Empirical accounting research
—
Three essays with intersections to management and corporate governance

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To the reader

Historically, German financial accounting and reporting was geared towards regulatory requirements like taxation and dividend pay-outs. In recent years, German public firms started adopting internationally accepted financial accounting standards to signal their commitment to capital market communication. Nowadays, German financial accounting and reporting is trying to meet multiple objectives: It is used as a communication device to shareholders while at the same time it remains instrumental in regulatory settings like, e.g. taxation. Also, financial accounting is a key ingredient to many issues of corporate governance.

The dissertation thesis of Tolga Davarcioglu reflects this multi-objective nature by investigating the phenomenon of financial accounting from different angles. While the first paper looks into the determinants of voluntary compliance to accounting standards, the second paper assesses the effects of mandatory IFRS adoption. Finally, the third paper studies the interplay of board structure and firm performance. In general, the projects find that some of the standard economic incentive stories do not seem to be able to explain the financial accounting behavior of German firms. This calls for future research into the (non-economic) determinants of managerial behavior.

The overarching theme of the three papers is methodological: all papers use empirical archival approaches. This is considered to be “mainstream” in the current international literature. Nevertheless, the work presented here is far from being mainstream as it is based on carefully hand-collected data. In recent years, most studies in the area of empirical financial accounting research have been based on publicly available standardized databases. While these databases allow large-sample studies with obvious advantages in terms of descriptive appeal and external validity, the data presented in these databases are only a crude proxy for the financial accounting information available to market participants. Financial accounting information is rich, multi-dimensional and qualitative as well as quantitative in nature. Researchers which strive to understand the determinants and consequences of financial reporting should be studying financial accounting data “in the wild”. Focusing the analysis on key financial figures available from public data sources is like studying the behavior of elephants by going to the zoo: It is useful but likely to provide an incomplete picture.

The use of high-quality data is a significant contribution as it makes the mixed results of some of the projects more interesting. Mixed findings based on standard archival data can always be blamed to lacking construct validity. In turn, the findings presented here clearly indicate the limitations of traditional economic theories which predict managerial behavior. Thus, future work is needed to continue the work presented here by linking theories of different paradigms. In that respect, the work of Tolga Davarcioglu adds to our understanding of the real-world phenomenon of financial reporting and corporate governance. I hope it will be widely read and used.

Berlin, October 17, 2011

Joachim Gassen

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Berlin, October 2011 Tolga Davarcioglu

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An introductory summary

Accounting research and empirical accounting

Accounting, in its specific sense, is not defined up to now and may never be. This probably lies in the circumstance that accounting is a response to practical needs. Since these needs are different in every country and period of time, accounting is an ever-changing, dynamic and evolving profession. In this respect, accounting can be considered to follow the Darwinian principle in so far that only useful accounting principles survive (Alexander and Nobes, 2010). Of course, there have been endeavors to define accounting. A somewhat broader definition is provided by the Accounting Principles Board (1970):

"Accounting is a service activity. Its function is to provide quantitative information primarily financial in nature, about economic entities that is intended to be useful in making economic decisions, in making resolved choices among alternative courses of action."

The broadness of this definition illustrates that accounting is multifaceted. In order to provide "quantitative information", there are rules that need to be applied. An essential part of accounting is about developing and interpreting accounting rules. The provided information generally pertains to "economic entities". In the accounting profession, this usually refers to business entities which include hospitals and non-profit organizations. But then, these entities are also composed of individuals like managers, board directors or employees. And who are the parties that are supposed to make "economic decisions (…) among alternative courses of action"? Interested parties, also called users of accounting information, include those outside the business such as investors, lenders, suppliers, customers, governments or the public.

Given the purpose of accounting, research pertaining to accounting deals with the question how to provide decision-useful information but also has the intention to predict and to explain behavior based on theoretical models. Bearing this in mind, it is unsurprising that accounting research is broad and intersects with numerous other disciplines like law, management, finance, economics or psychology. Consequently, accounting papers cover a broad range of topics. Oler, Oler and Skousen (2010) categorize these topics into financial accounting, managerial accounting, auditing, tax, governance, and others. While this gives an idea about possible subjects of accounting research, it tells little about the nature of accounting research. Typically, accounting research is subdivided into normative and positive research. While it is no easy task to trace back the beginnings of accounting research, they are believed to be normative in nature (Fülbier and Weller, 2008). Normative research aims at giving ideas about what ought to be. Typical questions raised in this research line deal with purpose and content of financial statement items like the balance sheet and income statement. On the other hand, positive accounting research is a phenomenon of the late 1960s, pioneered by works of Benston (1967), Ball and Brown (1968), and Beaver (1968). Positive research aims at postulating hypotheses about causes and effects with respect to accounting practices and to test these hypotheses (Kinney, 1986). Empirical accounting is an indispensable part of positive accounting research. Its scope is to provide results that accept or reject hypotheses and by this, to provide evidence for or against theoretical models. Also, descriptive and explorative empirical accounting provides important contributions to advance accounting theory and to identify contemporary “hot topics” in accounting.

The three papers provided by this cumulative PhD-thesis need to be considered against this background. I address topics from the area of accounting, management and corporate governance in these papers. Building on theoretical frameworks, I apply established empirical methodology in order to validate or reject predictions on certain accounting outcomes. In particular, each paper combines publicly available data with purposefully hand-collected data. At the same time, each paper takes advantage of a special setting that is predominantly determined by institutional factors. As a result, research questions can be addressed with a novel data quality. This kind of research comes with both advantages and disadvantages. While it addresses questions that have not been raised before, it also implies to explore in the dark. Research questions that are illuminated in this vein can yield interesting answers, yet, the approach also bears the risk of producing null results. To some extent, this also holds true for the papers presented. Of course, a null result does not necessarily mean that the result bears no content or informational value. Rather, the expected content or expected relationship has not been found. In this respect, this kind of research is important because even in the face of null results, it can give other researches important input for future research. Subsequently, I give a short overview of each of the three papers.

The first paper with the title "*What drives voluntary accounting compliance? Evidence from German Accounting Standards*" deals with compliance to voluntary accounting standards. In the broadest sense, this paper relates to the accounting choice literature, which Fields, Lys and Vincent (2001) define as:

"An accounting choice is any decision whose primary purpose is to influence (either in form or substance) the output of the accounting system in a particular way, including not only financial statements published in accordance with GAAP, but also tax returns and regulatory filings."

German Accounting Standards (GAS) aim at improving accounting quality of consolidated financial statements by restricting some of the rule-based options offered in German GAAP, requesting more disclosure and demanding more standardized disclosure. Providing accounting information is essential for facilitating contracting. In this respect, gaining insights into why firms voluntarily exceed disclosure requirements or adopt alternative accounting regimes is important in order to assess to which extent disclosure can be left to the market and where regulation is necessary to guarantee provision of relevant information to different users of accounting information. An understanding on why firms adopt alternative accounting regimes can also be helpful in harmonization endeavors. Yet, the mere circumstance that a firm adopts an accounting regime does not necessarily imply that the firm complies with all its requirements. Studies within this field can provide valuable insights that can help to find triggers that encourage compliance by companies and ultimately might improve accounting quality.

My research investigates the factors that drive compliance with the four German Accounting Standards GAS 2 (Cash Flow Statements), GAS 3 (Segment Reporting), GAS 4 (Acquisition Accounting in Consolidated Financial Statements) and GAS 14 (Foreign Currency Translation). The selection of the standards is based on the extent to which the standards restrict favored rule-based options of German GAAP. I consider the institutional setting of the study to be particularly suitable in order to assess my research questions. During 1998 and 2004, publicly listed German firms had the option to choose among three different accounting regimes in order to prepare their consolidated financial statements: German GAAP, IAS/IFRS and US GAAP. Firms that apply German

GAAP were supposed to comply, in addition, with GAS. This setting allows to extend existing literature by investigating whether compliance is driven by public exposure and peer pressure.

Results of the study show that compliance for every standard is decided on a case-to-case basis since compliance is significantly lower for standards that restrict popular rule-based options. The results of an ordered logistic regression show that compliance is driven by size, the auditor's affiliation to the institution that develops the GAS and debt agency problems. I find no relationship between compliance and public exposure. Additional tests investigating the compliance with standards separately show that peer pressure, the auditor and financing needs influence the compliance decision. A change analysis reveals that firms that newly adopt GAS make only minor changes to their cash flow statements and segment reports. Results also suggest that once firms have decided to comply with GAS, this becomes a routine practice implying that firms comply with GAS out of habit or because it has become a standard process.

The implications for institutions that formulate accounting standards or codices that practitioners can choose to apply on a voluntary basis are fourfold. First, even in the light of a set of rules aiming at improving corporate disclosure, non-compliance is still prevalent and additional incentives and advantages for various users need to be provided in order to get the rules accepted by practitioners. Second, in order to avoid a labeling process, partial compliance to rules should be disclosed to the users of accounting information in detail as this might be relevant with regard to comparability. Third, acceptance of the standards by other firms within the same industry can have a positive influence on compliance. Fourth, affiliated third parties with the publishing organization that are also affiliated to firms that apply the standards can enhance compliance and dissemination of the standards.

The second paper with the title "*Accounting quality after voluntary IFRS adoption – Evidence based on provision disclosure of German firms*" deals with the effects of voluntary IFRS adoption on accounting quality based on provision disclosure. In so far, the paper can also be seen in the light of accounting choice, but it puts its focus on the consequences on accounting quality. Drawing on Cascino et al. (2010):

> "The quality of accounting information refers to: i) the informativeness of reported numbers, ii) the level of disclosure, and iii) the degree of compliance with generally accepted accounting standards."

The study puts its focus on the level of disclosure and the degree of compliance around IFRS adoption on accounting for provisions. Dealing with the dispersion of IFRS is relevant because the IFRS play an outstandingly important role in the harmonization process of accounting worldwide. Whether and to what extent the proclaimed goal to provide standards of high quality that facilitate users of accounting information to make economic decisions is being fulfilled by the IFRS has not been answered conclusively. Prior literature has particularly focused on the earnings quality aspect of accounting quality. This paper takes an alternative approach by focusing on the disclosure aspect. First, compliance with disclosure requirements and disclosure level are compared under local GAAP (final year prior to IFRS adoption) and under IFRS (transition year). Second, determinants driving these measures on a firm level are investigated.

The results show that compliance is significantly lower and that disclosure level is significantly higher under IFRS. Non-compliance under IFRS primarily stems from the circumstance that virtually no firm fulfills the restrictive demands made on disclosing qualitative pieces of information. Improvement in the disclosure level primarily stems from more detailed disclosure in the balance sheet and more quantification in the notes. Strongly emphasizing the limitations of the approach, the results are consistent with the notion that IFRS adoption has a positive impact on the disclosure aspect of accounting quality regarding accounting for provisions. Improvement is more pronounced for firms where provisions are relatively more important in proportion to the balance sheet and where IFRS adoption has a higher impact on the provisions. At the same time, positive changes are stronger for more levered and more closely held firms that typically have less incentives to provide accounting information for a broad investor base.

