogeneity in the causal relationship between disclosure and cost of debt. Simultaneity, as a first source, accrues from the fact that cost of debt may be regarded as interdependently determined with disclosure quality. Howev-

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er, the authors point out that this ‘equilibrium feedback mechanism’, as defined by *Griffiths et al.* (1993), does not severely influence regression outcomes, referring to the findings of *Welker* (1995) and *Hail* (2002). Omitted-variable bias, as a second source of endogeneity, occurs when variables that are correlated with both the dependent and one or more independent variables (joint determinants) are not included in the model. In order to reduce the risk of a bias, I used a set of variables that jointly determined the cost of debt and corporate disclosure, as had been suggested by *Nikolaev/van Lent* (2005) and other authors.

In some cases, it is impossible to directly observe a relevant source of firm heterogeneity or to find variables that proxy for it. *Nikolaev/van Lent* (2005) suggest two unobservable firm characteristics. First, they assume investors to differ in their sophistication. In the estimations carried out above, investor sophistication was proxied by observable firm (*Free float*) and security characteristics (*Lot size*). It remains, however, uncertain whether bondholder and shareholder sophistication/knowledge is adequately captured, given the variables’ puzzling impact in the estimations. Second, management talents differ and signals to the market are assumed to vary in consequence. Managers are moreover uncertain about the reaction of market participants to (non-)disclosure. These characteristics are truly unobservable for researchers, but there are two practical solutions; either instrumental variables (*IV*) are used or the analysis is shifted to a time-series focus, e.g. using first difference (*FD*) estimation. In the following, I apply these two approaches to carry out different endogeneity tests.

In order to perform an expedient *IV* regression, it is essential to find instruments that are strongly correlated with *BR quality* and *IR quality* but unrelated to *Spread* and the error term. *Orens et al.* (2010) and *Klock et al.* (2005) suggest, among other variables, total assets and firm leverage as instruments for the level of corporate disclosure/governance, which I found to be of limited suitability due to their high correlation with *Spread*. Based on the multiple regression results, *Return on sales*, *Market-to-book*, and the variable *Offer* (in the *BR quality* estimation) are weakly or not at all linked to *Spread*. These variables are common predictors for the level of disclosure and show a strong correlation with *BR quality* and *IR quality*. Other variables that are used by *Orens et al.* (2010) and *Klock et al.* (2005) turn out to be weakly linked to the disclosure measures (sales growth and capital intensity) or are not available for this analysis (*CEO* ownership and media exposure).

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The first four columns of Table E-8 contain results from the *IV* regression, using a limited information maximum likelihood (*LIML*) estimator. For a better comprehensibility, both *IV* stages are displayed. The results suggest that *BR quality* and *IR quality* explain greater changes in the yield spread when they are instrumented, confirming the findings of Orens et al. (2010). An improvement of one percentage point in the *BR quality* ranking reduces the mean yield spread by around 1.7 percent (1.6 percent for *IR quality*), which is around three times the effect from the pooled *OLS* estimations. The *Durbin-Wu-Hausman* test indicates that both main predictors are slightly endogenous in the original model (*p*-values of 0.026 and 0.137, respectively, under the null hypothesis of exogeneity). *IV* results are prone to biases caused by instruments that are too weak or correlated with either the error term or *Spread*, in this case. The *LIML* estimator is more robust in this respect than a *2SLS* estimator and the instruments are found to exceed the critical *F*-values. However, *Market-to-book*, as the strongest instrument, is not truly unrelated to *Spread* according to the pooled *OLS* results and the *Sargan-Hansen* test indicates that the null hypothesis of no correlation with the error term may be rejected at a significance level of five percent for the instruments of *IR quality*. The *IV* estimation is nonetheless qualified as a robustness test, suggesting that the direction of coefficient signs in the pooled *OLS* model is valid.