The third paper with the title "*Multiple board appointments and firm performance - German evidence*" strongly intersects with the field of corporate governance. Drawing on Denis and McConnell (2003):

"We define corporate governance as the set of mechanisms—both institutional and market-based—that induce the self-interested controllers of a company (those that make decisions regarding how the company will be operated) to make decisions that maximize the value of the company to its owners (the suppliers of capital)."

The mechanisms referred to comprise internal and external components. Within the paper, the board of directors, which is typically seen as an internal corporate governance mechanism, is the main object of scrutiny. A firm's board, also referred to as "the lynchpin of corporate governance" (Gillan, 2006), has an outstandingly important role for firm performance. It is this relationship investigated within the course of the paper. In Germany, a publicly held firm features a two-tier board. The management board is responsible for a firm's operational and strategic alignment. The management board reports to the supervisory board. The monitoring tasks of the supervisory board comprise e.g. appointment of managers or determination of the salary. While a board's effectiveness is driven by numerous factors, a board's structure, composition, activity or establishment of committees have been identified as central determinants. The focus of my study lies on multiple board appointments held by board directors. Multiple board appointments are a relevant topic in corporate governance research since impact on firm performance is not unequivocally predictable. They are perceived to reduce the effectiveness of monitoring tasks because directors might neglect their corporate duties. On the other hand, directors are expected to benefit from additional experience and networks that can enhance firm performance.

I investigate the effect of multiple board appointments on firm performance for a sample of publicly listed German firms. Since multiple board appointments can be characterized along numerous dimensions and their effect on firm performance is not unequivocally predictable, the incidence of multiple board appointments is investigated from several angles. First, I contrast the Busyness Hypothesis versus the Reputation Hypothesis. Busyness is measured by the number of additional board appointments while several director characteristics are used to measure reputation and skills. Second, I examine the presence of directors featuring bank affiliations on firm performance. Finally, I investigate the presence of directors featuring international board appointments on firm performance, and international activities, respectively. Although my results are mixed, I cautiously conclude that multiple board appointments negatively affect firm performance. Director characteristics that are expected to have a positive influence on firm performance do not counteract this finding.

Although mixed, the findings still offer some insights on the occurrence of multiple board appointments. The results do not support the idea that their influence on firm performance is negative per se. Hence, it does not seem appropriate to put restrictions on the number of multiple board appointments with the argument to increase board effectiveness for all corporate boards. Rather, active board members need to assess in which form board effectiveness might benefit from appointing a certain director to the board. At the same time, appointed directors need to assess whether they are able to fulfill all their responsibilities when taking any additional board appointments. This might seem like a somewhat naïve statement in the light of self-interests and selfish behavior and directly leads to the question whether other control mechanisms could be helpful in ensuring that board directors do not take too many board appointments. On the one hand, this might be achieved by self-imposed corporate guidelines which offer higher flexibility. On the other hand, directors need to question board effectiveness constantly and directors need to assess whether board effectiveness suffers from directors that burden too many responsibilities on themselves.

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What drives voluntary accounting compliance? Evidence from German Accounting Standards

Tolga Davarcioglu

Abstract: This paper identifies determinants of voluntary compliance with German Accounting Standards (GAS). During 1998 and 2004, publicly listed German firms had the option to choose among three different accounting regimes in order to prepare their consolidated financial statements: German GAAP, IAS/IFRS and US GAAP. Firms that apply German GAAP were supposed to comply, in addition, with GAS. GAS restrict some of the rule-based options of German GAAP, request more disclosure and demand more standardized disclosure. Compliance with GAS is required but not mandatory. I investigate compliance with four different GAS. My results show that compliance for every standard is decided on a case-to-case basis since compliance is significantly lower for standards that restrict popular rule-based options. The results of an ordered logistic regression show that compliance is driven by size, the auditor's affiliation to the institution that develops the GAS and debt agency problems. I find no relationship between compliance and public exposure. Additional tests investigating the compliance with standards separately show that peer pressure, the auditor and financing needs influence the compliance decision. A change analysis reveals that firms that newly adopt GAS make only minor changes to their cash flow statements and segment reports. Results also suggest that once firms have decided to comply with GAS, this becomes a routine practice implying that firms comply with GAS out of habit or because it has become a standard process.

Keywords: voluntary accounting compliance, compliance determinants, German Accounting Standards, public exposure, media coverage, peer pressure, cash flow statement, segment report

1 Introduction

In general, the term corporate compliance refers to the existence of laws and regulations that have to be followed by firms. Lately, corporate compliance is used in a broader way, encapsulating all measures guarantying that management and employees act within legal boundaries (Schneider, 2003). A widely accepted definition of corporate compliance does not exist. Compliance is considered as part of good corporate governance (Vetter, 2009). For instance, the German Corporate Governance Codex describes compliance as follows: “The Management Board ensures that all provisions of law and the enterprise’s internal policies are abided by and works to achieve their compliance by group companies (compliance)” (Government Commission, 2009). Assuming that compliance with requirements has positive effects, the concept of voluntary compliance is appealing from an enforcement perspective since it can help to improve regulatory efficiency by reducing enforcement costs (Scholz, 1984). The concept of voluntary compliance refers to the willingness to comply with laws, rules or regulations without the need to do so. Voluntary compliance plays a role in various parts of corporate disclosure as for example with (additional) accounting standards or corporate governance related disclosure like codes of conduct. This paper identifies determinants of voluntary compliance with German Accounting Standards (GAS) explicitly addressing effects of public exposure and compliance pressure.

Within accounting research, compliance with corporate disclosure requirements and accounting standards is a well established research area. Additionally, researchers investigate why firms voluntarily go beyond disclosure requirements or adopt a non-domestic accounting set. For example, Inchausti (1997) investigates determinants that affect disclosure of compulsory and voluntary information. Insights into disclosure behavior are important in order to assess the extent to which disclosure can be left to the market and where regulation is necessary to guarantee provision of relevant information to different users. Also, factors influencing adoption of international accounting standards have been thoroughly investigated in the light of an ongoing internationalization of accounting (e.g. El-Gazzar, Finn and Jacob, 1999; Ashbaugh, 2001; Cuijpers and Buijink, 2005). Knowledge about such determinants can be useful in harmonization endeavors. However, the mere fact that a firm adopts an accounting set does not necessarily imply that the firm complies with all its requirements. Several studies pick up this concern (e.g. Street and Bryant, 2000; Street and Gray, 2001; Glaum and Street, 2003). They show that compliance is different for firms with and without U.S. listings or filings, or that the compliance degree among firms following IAS/IFRS differs across standards. A related issue is that of labeling. Adoption or compliance might be a labeling process where certain accounting standards or accounting regimes are merely used as a brand name (Ball, 2006). In these cases, firms do not make real changes to their reporting after the adoption of a new accounting regime (Daske et al., 2009). Studies investigating compliance can help in finding triggers that encourage compliance or identify neuralgic areas where enforcement is needed. If compliance is a necessary condition to guarantee accounting quality, this might ultimately be used to improve accounting quality. However, it is acknowledged that accounting quality is a multifaceted concept and that it has different meanings for different recipients of accounting information. In this paper, I address the question on which determinants drive voluntary compliance with German Accounting Standards (GAS). In this endeavor, I particularly borrow from institutional theory in order to shed light on the relation between public pressures and accounting-related disclosure. Institutional theory posits that firms do not only maximize profits but also strive for legitimacy. For a firm to be legitimate, its actions need to be congruent within a social system of “norms, values, beliefs and definitions” (Suchman, 1995). Adhering to external pressures can lead to external legitimization which in turn can explain why organizations tend to pursue homogenous practices (DiMaggio and Powell, 1983).

I exploit the German institutional setting during 1998 and 2004 to identify determinants of voluntary compliance with German Accounting Standards (GAS). The GAS are standards that are to be complied with in addition to German GAAP. GAS restrict some of the rule-based options of German GAAP, request more disclosure and demand more standardized disclosure. Compliance with GAS is required but not mandatory. Prior evidence of GAS compliance indicates that companies engage in “standard picking”, i.e. companies comply with some but not all standards. I investigate compliance with the four German Accounting Standards GAS 2 (Cash Flow Statements), GAS 3 (Segment Reporting), GAS 4 (Acquisition Accounting in Consolidated Financial Statements) and GAS 14 (Foreign Currency Translation). The selection of the standards is based on the extent to which the standards restrict favored rule-based options of German GAAP. While compliance with two of the standards is possible without a strong deviation from German GAAP, the other two restrict popular rule-based options. I assume that firms decide to comply with GAS if the benefits exceed the costs. In order to measure compliance benefits, I draw on evidence found by prior literature (e.g. Dumontier and Raffournier, 1998; Street and Gray, 2001).

The investigation reveals that compliance is significantly lower for the two standards that restrict popular rule-based options. Since the number of compliant firms with these standards is too low, I restrict my analyses to the remaining two standards: GAS 2 and GAS 3. The first standard deals with the preparation of cash flow statements, the latter with the preparation of segment reports. Utilizing an ordered logistic regression, my main finding suggests that a higher level of compliance is driven by (1) size, (2) the auditor's affiliation to the institution that develops the GAS and (3) debt agency problems. I find no evidence that compliance is driven by public exposure. Additional tests suggest that compliance determinants differ among the standards. Compliance related to the preparation of cash flow statements is positively associated with size, peer pressure and debt agency problems, and negatively associated with being audited by a BIG4 audit firm. Compliance related to the preparation of segment reports is positively associated with size and debt agency problems, and negatively with financing needs. A change analysis reveals that firms that newly adopt the standards make only minor changes to their cash flow statement or segment report. The results also suggest that firms giving a general statement to comply with all GAS make lesser changes to their cash flow statement and segment report than firms explicitly stating to comply with the respective standard. Results also suggest that once firms have decided to comply with GAS, this becomes a routine practice implying that firms comply with GAS out of habit or because it has become a standard process.

The study contributes to the existing literature by explicitly addressing the effects of public exposure and peer pressure on voluntary compliance with accounting standards. In this respect, I add to several studies dealing with voluntary disclosure (e.g. Chow and Wong-Boren, 1987; Meek, Roberts and Gray, 1995), voluntary adoption of accounting standards (e.g. Dumontier and Raffournier, 1998; Ashbaugh, 2001; Cuijpers and Buijink, 2005; Gassen and Sellhorn, 2006) and accounting compliance (e.g. Street and Bryant, 2000; Street and Gray, 2001; Glaum and Street, 2003) and to Lim and McKinnon (1993), who investigate the relationship of political visibility on voluntary disclosure by statutory authorities. My results also add to a strand of literature dealing with media coverage and its interplay with corporate issues like environmental disclosure (Neu, Warsame and Pedwell, 1998; Cormier, Magnan and van Velthoven, 2005), corporate governance (Dyck, Volchkova and Zingales, 2008) or auditor decisions (Frost, 1991; Mutchler, Hopwood and McKeown, 1997; Joe, 2003).