First differencing allows me to capture the effect of unobserved firm heterogeneity as it concentrates on time-series variations within a firm. The analysis cannot be run for *BR quality* since its variation has been limited to the years 2010 and 2011. *IR quality* is found to have a statistically significant effect on *Spread* (last two columns of Table E-8). The coefficient size is almost the same as in the *OLS* without first differences. These results deviate from the findings of Nikolaev/van Lent (2005), who document a greater influence of disclosure when over-time variations instead of an unweighted mixture of cross-sectional and temporal differences are in the focus. Using the between estimator, which focuses on changes between firm averages over time, on the other extreme, I find the negative coefficient of *IR quality* to be larger than in the pooled *OLS* model. However, the between estimator may also be driven by changes in the composite error in addition to changes in each firm's mean *IR quality* over time. It is, quite the contrary, important to notice that conducting fixed and random effects estimations²⁶

²⁶ These alternative regressions are carried out only for *IR quality* due to the lack of temporal variations in the *BR quality* variable. Detailed results are not reported.

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for a robustness check yields virtually the same effect sizes for *IR quality* as in the pooled *OLS* and in the *FD* models. After all, the results of the pooled *OLS* model, which includes various joint determinants, as reported in Table E-7, seem to be consistent in this context. Taken together, unobserved heterogeneity does not appear to be a severe issue in my analysis.

Table E-8
Results of IV and First Difference Regressions²⁷

	<i>IV (BR quality)</i>				<i>IV (IR quality)</i>				<i>FD (IR quality)</i>	
	1 st stage		2 nd stage		1 st stage		2 nd stage		Coeff. T-value	
	Coeff.	T-value	Coeff.	Z-value	Coeff.	T-value	Coeff.	Z-value	Coeff.	T-value
<i>BR quality</i>			-1.689	-3.31 ^a						
<i>IR quality</i>							-1.637	-1.81 ^b	-0.480	-1.80 ^b
Beta	-0.185	-2.15 ^b	0.148	0.71	-0.037	-0.44	0.467	2.30 ^b	-0.267	-1.84 ^b
Return volatility	0.111	0.68	1.117	3.85 ^a	-0.288	-2.74 ^a	0.453	1.23	0.422	0.80
Loss	0.003	0.06	0.673	7.59 ^a	-0.132	-2.31 ^b	0.478	2.42 ^a	0.226	1.71 ^b
Return on sales ²⁸	-0.478	-2.03 ^b	-1.183	-2.89 ^a	-0.385	-2.53 ^b			0.500	0.53
Leverage	0.199	0.85	1.921	5.26 ^a	-0.050	-0.24	1.231	2.84 ^a	0.651	1.43 ^c
Asset (<i>ln</i>)	0.057	2.28 ^b	0.043	0.85	-0.003	-0.16	-0.073	-1.26	-0.338	-1.48 ^c
Capital intensity	0.031	0.35	-0.354	-2.11 ^b	0.189	2.73 ^a	-0.034	-0.17	-0.716	-0.85
Market-to-book ²⁸	0.068	2.88 ^a			0.077	5.58 ^a			-0.053	-0.78
Lot size (<i>ln</i>)	0.030	2.27 ^b	0.105	4.75 ^a	-0.001	-0.03	0.060	2.21 ^b	-0.009	-0.41
Free float	0.164	2.08 ^b	-0.098	-0.50	0.070	1.01	-0.323	-1.25	0.398	2.37 ^b
Offer ²⁸	-0.070	-2.38 ^b			0.035	1.50 ^c	0.140	2.52	0.050	0.86
Issue size (<i>ln</i>)	0.023	0.29	-0.442	-3.30 ^a	0.041	0.67	-0.393	-2.30 ^b	0.189	1.31 ^c
Duration	0.014	0.72	0.158	4.60 ^a	0.029	1.54 ^c	0.168	4.05 ^a	0.054	1.86 ^b
Convexity	-0.098	-0.95	-0.845	-5.68 ^a	-0.172	-1.79 ^b	-0.887	-3.82 ^a	-0.156	-1.44
Constant	-1.488	-1.36	12.056	5.61 ^a	-0.309	-0.37	13.931	7.10 ^a	0.124	5.81 ^a
<i>N</i>	174		174		180		180		132	
adj. <i>R</i> ²	0.149 ²⁹		0.781		0.144 ²⁹		0.749		0.714	
<i>F</i> -statistics	9.51 ²⁹		144.08		16.80 ²⁹		103.93		129.13	
Year dummies	Yes		Yes		Yes		Yes		Yes	

5. Conclusions and implications

Theory suggests that voluntary firm disclosure reduces information asymmetries between bond issuers and bondholders. It allows assessing the downside risk, evaluating characteristics

²⁷ *T*- and *z*-statistics are calculated using cluster-robust standard errors. ^a, ^b, and ^c denote significance at 1-, 5-, and 10-percent levels, respectively (one-tailed tests for variables with directional predictions, two-tailed tests otherwise).