The remainder of the paper proceeds as follows: Section 2 provides the motivation, discusses relevant literature and provides information about the institutional setting, the Accounting Standards Committee of Germany and German Accounting Standards. Section 3 presents the sample, describes the research design, and provides the analyses and the results. Section 4 concludes.

2 Background

2.1 Motivation and related studies

The scope of this study is to document factors that are associated with voluntary compliance with German Accounting Standards. The study enhances existing literature by investigating whether public exposure and compliance pressure drive companies towards voluntary compliance with accounting standards. I exploit the German institutional setting during 1998 and 2004 to test for such a relationship. During that period, publicly listed German companies had the option to choose between three different accounting regimes in order to prepare their consolidated financial statements: German GAAP, IAS/IFRS and US GAAP. Firms following German GAAP were required to comply with GAS in their consolidated financial statements, but were not penalized for non-compliance by the German legislator. I follow prior literature on the assumption that a firm chooses to comply when the benefits exceed the costs (e.g. Meek, Roberts and Gray, 1995; Ashbaugh, 2001). GAS have been developed to enhance the quality of

German GAAP consolidated financial statements. A firm that prepares its consolidated financial statement in accordance with German GAAP faces additional costs by adhering to GAS. At least, that is the case wherever additional compliance leads to more disclosure or prevents to exert a rule-based option. Since different GAS cover different aspects of accounting, each standard exhibits different costs. At the same time, compliance is cheaper for firms that are already devoted to accounting practices as proposed by GAS. Evidence from Gebhardt and Heilmann (2004a; 2004b) hints at the existence of cheaper and costlier GAS. Among other things, they assess compliance with GAS 4, a standard which restricts the numerous possibilities offered in German GAAP related to acquisition accounting. They do not only find that few firms comply with the standard but also observe firms that state to comply with GAS except for GAS 4. They denote this as “standard picking”.

The study is further motivated by prior findings concerning the German Corporate Governance Code (GCGC). The code gives recommendations for approved best practice. Like for the GAS, compliance with the code is not mandatory. It follows a comply-or-explain philosophy, which means that non-compliers have to disclose why they do not comply with the code. Werder, Talaulicar and Kolat (2005) identify neuralgic norms of the code. Similar to this study, they identify requirements that firms prefer to ignore. These neuralgic norms are predominantly related to board member compensation and accounting requirements. While they link compliance to size, they encourage more research on this topic. Findings of Goncharov, Werner and Zimmermann (2006) suggest that compliance with the GCGC is value relevant for the capital market.

I expect the observed standard picking to be related to public exposure and compliance pressure. Particularly the environmental disclosure literature provides some evidence on the connection between public exposure, compliance pressure and corporate disclosure. Solomon and Lewis (2002) survey three groups[1] on their views on possible incentives and disincentives for voluntary corporate environmental disclosure in the UK. Strikingly, improvement of the company's corporate image received highest scores among recipients of corporate environmental disclosure. Lowest scores were given to meeting demands for environmental information and meeting company ethics, respectively. On the other hand, acknowledging social responsibility received highest and peer pressure between firms in the same industry received lowest scores from the company group. Peer pressure was mid-ranked by the other two groups. These results indicate that the company respondents viewed their incentives to be more altruistic in comparison to the other two groups that regarded the incentives to be more marketing, corporate image and peer pressure related. The survey results are backed for example by Neu, Warsame and Pedwell (1998) and Cormier, Magnan and van Velthoven (2005). Addressing the effects of public pressures, they show a positive relationship between media coverage and environmental disclosure. Rather little is known about the relationship between public pressure and accounting-related disclosure. Lim and McKinnon (1993) investigate the impact of political visibility and voluntary disclosure of statutory authorities in New South Wales, Australia. They describe political visibility as an increased attraction by politicians, organized groups like trade unions and the general public. They find that a higher political visibility is positively associated with more disclosure of financial and non-financial information. This association does not hold for information that is sensitive in nature.

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[1] Solomon and Lewis distinguish between an interested party group, a normative group and a company group. The first group is considered as users of the provided information. The normative group is not necessarily considered as users but as an expertise group that has a strong opinion about what information is requested and required by the users. I subsume these groups to recipients of environmental disclosure.

Finally, the study relates to literature dealing with effects of media coverage. Frost (1991), Mutchler, Hopwood and McKeown (1997) and Joe (2003) investigate media coverage and effects on the auditor and audit opinion. Rather few studies are related to media coverage and corporate governance. Dyck, Volchkova and Zingales (2008) study effects of media coverage in Russia. They show that increased media coverage increases the probability to reverse a corporate governance violation.

2.2 The institutional setting in Germany

2.2.1 The Accounting Standards Committee of Germany and German Accounting Standards

Developments concerning accounting in Germany during the 1990's were characterized by an ongoing process of internationalization (Nobes, 2006). German companies were faced by a demand for accounting information by international investors. As a consequence, some companies prepared their consolidated financial statements in compliance with German GAAP (*Handelsgesetzbuch - HGB*), while simultaneously complying with international standards, i.e. IAS/IFRS or US GAAP; this was also known as dual accounting. Dual accounting generally does not result in conformity with both accounting regimes, but alleviates differences in the accounting regimes. This is predominantly achieved by exploiting rule-based options. Other companies chose to comply with German GAAP in parallel with international standards; this procedure results in two different financial statements. One disadvantage of this method is that differing accounting regimes produce differing accounting figures. These figures can strongly deviate from each other and result in confusion of potential investors. Ease was brought by the German Capital Raising Facilitation Act (*Kapitalaufnahmeerleichterungsgesetz - KapAEG*) of 1998, permitting publicly listed companies to prepare a consolidated financial statement according to international accounting standards (IAS/IFRS or US GAAP) instead of a German GAAP statement until the end of 2004. As a consequence, German companies were allowed to choose between three different accounting regimes during 1998 and 2004.

This diversity was enriched by the Corporate Sector Supervision and Transparency Act (*Gesetz zur Kontrolle und Transparenz im Unternehmensbereich - KonTraG*), passed in 1998. The Act enabled the Federal Ministry of Justice (FMJ) to approve a private organization to set standards. This led to the Standardization Agreement (*Standardisierungsvertrag*) of September 1998 between the Federal Ministry of Justice and the Accounting Standards Committee of Germany (ASCG; *Deutsches Rechnungslegungs Standards Committee e.V.* - DRSC), the German private standard setter. The ASCG is a registered association. Among other things, the ASCG became responsible for elaborating recommendations concerning the application of principles of consolidated financial statements. Structure and mode of operation of the ASCG are roughly comparable to the International Accounting Standards Committee Foundation (IASCF). The German Accounting Standards Board (GASB; *Deutscher Standardisierungsrat* - DSR) is supposed to achieve the committee's chartered goals. Like the International Accounting Standards Board (IASB), the GASB has the responsibility to prepare accounting-related statements like discussion papers or the German Accounting Standards (GAS; *Deutsche Rechnungslegungs Standards* - DRS).

The ASCG faced manifold criticism since its foundation (Sing, 2004). A strongly debated topic is the standards' (missing) binding character, also referred to as 'missing grip' (Küting and Hütten, 1999). This is a crucial point to the investigation and needs to be considered from a legal perspective. Sometimes, the terms "norm" (Biener, 1996) or “qualified norm” (Beisse, 1999) were used in connection with the GAS. These terms are not to be interpreted in a legal understanding (Paal, 2001). A GAS adopted from the committee does not deploy a binding character. Rather, a GAS has the characteristic of a recommendation. It becomes binding only after the Federal Ministry of Justice promulgates the standards. Consolidated financial statements that comply with promulgated GAS are subject to the *assumption* of being in line with rules of orderly bookkeeping (*Grundsätze ordnungsmäßiger Buchführung* - *GoB*) as implied by para. 342 sect. 2 HGB. The necessity to promulgate the standards first is also referred to as “co-operative solution” (Pellens, Bonse and Gassen, 1998).

Nevertheless, even after promulgation by the Federal Ministry of Justice, the necessity to comply with GAS needs further assessment. It is widely accepted that promulgation by the FMJ implies a GAS to be in line with current legislation. This is not only stipulated by the Standardization Agreement (DRSC, 1998), but is also an accepted perception in the literature (Beisse, 1999). However, complying with the standards leads to the *assumption* of being in line with rules of orderly bookkeeping. The GAS do not have the same authority as laws or ordinances (Ernst, 1998). This is because in the context of constitutional law, legislation is only incumbent on the legislator (art. 20 sect. 2 sent. 1, art. 70 Basic Law for the Federal Republic of Germany). The legislator is allowed to delegate this task under very restrictive conditions. Since the ASCG has not explicitly been entrusted with this task, the standards are not enacted (Budde and Steuber, 1998; Förschle, 2006).

Still, the implications of the word *assumption* remain unclear. Especially in the early stages of the committee, some authors perceived para 342 sect. 2 HGB to be a legal presumption (*Rechtsvermutung;* Paal, 2001). However, the circumstance that a financial statement is in line with current regulations cannot be assumed. This circumstance needs legal assessment (Hommelhoff and Schwab, 1998). Proponents of this perception argue that the assumption does not relate to a matter of fact but to a behavior. Complying with GAS (behavior) leads to a financial statement that is in line with rules of orderly bookkeeping (legal consequence). But whether that financial statement fulfills legal requirements needs ultimate clarification by legal assessment (Hellermann, 2000). The consequence for any individual case is that this assessment remains within the scope of courts. Thus, a consolidated financial statement prepared in compliance with GAS should prove to be useful in the case of a legal dispute when facing a court (Spannheimer, 2000; Hommelhoff and Schwab, 2002). I follow the perception that the legislator wanted to achieve a factual enforcement of the standards without a legal necessity to comply with the GAS (Spannheimer, 2000). Hence, complying with GAS leads to the assumption that the consolidated financial statement is in line with rules of orderly bookkeeping, but non-compliance does not result in direct legal penalties (Hütten and Brakensiek, 2000).

Summarizing, the described setting features the particularity that firms following German GAAP were also required to comply with an additional set of accounting standards: the GAS. The GAS have the purpose to enhance the quality of consolidated financial statements. Since no direct legal penalties are associated with non-compliance, following the GAS can be considered voluntary. In this respect, it offers a quasi-experimental setting that allows an investigation on what drives voluntary compliance with an additional set of accounting standards.

2.2.2 Investigated German Accounting Standards

German Accounting Standards predominantly deal with aspects of German consolidated financial statements. GAS often relate to cases where uniform accounting practice is not stipulated either because of the existence of rule-based options or because existing rules are not explicit. I hand-collected data on compliance with GAS 2, GAS 3, GAS 4 and GAS 14. The standards are presented subsequently.

GAS 2: Cash flow statements

Before 1998, a cash flow statement was not a mandatory part of a German GAAP consolidated financial statement. Because of missing regulations, the Accounting and Auditing Board (*Hauptfachausschuss* - HFA)[2] together with a working group of the Schmalenbach Society (*Schmalenbach-Gesellschaft für Betriebswirtschaft e.V.*) created a pronouncement on how to prepare cash flow statements (HFA, 1995). Overall, this pronouncement was very close to SFAS 95 and IAS 7. When the KonTraG was passed, para. 297 sect. 1 sent. 2 HGB was modified, making cash flow statements a mandatory part of consolidated financial statements for publicly listed companies. German GAAP does not state any specifications with regard to content or form. Because of this, GAS 2 features guidelines on how to prepare a cash flow statement. GAS 2 is closely related to the guidelines published by the HFA. Particularly, it requires the cash flow statement to be aligned in vertical format, asks for minimum classification requirements and distinguishes between cash flows from operating activities, investing activities and financing activities. Overall, GAS 2 demands more standardized disclosure but does not impose existing rule-based options.

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[2] The Accounting and Auditing Board is a permanent board of the Institute of Public Auditors in Germany, Incorporated Association (*Institut der Wirtschaftsprüfer in Deutschland e.V.* - IDW). The institute fulfills several tasks related to the profession of auditing, among other, developing pronouncements to accounting-related topics.

GAS 3: Segment reporting

Like cash flow statements, segment reports became a mandatory part of consolidated financial statements in 1998. Similar to cash flow statements, German GAAP provides no specifications concerning the structure of a segment report. These specifications are provided by GAS 3. The standard can be seen as a mixture of IAS 14 and SFAS 131 with some additional requirements. Segments are identified by the management approach. GAS 3 requires disclosure with respect to how segments are identified, segment descriptions, balance sheet numbers and income numbers like revenues, assets or liabilities. It is notable that GAS 3 exceeds the international regulations in some aspects. Unlike IAS 14, GAS 3 requires to disclose business with dominant clients or details with respect to confinement of segments. Similar to GAS 2, compliance with GAS 3 does not restrict rule-based options but gives guidelines on disclosure. Certainly, GAS 3 is more restrictive than mere compliance with German GAAP as it might result in disclosure of sensible data to competitors.

GAS 4: Acquisition accounting in consolidated financial statements

GAS 4 deals with acquisition accounting. It provides a more detailed guideline and restricts some of the rule-based options offered by German GAAP. With regard to initial consolidation of a subsidiary, GAS 4 mandates that it shall be carried out as of the date of acquisition of the subsidiary. German GAAP also allows later points in time for initial consolidation of subsidiaries (para. 301 sect. 2 HGB; GAS 4.7; GAS 4.9). Of particular interest is GAS 4 with regard to the consolidation method. The standard mandates the fair value purchase method and abolishes the possibility of using the book value method. The book value method is popular among German companies since more hidden reserves are disclosed as compared to using the fair value purchase method

(Gebhardt and Heilmann, 2004b). Finally, GAS 4 mandates to recognize the goodwill as an asset that needs to be amortized over its expected useful life. This limits the possibility to offset the goodwill against retained earnings, which is income neutral and very popular among German firms (Krämling, 1998).

GAS 14: Foreign Currency Translation

German GAAP requires consolidated financial statements to be disclosed in Euro, but it does not specify how statements in a foreign currency are to be translated. Over the years, numerous possible methods were discussed. The HFA announcement of 1998 proposed the use of the current/closing rate method and the temporal principal of translation depending on the economic situation of the subsidiary (HFA, 1998). Prior results show that the use of the latter method is unpopular among German companies, which is interpreted as unwillingness to perform the more complex temporal principal of translation (Gelhausen and Mujkanovic, 1995; Littkemann and Moedebeck, 2000). GAS 14 requires companies to translate foreign accounting records according to the concept of functional currency. As a consequence, companies first have to assess whether the current/closing rate method or the temporal principal of translation is appropriate for translation. Overall, GAS 14 is very close to the HFA announcement. GAS 14 restricts the use of the current/closing rate method which is favored by German companies.

Expectations on compliance

I expect different degrees of compliance because some of the standards cover broader aspects like disclosure requirements, while other standards restrict popular rule-based options offered by German GAAP. I expect compliance with GAS 2 and GAS 3 to be higher than with GAS 4 and GAS 14. Evidence of Gebhardt and Heilmann (2004a; 2004b) supports these expectations. Gebhardt and Heilmann (2004b) investigate compliance with GAS 4 in the years 2001 (75 companies) and 2002 (53 companies). They do not only find low compliance with GAS 4, but even observe companies applying GAS while explicitly ignoring GAS 4. They also report compliance with GAS 2 and GAS 3, which is significantly higher.

2.3 Prior findings and hypotheses development

As of my knowledge, there is no prior literature on determinants of compliance with GAS. The German setting between 1998 and 2004 is somewhat unique. I see strong similarities to voluntary disclosure, voluntary adoption of international accounting standards and compliance with international accounting standards. Consequently, I draw on prior findings of these literature streams in order to assess compliance benefits. I add to prior findings by addressing effects of public exposure and compliance pressure.

An influence of public exposure and compliance pressure on disclosure and compliance can be particularly expected from the view point of legitimacy theory. Under the legitimacy theory, a firm's management is responsive to community expectations (Patten, 1991). For a firm to be legitimate, its actions need to be congruent within a social system of "norms, values, beliefs and definitions" (Suchman, 1995). According to Maurer (1971) "legitimation is the process whereby an organization justifies to a peer or superordinate system its right to exist". Consequently, a firm will take actions that are accepted within the community that the firm is a part of. Applied to corporate disclosure, especially the annual report may give account on whether the management fulfills community expectations (Wilmshurst and Frost, 2000). Following this line of arguments, the need to legitimize actions should be higher for firms that are more publicly exposed to a community or when peers take measures that are accepted by the community. Subsequently, I present the measures that are used to capture public exposure and compliance pressure.

Public exposure

I hypothesize that public exposure positively influences compliance with GAS. Public exposure is difficult to pinpoint and not necessarily captured by size. Large companies can stay unnoticed because they operate as suppliers, while small companies might be popular for special products. Also, companies of certain industries are more exposed because of their operating activities. For example, the interest in chemical or utility companies is strong due to their environmental actions or pricing behavior. Earlier studies draw on media coverage to measure public pressures (e.g. Neu, Warsame and Pedwell, 1998; Cormier, Magnan and van Velthoven, 2005). I follow prior literature in this approach by drawing on a firm's coverage in the German press. I use LexisNexis to find the number of articles related to a firm. I also propose an alternative approach to measure public exposure. Press coverage might be biased as a measure for public exposure. Bias might result from a disproportionate share of business-related press. Larger companies have more business-related news, a circumstance that might bias media coverage towards larger companies. This is part of public exposure but ignores other factors e.g. that some companies interact more with customers and clients, or that public interest is stronger for some companies than for others. Because of this, I propose to capture public exposure by the number of produced hits of a search request on the search engine Google. I see this measure to be more advantageous with regard to the aforementioned shortcoming because a search query encapsulates hits to business-related topics but for example also finds company profiles, job advertisements or product presentations on websites. This method also comes with a disadvantage. Unfortunately, I do not have

Google hits as of the end of the considered observation year. Hence, I draw on search results as of the year 2008. In this respect, I assume that public exposure is relatively stable over time.

Compliance pressure

The findings of Solomon and Lewis (2002) suggest that peer pressure influences company behavior in terms of corporate disclosure. From another perspective, Gleason, Jenkins and Johnson (2008) show that investors reassess financial statements within one industry, when a firm of that industry restates its financial statement. This finding implies that managers should be well aware of corporate decisions made by their competitors. I use the setting at hand to investigate whether peer pressure induces compliance with GAS. I expect that a non-compliant company which belongs to an industry with numerous compliers is faced by compliance pressure in order to show that its financial statements are at least prepared using the same quality standards as those used by its competitors.

Compliance pressure might also be exerted by affiliations to a group. The ASCG is a registered association. Individuals that are qualified in the area of accounting can apply for membership in the association. Membership is also possible for firms under certain circumstances. Audit firms are found in the membership list, as well. I assess whether the circumstance that the auditor is a member of the ASCG is associated with GAS compliance.

Size

Prior results indicate a positive relationship between voluntary disclosure or voluntary adoption of international accounting standards and size (e.g. Meek, Roberts and Gray, 1995; Ashbaugh, 2001; Cuijpers and Buijink, 2005). It remains unclear, which mechanism is behind the disclosure and size relationship. The following explanations are considered in the literature: Disclosure is costly. Bigger firms are believed to have lower information production costs, benefiting from distributing fix costs associated with disclosure to more pieces of information (Firth, 1979). Also, big companies might have lower costs of competitive disadvantage associated with disclosure of sensitive information (Meek, Roberts and Gray, 1995). Another reason for expecting a positive relation between size and disclosure may root in a relationship between size and political costs (Watts and Zimmerman, 1986). Accordingly, bigger firms are under higher observation from the government, regulatory agencies or private sector interest groups like labor unions. Hence, I expect a positive relationship between size and GAS compliance.

Growth opportunity

Smith and Watts (1992) argue that information asymmetry and agency costs are higher for growth firms since managers have more knowledge about the firm’s investment opportunities and of expected future cash flows. Hence, in the presence of growth opportunities, firms might increase their disclosure in order to overcome information asymmetries. This argument is especially prone for voluntary disclosure since mandated disclosure might not be sufficiently suitable in order to provide enough quality for the recipients of accounting information (Core, 2001). On the other hand, Glaum and Street (2003) argue that growth opportunities might have a negative impact on compliance with disclosure requirements due to more merger and acquisition activities which might challenge a firm’s accounting practice. Due to the contradicting explanations, I do not make predictions regarding its effect on compliance with GAS.

Risk

In the presence of more information asymmetries, the valuation of riskier firms is considered to be more difficult for investors. In this respect, investors might incorporate the probability that a firm withholds unfavorable information that might be relevant for the valuation of a firm or the consideration of a firm's default risk (Sengupta, 1998). In order to overcome valuation difficulties, investors are expected to collect more information, which is costly (Cormier, Magnan and van Velthoven, 2005). Firms can mitigate these costs by providing more disclosure. Compliance with GAS is subject to this argument in two ways. First, compliance with GAS is often associated with increased disclosure. Second, compliance is associated with the establishment of more standardized disclosure that is easier to process. For both reasons, I expect that compliance is positively associated with more risky firms.