²⁸ *Market-to-book* and *Offer* are instrumental variables determining *BR quality*. *IR quality* is instrumented by *Return on sales* and *Market-to-book*.

²⁹ These are partial values for the excluded instruments.

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of bond issuing firms and monitoring management behavior. German firms increasingly finance themselves through the market for public debt, oftentimes without opting for a credit rating. They employ bondholder relations officers or advisors. Professional organizations engage themselves in defining best practices for the communication with bondholders and analysts. However, insights into disclosure effects on bond markets have been comparatively scant until now. Against this background, my analysis was committed to test the relationship between disclosure efforts and cost of debt for German bond issuers. I apply two different disclosure rankings to a single firm sample and compare their effect size. The first is a newly developed ranking that measures bondholder-specific Internet disclosure and the other is a conventionally used ranking for the quality of general investor relations, as perceived by fund managers and stock analysts.

Professionals typically claim that a firm's bondholder relations and stock-related investor relations are based on the same capital market story, however emphasizing different aspects. Indeed, there is a strong relationship between both dimensions of communication as I find them to be moderately to strongly correlated with each other, keeping in mind that their definitions are different. Multiple regression results reveal that the influence of both ranking scores on the cost of debt is on a comparable level. The economic significance of bondholder relations contents is only marginally higher. In accordance with prior research, particular emphasis is placed on potential endogeneity of the disclosure measures. An augmented pooled *OLS* model, as used in the main analysis, is found to be sufficient to capture biasing effects.

The results of this study are almost equally relevant for scholars and for professionals. The research approach fills an academic void on the debt side of German firms' capital market communication. So far, there have been few studies worldwide or in the European context dealing with corporate disclosure on the bond market. Generally, there is little evidence on the effectiveness of disclosure for German firms. Future research could focus on comparing the effect of investor relations activities on both a firm's debt and equity values. Moreover, it would be interesting to know exactly whether bondholder relations works differently for different firm types. Even without this special focus, corporate officers, who are engaged in communicating with bond market participants, may feel confirmed in the recognition of their own task by considering the results of this study.

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F. Thesis Framework: Conclusions and Outlook

1. Concluding remarks to the research questions

As initially outlined, this doctoral thesis centered on a research interest concerning the extent and effectiveness of corporate disclosure directed at the German bond market. It delivers unprecedented insights into bondholder relations practices and is thought to establish this topic as a research field that is complementary to previous work on shareholder-related disclosure. All analyses from the thesis are empirical. The basic firm and bond data has been collected as part of an internal research project conducted by a team around Professor Heinrich Degenhart from Leuphana University. For each paper, additional information has then been collected using a survey design or externally provided data. In the following, I will take up the research questions as specified in the introductory part of this thesis framework so as to answer them by using the individual results from the papers. Finally, I will summarize the overall research outcome of the thesis and suggest ideas for future research in this field.

First of all, it made sense to analyze the importance of bondholder relations, as viewed by firms that are concerned with providing private information to bondholders in the context of their bond issues. Firms have been observed to differ in the way they evaluate this topic, in the use of communication instruments, and in the perception of target groups, but it has been unclear to which degree. The first study, which is written in German and entitled “Anleihekommunikation in der Unternehmenspraxis: Ergebnisse einer Befragung deutscher Emittenten“, links these questions and, thereby, offers an introduction into bondholder relations on the German market. Having conducted a structured survey among all German non-financial firms with outstanding bonds at the beginning of 2012, we find out that bondholder relations is, on average, ranked as much more important before a security is placed to the market, with a mean score of 4.52 on a scale from 1 (unimportant) to 5 (very important), than after the placement (mean score of 3.61). While the finance departments outweigh their investor relations colleagues in significance for the placement phase, their contribution seems to be rather equal in the follow-up.