Financing needs

A firm's financing needs have been associated with disclosure. Firms that have financing needs exceeding their internal resources might suffer from a shortage of external funding due to the existence of asymmetric information between the firm and investors (Petersen and Rajan, 1994). The asymmetric information is caused by the opacity of a firm. The willingness of investors to invest into a firm is higher when there is more transparency which reduces the danger of adverse selection. This may be particularly relevant for voluntary disclosure since mandated disclosure might not suffice to overcome asymmetric information (Hyytinen and Pajarinen, 2005). A positive association between financing needs and disclosure is documented by Frankel, McNichols and Wilson (1995). Such a relationship is also conceivable in the setting at hand for several reasons. First, GAS have been designed to guarantee or increase disclosure quality. Consequently, compliance could convey decision-useful information. Second, compliance could be interpreted as signal that the firm is rule-abiding and consequently, trustworthy. Hence, I expect a positive relationship between compliance and financing needs.

Debt agency problems

Prior literature investigated the effect of higher debt agency problems on disclosure. The general idea is that increased corporate disclosure allows creditors an easier assessment of a firm's ability to pay back its debt and whether firms violate debt covenants (Smith and Warner, 1979; Jaggi and Low, 2000). Typically, debt agency problems are measured by leverage (Chow and Wong-Boren, 1987; Meek, Roberts and Gray, 1995; Raffournier, 1995). While there is agreement that higher debt concentration implies higher agency costs of debt, there is no consensus whether this implies higher or lower disclosure (compare e.g. Chow and Wong-Boren, 1987; Eng and Mak, 2003). Higher disclosure would stem from more information especially relating to debt covenants. On the other hand, Zarzeski (1996) argues that companies with a high leverage in bank-oriented countries have a lower need to disclose information because banks are insiders to the company, possessing other means of obtaining information. Since theory and empirical evidence are mixed, I make no predictions between compliance and debt agency problems.

International activities

With an ongoing internationalization of business, companies are faced by an increased demand for information by foreign stake- and shareholders. This may be the case even without a listing on foreign stock exchanges but because international operations are associated with a higher visibility by customers, suppliers or local authorities (Dumontier and Raffournier, 1998). For example, Raffournier (1995) documents a positive relationship between international activity and disclosure for Swiss firms. Dumontier and Raffournier (1998) find a positive relation between voluntary compliance with IAS and international activities. While the GAS aim to make German accounting more comparable and compatible with international standards, it seems reasonable that firms that are really inclined to reach out to international investors would rather choose to adopt international standards. Because of this, I interpret compliance with GAS mainly as communication with domestic shareholders. As a consequence, I make no predictions on the relationship of adopting GAS 2. I expect a positive relationship between international activities and GAS 3 because multi-national companies have a higher need to communicate their national and international activities.

Profitability

The disclosure literature argues that profitable companies would want to be recognized in order to attract potential investors. On the other hand, high disclosure might bear costs in form of loss of competitive advantages or bargaining power (Admati and Pfleiderer, 2000). Empirical results on the relationship between profitability and voluntary disclosure are mixed. Singhvi and Desai (1971) and Wallace and Naser (1995) find a positive impact on disclosure. Meek, Roberts and Gray (1995) do not find such a relationship. Dumontier and Raffournier (1998) find no such relationship for IAS compliance. Also, Cormier, Magnan and van Velthoven (2005) do not find a relationship between firm performance and environmental disclosure. It is important to note that the studies investigate the impact on different aspects of disclosure. In the light of contradicting theoretical explanations and empirical evidence, no prediction between compliance and profitability is made. Within the course of the investigation, I am not concerned about tax considerations, since consolidated financial statements are not used as a tax base in Germany.

Ownership

The structure of ownership is discussed in association with disclosure since it influences the level of monitoring and hereby the level of disclosure. Generally, the interests between managers and shareholders are not aligned since managers have incentives to consume perks or reduce work effort (Jensen and Meckling, 1976). This holds true especially when managerial ownership is low. If shareholders anticipate such disadvantageous behavior, they will transfer the expected costs to the managers. High stock ownership concentration should decrease the need for disclosure because of direct proximity to the company enabling an easier access to information. Consequently, if ownership is more disperse, high disclosure can be an instrument to reassure shareholders that management acts in favor of the shareholders. Following Cuijpers and Buijink (2005), I expect a negative relationship between compliance and stock ownership concentration.

Complexity

More complex firms might be more difficult to be analyzed by investors (Nagar, Nanda and Wysocki, 2003). Consequently, more complex firms are more likely to benefit from increased disclosure. While this argument is valid in the preparation of cash flow statements, it should especially hold true for requirements dealing with segment reporting. Accordingly, I expect a positive relationship with compliance.

Listing status

Several studies consider the effect of listing and filing requirements on disclosure or adoption of accounting standards. Because the institutional settings and/or the variables of interest differ in the studies, different measures for listing status are used. For example, El-Gazzar, Finn and Jacob (1999) and Ashbaugh (2001) draw on the number of foreign stock exchange listings, while Cuijpers and Buijink (2005) distinguish between EU and non-EU listings to proxy for international exposure. On the other hand, Cooke (1989) is interested in differences of non-listed and listed companies in voluntary disclosure in Sweden. As I only consider listed companies, a distinction between listed and not listed companies is irrelevant. Because I consider the use of GAS primarily as a communication instrument with domestic stakeholders, I measure whether the company is part of one of the selection indices (1) DAX (blue-chips), (2) MDAX (mid caps) and (3) SDAX (small caps) within the Frankfurt Stock Exchange, operated by *Deutsche Börse*. Being listed in one of these selection indices is associated with restrictions to size and market capitalization as well as higher disclosure requirements. Also, members of the selection indices compete for investors, which induces a need to produce high quality accounting disclosure. As a consequence, I expect a positive relationship between a listing in the selection indices and GAS compliance. This is in line with prior findings, e.g. Cooke (1989), Dumontier and Raffournier (1998) or Street and Bryant (2000). I also control for foreign listings but since I perceive compliance with GAS mainly as relevant for domestic investors, I make no prediction regarding the sign.

Auditor

Prior literature posits a possible relationship between the auditor and the client's policy regarding corporate disclosure or compliance with accounting standards. Particularly, large audit firms are believed to encourage a higher level of disclosure or compliance. The IAS/IFRS literature stream argues that large firm auditors have the possibility to access a broader range of knowledge and have superior training concerning international accounting standards, which positively influences compliance. Dumontier and Raffournier (1998) find no such relationship, while Street and Gray (2001) find a significantly positive relationship between audit firm size and IAS/IFRS compliance. There is no reason to believe that the former argument should hold for the national setting at hand.

Another argument is related to reputation. Large audit firms are believed to make their clients comply with disclosure or accounting requirements in order to demonstrate their independence. Independence is considered as an important factor constituting reputation (Watts and Zimmerman, 1986). Empirical evidence on this matter is mixed. For example, Singhvi and Desai (1971) and Raffournier (1995) find a positive relationship, Hossain, Perera and Rahman (1995) find no relationship while Wallace and Naser (1995) find a negative relationship. It is important to note that these studies are subject to different institutional settings, definitions of big audit firms (Big 8 vs. Big 6) and dependent variables. I expect a positive relationship with GAS compliance for different reasons. First, GAS were designed to harmonize German GAAP and international standards of supposed higher quality. If the reputation argument holds, this should work towards compliance. Second, auditors might want their clients to comply with standards, which are closer to international standards with regard to mandatory use of IAS/IFRS after 2004. Third, while usage of GAS is not mandatory, in cases of legal disputes, a statement adhering to GAS might still be of advantage.

Industry

The disclosure literature argues that membership to a certain industry might affect disclosure due to proprietary costs (Verrecchia, 1983). On the one hand, disclosure of certain pieces of information can be more important in one industry than in another. On the other hand, firms in some industries might prefer not to share sensitive information with their competitors. For example, Meek, Roberts and Gray (1995) find evidence that companies of the oil, chemicals and mining industry provide more non-financial information than other industries. In order to control for industry effects, I include industry fixed effects.

3 Empirical analyses

3.1 Sample selection

I derive my sample from the German Worldscope Universe. As displayed in Table 1, GAS 2 and GAS 3 were adopted and became effective for business years starting 1999. The standards were promulgated in 2000 by the FMJ. In order to avoid differences between those standards that were only adopted by the ASCG and those standards, which were promulgated by the FMJ, I choose the year 2000 as starting point for the analysis. Since capital market oriented companies are obliged to prepare IFRS consolidated financial statements for business years starting in 2005, I restrict my investigation period to the end of 2004.

Table 1: Summary of dependent variables

Variable	Name of standard	adopted by ASCG	effective since	promulgated by FMJ
GAS 2	Cash Flow Statements	29.10.1999	01.01.1999	31.05.2000
GAS 3	Segment Reporting	20.12.1999	01.01.1999	31.05.2000
GAS 4	Acquisition Accounting in Consolidated Financial Statements	29.08.2000	01.01.2001	30.12.2000
GAS 14	Foreign Currency Translation	25.08.2003	01.01.2004	04.06.2004

In a first step, I identify firms that are covered by Worldscope during 2000 and 2004 by their ISIN. From these observations, I delete financial companies (leading digit of SIC code equals 6) since these firms need to apply special GAS. Drawing on the Worldscope item "Accounting Standards Followed" (WC07536), I delete firms that do not follow German GAAP. From these remaining firms, I delete firms that are not obligated to prepare a consolidated financial statement either because they do not fulfill the German GAAP criteria of a group or the parent company is exempted in accordance with German GAAP.[3] Next, I delete all observations, where the financial statement could not be obtained (i.e. no statement to download, no reply on request or insolvency). Finally, I delete all observations that are not available in five consecutive years. The final sample consists of 405 firm-year observations of 81 unique firms. The sample selection process is displayed in Table 2.

Table 2: Sample selection

	Action	**Observations**
Worldscope Universe 2000 - 2004		**4,478**
minus: financial companies	-1,038	3,440
minus: non German-GAAP companies	-1,901	1,539
minus: companies not preparing a consolidated statement	-190	1,349
minus: statements could not be obtained	-671	678
minus: relevant variables were missing	-15	663
minus: observations for 5 consecutive years not available	-258	405
Final Sample		**405**

In comparison, Burger, Fröhlich and Ulbrich (2006) identify 736 German capital market oriented firms with an obligation to prepare a consolidated financial statement, from which 247 prepared their statement according to German GAAP in 2004. Limiting a comparison to the year 2004, I capture approximately 32.8% of potential GAS appliers.

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[3] For example, German GAAP offers exemptions if certain size criteria are not exceeded (para 293 HGB).

Table 3 shows the distribution of the sample firms by industry. The industry classification bases on the SIC division structure. The majority of the sample firms belong to the manufacturing industry.

Table 3: Distribution of sample firms by industry group (n=81)

Industry group	**n**	**%**
Division A: Agriculture, Forestry, And Fishing	0	0.00%
Division B: Mining	2	2.47%
Division C: Construction	1	1.23%
Division D: Manufacturing	44	54.32%
Division E: Transportation, Communications, Electric, Gas, And Sanitary Services	6	7.41%
Division F: Wholesale Trade	9	11.11%
Division G: Retail Trade	6	7.41%
Division H: Finance, Insurance, And Real Estate	*0*	*0.00%*
Division I: Services	13	16.05%
Division J: Public Administration	0	0.00%
Total	**81**	**100.00%**

Notes:
Industry classification bases on the SIC division structure. No firm belongs to Division H since all Finance, Insurance and Real Estate firms were deleted from the sample.

3.2 Empirical measures

3.2.1 Compliance with GAS in the sample

I first assess compliance with the respective standards. Results are summarized in Table 4. Notably, the number of firms complying with GAS 4 and GAS 14 is considerably low. Only one firm (1.23%) complies with GAS 4 and only nine firms (14.06%) out of 64 possible appliers comply with GAS 14. The number of GAS 14 compliers and non-compliers does not sum up to 81 because not every firm has foreign subsidiaries. Compared to GAS 2 and GAS 3, a clear difference in the willingness to comply with the more costly standards becomes apparent. Since the number of firms complying with GAS 4 and GAS 14 is too low and does not exhibit enough variation, performing regression analyses is not feasible. Hence I restrict my investigation to GAS 2 and GAS 3.

Table 4: GAS compliance (n=405; 81 distinct firms)

	GAS 2		**GAS 3**		**GAS 4**		**GAS 14**	
Year	**non-compliers**	**compliers**	**non-compliers**	**compliers**	**non-compliers**	**compliers**	**non-compliers**	**compliers**
2000	64	17	67	14	n.a.	n.a.	n.a.	n.a.
2001	63	18	61	20	80	1	n.a.	n.a.
2002	57	24	55	26	80	1	n.a.	n.a.
2003	56	25	58	23	80	1	n.a.	n.a.
2004	54	27	57	24	80	1	55	9
Σ	**294**	**111**	**298**	**107**	**320**	**4**	**55**	**9**

In the year 2000, 17 firms (20.99%) comply with GAS 2. At the end of 2004, the number of compliant firms amounts to 27 (33.33%). Likewise, 14 firms (17.28%) comply with GAS 3 in the year 2000, while the number of compliant firms increases to 24 (29.63%) at the end of 2004. This positive trend indicates an increasing importance of GAS compliance within the sample. Yet, the circumstance that the positive trend is limited to GAS 2 and GAS 3 indicates that the standards are differently accepted by the firms or that compliance with the standards is used to fulfill different purposes.

3.2.2 Main variables: Public exposure and compliance pressure

I capture public exposure by two measures since I am especially interested in the relationship between a firm's public exposure and compliance. First, I measure press coverage. In doing so, I collect the number of articles related to a company from January 1 until December 31 of the respective year in the German press. I draw on the database LexisNexis to retrieve this data. Second, I capture public exposure by the number of produced hits of a search request on the search engine Google. In both cases, I use the same query string: a firm's official name including the abbreviated legal form (i.e. AG, KGaA, SE). Including the abbreviated legal form prevents that the number of produced hits is inflated if the firm name has meanings that are used in another context. For example a search for *Brilliant* instead of *Brilliant AG* might also refer to the adjective brilliant, places in the USA and Canada or to several other meanings.

In order to capture peer pressure, I draw on the pressure imposed by compliant companies in the same industry. The variable accounts for all companies that comply with the considered GAS within the same industry as the considered company. Inclusion in an industry is measured by the SIC division structure. The calculation is as follows:

$$GASPEER_j = \frac{AVGGAS_i * n_i - GAS_j}{n_i - 1},$$

where GASPEER is the peer pressure for the company *j*, AVGGAS is the average compliance with the considered standard in the industry *i* including the effect of the company *j* under study and *n* is the number of companies in the industry *i*, GAS is an indicator variable which is 1 if the company *j* complies with the considered standard. GASPEER takes the value 0, if the number of companies in an industry is one or if no company complies with the respective standard in the industry. This approach accounts for the pressure induced by the considered company.

Finally, I measure whether compliance is associated with being audited by an audit firm that is a member of the ASCG. Because the BIG4 audit firms are all members of the ASCG, the dummy variable ASCGMEM is one if the audit firm is a member but not a BIG4 audit firm to avoid multicollinearity.

3.2.3 Control variables

I include controls for size, growth opportunity, risk, financing needs, debt agency problems, international operations, profitability, ownership concentration, complexity, listing status, auditor and industry into my analysis. A summary of the independent variables including a description can be found in Table 5.

Table 5: Summary of independent variables

Variable	Proxy for	Description (Source)
MKTCAP	Size	Natural logarithm of a firm's market capitalization (Worldscope)
GOOGLE	Public Exposure	Natural logarithm of the number of produced hits of a search request on the search engine Google using a firm's official name including legal form (www.google.de)
PRESS	Public Exposure	Natural logarithm of the number of articles found searching for a firm's official name including legal form (LexisNexis)
GAS2PEER	Compliance Pressure	Self-constructed variable measuring the degree of GAS 2 use in the industry
GAS3PEER	Compliance Pressure	Self-constructed variable measuring the degree of GAS 3 use in the industry
ASCGMEM	Compliance Pressure	Indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG but is not a BIG4 audit firm (hand-collected)
TQ	Growth opportunity	Market value of the equity at the end of the year plus the difference between the book value of assets and the book value of equity at the end of the year, divided by the book value of the assets at the end of the year (Worldscope)
BETA	Risk	Measure of risk capturing the relationship between the volatility of the stock and the volatility of the market (Worldscope)
FINANCE	Financing needs	Net cash flow from financing activities to total assets (Worldscope)
LEV	Debt agency problems	Total debt to total assets (Worldscope)
%FORSALES	International operations	Foreign sales to sales (Worldscope)
ROA	Profitability	EBIT to averaged total assets (Worldscope)
CLSHELD	Ownership structure	Closely held shares to common shares outstanding (Worldscope)

SEG	Complexity	Number of product segments (Worldscope)
LISTING	Listing Status	Indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse at December 31 of the considered year (Deutsche Börse)
FORLISTING	Listing Status	Indicator variable taking the value 1 if a firm has a foreign listing (Worldscope)
BIG4	Auditor	Indicator variable taking the value 1 if a company is audited by one of the BIG4 audit firms (hand-collected)
Industry dummies	Industry	Industry classification based on the SIC division structure (Worldscope)

3.3 Research design

I checked every annual statement on compliance with the respective German Accounting Standard. Compliance was coded with 1, non-compliance with 0. A company stating to generally comply with GAS was considered as a complier. Generally, I assume that a firm stating to comply with GAS fulfills the requirements of the respective standard. This assumption is prone to two problems. First, it is conceivable that a firm complies with GAS but does not report so. Second, a firm might report to comply with GAS without actually fulfilling the necessary requirements. In this respect, I capture the probability that a firm reports to comply with GAS. With regard to my variables of interest, this is exactly the event I am interested in. I do not have enough compliant observations to perform regressions on GAS 4 and GAS 14 (compare 3.2.1). Consequently, I restrict my analysis to GAS 2 and GAS 3.

In order to assess the determinants of compliance with GAS, I follow earlier work on voluntary adoption of accounting standards and make use of logistic regression models (e.g. Cuijpers and Buijink, 2005; Gassen and Sellhorn, 2006). Basically, a logistic regression captures with which probability an event occurs. In a first step, compliance is assessed by an ordered logistic regression. I order compliance into three categories. Compliance with neither of the two standards constitutes the first and lowest category. Two compliance incidences are conceivable for the second category. First, a firm complies with GAS 2 but not with GAS 3. Second, a firm complies with GAS 3 but not with GAS 2. I see no qualitative difference between these two incidences. Consequently, both incidences can be found in the second category. Compliance with both standards constitutes the third and highest category. In a second step, I assess what drives compliance with GAS 2 and GAS 3 in separate logistic regressions in order to test what drives compliance with the respective standards.

One of the issues within the investigation is to disentangle public exposure from the control for size. To address this concern, I specify five different models. I estimate models with and without proxy variables for public exposure. In the first three models, I assess the association between compliance and (a) size, (b) public exposure as measured by the Google hits and (c) public exposure as measured by press coverage. In the model (a)+(b) I include size and Google hits and in the model (a)+(c) I include size and press coverage. The last two models are used in order to capture whether one measure is more suitable to explain compliance while controlling for the other at the same time.

The full model specification of the ordered logistic regression is as follows:

$$\begin{aligned} P(GAS) = \beta_0 &+ \beta_1 MKTCAP + \beta_2 PublicExposure + \beta_3 ASCGMEM \\ &+ \beta_4 TQ + \beta_5 BETA + \beta_6 FINANCE + \beta_7 LEV + \beta_8 \%FORSALES + \beta_9 ROA \\ &+ \beta_{10} CLSHELD + \beta_{11} SEG + \beta_{12} LISTING + \beta_{13} FORLISTING + \beta_{14} BIG4 \\ &+ industriedummies + yeardummies \end{aligned}$$

where GAS takes the value 3 for the lowest ranked category, the value 2 for the middle ranked category and the value 1 for the highest ranked category.

The full model specification of the logistic regressions is as follows:

$$\begin{aligned} P(GAS) = {} & \beta_0 + \beta_1 MKTCAP + \beta_2 PublicExposure + \beta_3 GASPEER + \beta_4 ASCGMEM \\ & + \beta_5 TQ + \beta_6 BETA + \beta_7 FINANCE + \beta_8 LEV + \beta_9 \%FORSALES + \beta_{10} ROA \\ & + \beta_{11} CLSHELD + \beta_{12} SEG + \beta_{13} LISTING + \beta_{14} FORLISTING + \beta_{15} BIG4 \\ & + yeardummies \end{aligned}$$

where GAS is an indicator variable taking the value 1, if the company states to comply with the considered standard, MKTCAP is the natural logarithm of a firm's market capitalization (Worldscope), *PublicExposure* is either GOOGLE, which is the natural logarithm of the number of produced hits of a search request on the search engine Google using a firm's official name including legal form (www.google.de) or PRESS, which is the natural logarithm of the number of articles found searching for a firm's official name including legal form (LexisNexis), GASPEER is a self constructed variable capturing peer pressure within an industry (calculation described above), ASCGMEM is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG but is not a BIG4 audit firm (hand-collected), TQ is market value of the equity at the end of the year plus the difference between the book value of assets and the book value of equity at the end of the year, divided by the book value of the assets at the end of the year (Worldscope), BETA is a measure of risk capturing the relationship between the volatility of the stock and the volatility of the market (Worldscope), FINANCE is net cash flow from financing activities to total assets (Worldscope), LEV is total debt to total assets (Worldscope), %FORSALES is foreign sales to sales (Worldscope), ROA is EBIT to average total assets (Worldscope), CLSHELD is closely held shares to common shares outstanding (Worldscope), SEG is the number of product segments (Worldscope), LISTING is an indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse at December 31 of the considered year (Deutsche Börse), FORLISTING is an indicator variable taking the value 1 if a firm has a foreign listing and BIG4 is an indicator variable taking the value 1 if a firm is audited by one of the BIG4 audit firms (hand-collected).