By applying a Principal Component Analysis to the manifest survey variables, all bondholder relations instruments may be combined to two distinctive factors, which we name *Personal*

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and *Non-personal instruments*. This is in line with expectations from previous research and from the professions. Each firm can be clearly assigned to one of four cluster groups that differ in the use of instruments (*Personal/Non-personal instruments* and *Dedicated/Undedicated use*). As to the target groups, we identify three main components *Private*, *Institutional*, and *Credit*, using which the firms may be assigned to four cluster groups. Institutional investors and associated information intermediaries are not qualified as clustering criteria, unlike the other two components. The results also indicate that there is a strong relationship between the use of instruments and the importance of target groups. Overall, there are no negative correlations, suggesting that firms tend to use either of the instruments more extensively when they rate a target group as more important. Personal instruments, however, are valued higher when institutional investors or capital market analysts are targeted, while non-personal instruments are valued higher in case a firm representative thinks that private investors or credit analysts are more important. The results of this first analysis serve to situate the bondholder relations topic. They demonstrate certain heterogeneity in the way German issuers evaluate the importance of communication efforts towards the bond market, the importance of different target groups, as well as the use of communication channels and instruments.

The second main analysis, entitled “Internet Bondholder Relations: Explaining Differences in Transparency among German Issuers of Corporate Bonds”, is set up to find causes for observed firm heterogeneity in the level of bondholder relations efforts, thereby referring to the third research question, as outlined in the introduction. The first analysis of my thesis revealed that bondholder relations was rated as important in the course of a bond issue, but it did not provide explanations for cross-sectional differences and it did not compare the subjective evaluations with factual bondholder relations efforts of the firms that had been questioned. Based on this, various determinants of the bondholder relations level, as defined by using a proprietary Internet disclosure ranking, are tested in several multiple regressions in order to identify firm characteristics that influence the disclosure behavior to the bond market. We identify stock listing and firm size to be major determinants, followed by the constructs of bond market orientation, investors’ informational needs, firm complexity, and family ownership. Only the default risk is found to be irrelevant in explaining the extent of information that bond issuers disclose on their websites. This may derive from the ambiguous theoretical relationship between firm performance and disclosure behavior. It is unclear if better performing

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firms disclose their success in order to benefit from lower cost of debt or whether they hesitate to reveal competitive information instead. It is also plausible that underperforming firms try to create an outward impression that excels their true internal success. The findings of this study are thought to serve as a basis for discussions in professional working groups and between firms and regulatory authorities that are concerned with setting disclosure standards. There is evidence that firms voluntarily disclose towards the bond market in Germany in addition to implementing legislative requirements. We provide a list of firm characteristics that determine the level of voluntary disclosure and document a higher degree of heterogeneity in voluntary disclosure than previous studies on various stock markets. These insights may help set up flexible incentives and regulations. Finally, the results imply that there is still a need for best-practice advices given by professional organizations in Germany in order to improve the bondholder relations practice in general.

Before the effectiveness of bondholder relations is examined, the third paper with the title “Are Economically Significant Bond Returns Explained by Corporate News? An Examination of the German Corporate Bond Market” was thought to provide insights into the relationship between corporate news and bond prices. It, thereby, refers to the fourth research question on the sensitivity of bond prices to corporate news. For this purpose, we decided to first identify economically significant bond returns and to match these with major news announcements published via *Bloomberg*. This approach is rather unconventional as event studies normally work the other way round. We, however, follow seminal research on the relationship between large stock prices and corporate news. In order to validate our findings, we perform an alternative analysis, which is based on the conventional event study approach. In total, our data sample for the year 2011 contains 51 non-financial firms listed in the prime segment of the German stock market having issued a total of 252 bonds. We analyze 4,401 announcements from 55 news categories, which themselves are aggregated to nine main categories.

Our main analysis reveals that the explanatory power of corporate news on the bond market is similarly strong as on the stock market in that 60 percent of economically highly significant bond returns may be associated with news announcements. Information on firm performance is most often associated with large returns, both on the individual and main category levels. They are followed by financial issues and M&A announcements. Examining the relative im-

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portance, defined as the share of each category's announcements being influential, we find financing issues and analyst activity to be most likely to drive economically significant bond returns. As to the time of occurrence, we discover that only a fifth of all returns coincide with the announcement. Finally, it is barely possible to distinguish main categories by reference to the size of their median returns, in terms of statistical significance. Only news on legal issues and government actions leads to bond returns that are significantly higher than the rest. According to our alternative analysis, predominantly earnings announcements induce absolute bond returns that are ranked above the mean, both on the level of individual categories and main categories. Financial analysts and investors are concerned with anticipating changes in firms' creditworthiness and subsequent movements of bond prices so as to rebalance their investment portfolio. The results may be important for investors and other market participants who base their investment decisions and analyses on fundamental firm characteristics. Firms may use these insights to match their information releases with the needs of their bondholders in order to reduce information asymmetries and improve their financing capabilities, consequently.