The research design at hand offers several advantages. I draw on cross-section data where the same firms are observed over time. As pointed out by Inchausti (1997) in a roughly comparable setting, this captures variation across different individuals and over time, increasing degrees of freedom and improving the efficiency of econometric estimates. In order to mitigate problems arising from general time trends, I include year fixed effects into the regressions. Observing the same firms for more than two years introduces the risk of serial correlation. The effect becomes stronger for longer time periods. This can result in biased standard errors that can ultimately lead to wrong test inferences. In order to address this concern, I cluster the standard errors over the firm (Kézdi, 2004; Petersen, 2009).

Table 6 shows correlations between the dependent and independent variables. The correlations among the size proxies and among the public exposure proxies are very high. This indicates possible multicollinearity problems in the model specifications (a)+(b) and (a)+(c). I address this concern within the empirical analyses. Descriptive statistics for the full sample are displayed in Table 7. All variables, which are not truncated by definition are winsorized by their 1% and 99% interval.

Table 6: Pearson/Spearman correlations between dependent/independent variables (n=405)

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**	**(17)**	**(18)**	**(19)**	**(20)**
(1) GAS2		**0.322**	**0.193**	**0.199**	**0.207**	**0.107**	**0.154**	**0.173**	**0.145**	0.070	0.029	0.075	**0.132**	0.064	0.042	**-0.090**	**0.168**	**0.108**	0.045	**-0.156**
(2) GAS3	**0.322**		**0.307**	**0.292**	**0.157**	**0.163**	**0.119**	**0.188**	**0.087**	**0.090**	**0.126**	-0.078	**0.184**	0.065	**0.094**	**-0.110**	**0.173**	**0.214**	0.049	0.024
(3) TOTASS	**0.112**	**0.276**		**0.877**	**0.591**	**0.611**	0.012	**0.173**	-0.045	0.043	**0.271**	**-0.094**	**0.140**	**0.185**	**0.258**	**-0.210**	**0.258**	**0.497**	**0.359**	**0.210**
(4) MKTCAP	**0.125**	**0.242**	**0.814**		**0.616**	**0.620**	0.016	**0.186**	0.021	**0.350**	**0.175**	-0.035	**-0.114**	**0.102**	**0.327**	**-0.161**	**0.224**	**0.514**	**0.309**	**0.175**
(5) GOOGLE	**0.166**	**0.094**	**0.473**	**0.504**		**0.673**	0.063	**0.088**	0.001	**0.169**	**0.368**	0.060	-0.050	**0.158**	0.056	**-0.276**	**0.153**	**0.506**	**0.348**	0.076
(6) PRESS	0.068	**0.111**	**0.491**	**0.507**	**0.590**		-0.038	0.011	0.058	**0.268**	**0.228**	0.071	0.037	-0.015	-0.037	**-0.271**	**0.240**	**0.541**	**0.315**	**0.142**
(7) GAS2PEER	-0.056	0.030	-0.007	-0.022	0.031	-0.039		**0.593**	**-0.111**	-0.067	**0.104**	-0.030	**-0.096**	**0.200**	0.061	-0.062	0.000	-0.064	0.027	**0.091**
(8) GAS3PEER	**0.099**	0.073	**0.096**	**0.087**	0.032	-0.030	**0.597**		-0.049	0.043	-0.011	-0.062	-0.074	**0.116**	0.050	0.048	**0.146**	-0.070	0.000	**0.197**
(9) ASCGMEM	**0.145**	**0.087**	-0.004	0.042	0.020	**0.085**	**-0.090**	0.001		**0.115**	**-0.104**	-0.034	**-0.126**	-0.032	**-0.089**	0.029	**0.188**	-0.007	-0.059	**-0.403**
(10) TQ	**0.130**	**0.137**	**0.088**	**0.436**	**0.224**	**0.285**	-0.056	0.076	**0.149**		0.024	**0.152**	-0.051	**-0.113**	0.065	0.079	0.057	**0.247**	-0.012	0.076
(11) BETA	0.018	**0.109**	**0.311**	**0.187**	**0.421**	**0.217**	**0.100**	-0.045	**-0.120**	-0.032		0.048	**0.245**	0.024	0.052	**-0.322**	**0.085**	**0.287**	**0.215**	-0.038
(12) FINANCE	0.047	**-0.088**	-0.040	**-0.082**	0.031	0.052	-0.062	-0.066	-0.031	0.031	-0.002		**0.095**	**-0.097**	**-0.274**	0.009	0.066	0.042	-0.003	-0.078
(13) LEV	**0.127**	**0.156**	**0.153**	**-0.129**	-0.059	0.025	**-0.119**	-0.043	**-0.128**	-0.039	**0.225**	**0.145**		0.080	**-0.095**	-0.055	**0.088**	**0.119**	-0.069	0.003
(14) %FORSALES	0.077	0.056	**0.134**	**0.092**	**0.141**	-0.038	**0.246**	**0.170**	-0.027	**-0.125**	0.058	-0.029	0.060		**0.212**	-0.039	0.040	**0.095**	**0.175**	**0.192**
(15) ROA	0.036	**0.144**	**0.236**	**0.461**	**0.142**	0.017	0.057	0.046	-0.017	**0.272**	**0.105**	**-0.263**	**-0.119**	**0.199**		0.005	**-0.168**	**0.111**	0.032	0.037
(16) CLSHELD	-0.052	**-0.089**	**-0.197**	**-0.104**	**-0.248**	**-0.258**	-0.002	**0.124**	0.039	**0.130**	**-0.351**	0.066	**-0.110**	-0.073	-0.034		**-0.183**	**-0.383**	**-0.273**	0.003
(17) SEG	**0.168**	**0.186**	**0.218**	**0.140**	0.056	**0.154**	-0.051	**0.098**	**0.163**	0.075	**0.084**	0.075	**0.129**	0.056	-0.078	**-0.121**		**0.102**	**0.150**	0.010
(18) LISTING	**0.108**	**0.214**	**0.491**	**0.485**	**0.477**	**0.521**	**-0.165**	**-0.152**	-0.007	**0.196**	**0.284**	0.038	**0.133**	**0.097**	**0.182**	**-0.404**	0.062		**0.252**	0.002
(19) FORLISTING	0.045	0.049	**0.250**	**0.206**	**0.255**	**0.257**	0.030	0.012	-0.059	0.026	**0.214**	-0.002	-0.072	**0.176**	0.015	**-0.223**	**0.094**	**0.252**		**0.147**
(20) BIG4	**-0.156**	0.024	**0.166**	**0.141**	0.029	**0.113**	**0.087**	**0.154**	**-0.403**	0.055	-0.038	-0.045	0.018	**0.189**	0.001	-0.002	0.031	0.002	**0.147**	

Variable definitions (data source):

GAS2 is an indicator variable taking the value 1 if a company states to comply with GAS2 (hand-collected), GAS3 is an indicator variable taking the value 1 if a company states to comply with GAS3 (hand-collected), TOTASS is the natural logarithm of a firm's total assets (Worldscope), MKTCAP is the natural logarithm of a firm's market capitalization (Worldscope), GOOGLE is the natural logarithm of the number of produced hits of a search request on the search engine Google using a firm's official name including legal form (www.google.de), PRESS is the natural logarithm of the number of articles found searching for a firm's official name including legal form (LexisNexis), GAS2PEER is a self-constructed variable measuring the degree of GAS2 use in the industry, GAS3PEER is a self-constructed variable measuring the degree of GAS3 use in the industry, ASCGMEM is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG but is not a BIG4 audit firm (hand-collected), TQ is market value of the equity at the end of the year plus the difference between the book value of assets and the book value of equity at the end of the year, divided by the book value of the assets at the end of the year (Worldscope), BETA is a measure of risk capturing the relationship between the volatility of the stock and the volatility of the market (Worldscope), FINANCE is net cash flow from financing activities to total assets (Worldscope), LEV is total debt to total assets (Worldscope), %FORSALES is foreign sales to sales (Worldscope), ROA is EBIT to averaged total assets (Worldscope), CLSHELD is closely held shares to common shares outstanding (Worldscope), SEG is the number of product segments (Worldscope), LISTING is an indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse at December 31 of the considered year (Deutsche Börse), FORLISTING is an indicator variable taking the value 1 if a firm has a foreign listing (hand-collected), BIG4 is an indicator variable taking the value 1 if a company is audited by one of the BIG4 audit firms (hand-collected).

Pearson (Spearman) correlations are displayed above (below) the diagonal. Bold typeset denotes significant correlations below the 10 % level.