My thesis is completed with the fourth article, which is entitled "Do Bondholder Relations Efforts Pay Off for German Firms? An Empirical Approach". Conducting a pooled regression analysis for a sample of 45 firms with 192 observations over a time period between 2005 and 2011, I find bondholder relations to significantly reduce yield spreads, controlling for a long list of other firm- and bond-specific determinants. The findings are robust against endogeneity and imply that there is only a marginal difference between bondholder relations and overall investor relations activities, often equated with shareholder-related disclosure, as respects their influence on the cost of debt. I discover that both dimensions of a firm's capital market disclosure are moderately to strongly correlated with each other. The results support the impression of professionals, who argue that bondholder and shareholder relations are part of the same capital market story, albeit with a different focus. Therefore, this study helps scholars and professionals in two respects. First, it discloses the very specific benefit of bondholder relations. Firms may use the potential to reduce their risk premium by disclosing more private information to bondholders and help them assess the creditworthiness and management's trustworthiness. Second, it confirms that bondholder relations may be truly seen as overlapping with shareholder-related investor relations and that taking both kinds of corporate disclo-

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sure together makes up a firm's total capital market communication. These are answers to the last research questions that I formulated in the introduction.

2. Potential for future research

Taken together, the four partial analyses of my doctoral thesis draw a comprehensive picture of the importance and effectiveness of corporate news and bondholder relations efforts for bond-issuing firms in Germany. They are a valuable contribution to the stream of research that is concerned with corporate disclosure and its relationship to the cost of capital, the cost of debt, and even more specifically the yields or yield spreads of corporate bonds. As outlined in the introduction, it was about time to establish bondholder relations (or fixed income investor relations following a marginally wider definition) as complementary to shareholder-related investor relations in research, as had already been done by professionals in the form of working groups and publications. By filling an academic void for the German market and beyond, the studies may serve as a foundation for further research.

Future analyses may, for instance, build on the results of my thesis by extending the research focus to include markets other than the German market for corporate bonds or to examine a longer time horizon. They may cover foreign markets and analyze cross-national differences by examining country-specific factors, such as legal, cultural, and institutional aspects. Beyond that, it might be worth to compare disclosure to the bond and to the stock markets for the same firm sample, using the results from the articles of my doctoral thesis as a basis. First, future research could directly compare German and international firms' investor relations efforts towards both the bond and the stock market. Such an analysis could yield further insights on organizational responsibilities within firms as well as on the importance of communication channels and instruments. Moreover, it could address the role of information intermediaries, such as (rating) analysts or the business press, on both markets. This would also entail examining the questions whether or not and, if so, how far firms prioritize certain information contents in disclosure towards either side of the capital market. Second, it is expedient to see whether or not the determinants that we found to have an effect on the level of (Internet) bondholder relations affect the stock-related disclosure as well. It would be worthwhile to examine the reasons for differences in heterogeneity between firms in the level of voluntary

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disclosure towards both segments of the capital markets. Third, a broader event study may examine the influence of corporate news on stock returns for the same set of firms and news categories, irrespective of the applied approach. Only a direct comparison, which includes both markets, would allow drawing conclusions about the effectiveness of certain news announcements. Following these results, firms and information intermediaries would be better capable of performing a cost-benefit analysis in order to decide which information is perceived by market participants. Also regulatory authorities, which are concerned with firm disclosures relevant to the capital market, may benefit from insights on the price sensitivity of certain kinds of news announcements. Last, it would be interesting to know whether or not the effect of disclosure on the financing cost varies between bonds and stocks of the same firms. Acknowledging that this task is not easy due to differences in definitions between cost of debt and cost of equity, the results of such an analysis could show if it is justified that bondholder relations has a subordinate significance in the context of firms' total disclosure. The results of this doctoral thesis in fact indicate that bondholder relations has a strong potential to be established as a pillar of corporate disclosure alongside with public relations, shareholder-related investor relations, and bilateral creditor relations.