Table 7: Descriptive statistics of the full sample (n=405)

Variable	Mean	Std.dev	Minimum	25th percintile	Median	75th percintile	Maximum
Panel A							
GAS2	0.274	0.447					
GAS2PEER	0.257	0.161	0.000	0.209	0.256	0.326	1.000
GAS3	0.264	0.441					
GAS3PEER	0.237	0.183	0.000	0.140	0.250	0.279	1.000
GAS4 (n=324)	0.012	0.111					
GAS14 (n=64)	0.141	0.350					
Panel B							
TOTASS	2,282.350	14,693.780	3.703	62.389	147.128	369.716	164,280.000
MKTCAP	1,356.750	8,610.690	0.450	15.780	41.895	133.200	97,164.540
GOOGLE	74.094	361.765	1.050	6.120	13.600	33.200	3,200.000
PRESS	117.884	634.963	0.000	5.000	15.000	43.000	6,320.000
ASCGMEM	0.121	0.327					
TQ	1.213	0.490	0.366	0.961	1.124	1.333	5.508
BETA	0.551	0.543	-0.990	0.190	0.460	0.910	1.530
FINANCE	-0.011	0.110	-0.746	-0.054	-0.022	0.016	0.760
LEV	0.284	0.203	0.000	0.108	0.283	0.421	1.000
%FORSALES	0.360	0.281	0.000	0.080	0.357	0.579	0.972
ROA	0.049	0.118	-0.502	0.013	0.066	0.101	0.671
CLSHELD	0.641	0.227	0.000	0.500	0.691	0.820	0.988
SEG	3.262	1.745	1.000	2.000	3.000	4.000	9.000
LISTING	0.232	0.423					
FORLISTING	0.025	0.155					
BIG4	0.541	0.499					

Variable definitions (data source):

GAS is an indicator variable taking the value 1 if a company states to comply with the respective GAS (hand-collected), GASPEER is a self-constructed variable measuring the degree of GAS use in the industry, TOTASS is a firm's total assets in M€ (Worldscope), MKTCAP is a firm's market capitalization in M€ (Worldscope), GOOGLE is the number of produced hits of a search request on the search engine Google using a firm's official name including legal form in thousand (www.google.de), PRESS is the number of articles found searching for a firm's official name including legal form (LexisNexis), ASCGMEM is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG but is not a BIG4 audit firm (hand-collected), TQ is market value of the equity at the end of the year plus the difference between the book value of assets and the book value of equity at the end of the year, BETA is a measure of risk capturing the relationship between the volatility of the stock and the volatility of the market (Worldscope), FINANCE is net cash flow from financing activities to total assets (Worldscope), LEV is total debt to total assets (Worldscope), divided by the book value of the assets at the end of the year (Worldscope), %FORSALES is foreign sales to sales (Worldscope), ROA is EBIT to averaged total assets (Worldscope), CLSHELD is closely held shares to common shares outstanding (Worldscope), SEG is the number of product segments (Worldscope), LISTING is an indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse at December 31 of the considered year (Deutsche Börse), FORLISTING is an indicator variable taking the value 1 if a firm has a foreign listing (hand-collected), BIG4 is an indicator variable taking the value 1 if a company is audited by one of the BIG4 audit firms (hand-collected).

3.4 Empirical Results

3.4.1 Findings on compliance

In this section, I present results of determinants of GAS compliance. After showing results of an ordered logistic regression, I present separate results on compliance with GAS 2 and GAS 3, respectively. For the latter analyses, I present descriptive statistics, univariate results and logistic regression results. When reporting univariate tests, I assess differences in mean and median. However, none of the variables are normally distributed (results of Kolmogorov-Smirnov tests with 1% significance level are not tabulated), indicating that the use of Wilcoxon two-sample tests is more appropriate. Chi-squared tests are used for nominal variables.

German GAAP violation

Before I deal with GAS compliance, I consider firms that did not prepare cash flow statements or segment reports. Since all firms in the sample are required to prepare a consolidated financial statement report, the preparation of both items is mandatory. Consequently, these firms violate German GAAP. However, German GAAP refers to the materiality principle. The main idea behind the principle is that all relevant and important information that is necessary to judge the economic situation of a firm need to be displayed in the financial statement. The materiality principle is further substantiated by cost-effectiveness considerations. The usefulness of the conveyed information is supposed to stand in an appropriate relationship to the invoked costs of conveying them. Since both principles draw on concepts that are not objectively measurable, it is in the management's discretion not to convey certain information. It is hardly possible to reasonably justify not to prepare a cash flow statement. The decision not to prepare a segment report for a firm that operates in only one product segment and only one geographical region might be justified in the light of materiality and cost-effectiveness considerations. In the course of the GAS compliance investigation, I code firms that did not prepare a cash flow statement or a segment report as GAS non-compliers.

A cash flow statement was not prepared in nine cases. The univariate results (Table 8) show that preparing firms (1) are bigger, (2) have more media coverage, (3) are riskier (only t-test), (4) have more debt agency problems, (5) have more international activities, (6) are less closely held, (7) are more complex, (8) are more often listed in one of the selection indices of Deutsche Börse and (9) are more often audited by a BIG4 audit firm.

A segment report was not prepared in 80 cases. The univariate results (Table 9) show that preparing firms (1) are bigger, (2) are more visible as measured by the Google hits, (3) have a higher Tobin’s q, (4) have more international activities, (5) are more profitable (only Wilcoxon test), (6) are more complex, (7) are more often listed in one of the selection indices of Deutsche Börse and (8) are more often audited by a BIG4 audit firm.

Table 8: Descriptive statistics and univariate analysis of determinants of cash flow statement preparation (n=405)

	Cash flow statement=1 (n=396)			Cash flow statement=0 (n=9)							
Variable	**Mean**	**Std.dev**	**Median**	**Mean**	**Std.dev**	**Median**	**Expected sign**	**t-statistic**	**p-value**	**z-statistic**	**p-value**
TOTASS	5.065	1.632	5.012	3.701	1.056	3.550	+	**2.490**	(0.013)	**3.005**	(0.003)
MKTCAP	4.022	1.896	3.763	3.098	0.978	2.751	+	**2.720**	(0.023)	**1.696**	(0.090)
GOOGLE	2.689	1.424	2.614	2.062	0.967	1.740	+	1.310	(0.190)	1.583	(0.114)
PRESS	2.773	1.685	2.708	1.362	2.104	0.000	+	**2.470**	(0.014)	**2.123**	(0.034)
TQ	1.216	0.492	1.125	1.064	0.339	0.916	+/-	0.920	(0.357)	1.473	(0.141)
BETA	0.556	0.547	0.520	0.344	0.316	0.440	+/-	**1.940**	(0.083)	1.187	(0.235)
FINANCE	-0.012	0.111	-0.022	0.007	0.094	-0.003	+/-	-0.510	(0.607)	-0.317	(0.751)
LEV	0.289	0.202	0.287	0.059	0.102	0.009	+/-	**6.490**	(0.000)	**3.417**	(0.001)
%FORSALES	0.365	0.280	0.362	0.137	0.266	0.000	+	**2.430**	(0.016)	**2.564**	(0.010)
ROA	0.050	0.116	0.066	0.041	0.201	0.024	+/-	0.120	(0.907)	0.871	(0.384)
CLSHELD	0.638	0.227	0.679	0.769	0.193	0.779	-	**-1.710**	(0.088)	**-1.914**	(0.056)
SEG	3.293	1.740	3.000	1.889	1.453	1.000	+	**2.400**	(0.017)	**2.551**	(0.011)
LISTING	0.237	0.426		0.000	0.000		+			**2.782**	(0.095)
FORLISTING	0.025	0.157		0.000	0.000		+/-			0.233	(0.629)
BIG4	0.548	0.498		0.222	0.441		+			**3.760**	(0.053)

Variable definitions (data source):

TOTASS is the natural logarithm of a firm's total assets (Worldscope), MKTCAP is the natural logarithm of a firm's market capitalization (Worldscope), GOOGLE is the natural logarithm of the number of produced hits of a search request on the search engine Google using a firm's official name including legal form (www.google.de), PRESS is the natural logarithm of the number of articles found searching for a firm's official name including legal form (LexisNexis), TQ is market value of the equity at the end of the year plus the difference between the book value of assets and the book value of equity at the end of the year, divided by the book value of the assets at the end of the year (Worldscope), BETA is a measure of risk capturing the relationship between the volatility of the stock and the volatility of the market (Worldscope), FINANCE is net cash flow from financing activities to total assets (Worldscope), LEV is total debt to total assets (Worldscope), %FORSALES is foreign sales to sales (Worldscope), ROA is EBIT to average total assets (Worldscope), CLSHELD is closely held shares to common shares outstanding (Worldscope), SEG is the number of product segments (Worldscope), LISTING is an indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse at December 31 of the considered year (Deutsche Börse), FORLISTING is an indicator variable taking the value 1 if a firm has a foreign listing (hand-collected), BIG4 is an indicator variable taking the value 1 if a company is audited by one of the BIG4 audit firms (hand-collected).

The significance of sample differences is assessed by t-tests and Wilcoxon tests for the means and the medians of non-nominal variables and by Chi-squared tests of nominal variables.

Bold typeset denotes significant difference (two-sided) below the 10 % level.

Table 9: Descriptive statistics, univariate analysis and pooled logistic regression of determinants of segment report preparation (n=405)

Panel A

	Segment reporting=1 (n=325)			Segment reporting=0 (n=80)							
Variable	**Mean**	**Std.dev**	**Median**	**Mean**	**Std.dev**	**Median**	**Expected sign**	**t-statistic**	**p-value**	**z-statistic**	**p-value**
TOTASS	5.236	1.673	5.136	4.215	1.148	4.025	+	**6.450**	(0.000)	**5.859**	(0.000)
MKTCAP	4.199	1.942	3.980	3.198	1.377	3.095	+	**5.330**	(0.000)	**4.214**	(0.000)
GOOGLE	2.783	1.424	2.617	2.237	1.313	2.595	+	**3.120**	(0.002)	**2.087**	(0.037)
PRESS	2.801	1.698	2.708	2.504	1.723	2.708	+	1.400	(0.163)	1.077	(0.282)
TQ	1.242	0.523	1.132	1.093	0.297	1.063	+/-	**3.390**	(0.001)	**2.215**	(0.027)
BETA	0.542	0.557	0.460	0.588	0.488	0.540	+/-	-0.670	(0.503)	-0.687	(0.492)
FINANCE	-0.014	0.115	-0.020	0.000	0.089	-0.025	+/-	-1.180	(0.240)	-0.585	(0.558)
LEV	0.288	0.211	0.285	0.268	0.169	0.270	+/-	0.910	(0.362)	0.764	(0.445)
%FORSALES	0.383	0.282	0.372	0.268	0.260	0.238	+	**3.310**	(0.001)	**3.305**	(0.001)
ROA	0.053	0.103	0.068	0.035	0.164	0.054	+/-	0.950	(0.342)	**1.723**	(0.085)
CLSHELD	0.644	0.228	0.694	0.629	0.223	0.685	-	0.520	(0.604)	0.641	(0.521)
SEG	3.508	1.684	3.000	2.263	1.636	1.500	+	**5.960**	(0.000)	**6.307**	(0.000)
LISTING	0.255	0.437	0.000	0.138	0.347	0.000	+			**5.006**	(0.025)
FORLISTING	0.031	0.173	0.000	0.000	0.000	0.000	+/-			2.524	(0.112)
BIG4	0.588	0.493	1.000	0.350	0.480	0.000	+			**14.605**	(0.000)

Panel B

Independent variable	**Expected sign**	**Coefficient**	**p-value**
MKTCAP	+	0.042	(0.794)
TQ	+/-	**0.918**	(0.088)
BETA	+/-	-0.311	(0.255)
FINANCE	+/-	-1.832	(0.207)
LEV	+/-	0.546	(0.520)
%FORSALES	+	**1.353**	(0.057)
ROA	+/-	1.324	(0.500)
CLSHELD	-	0.558	(0.431)
SEG	+	**0.600**	(0.000)
LISTING	+	**0.919**	(0.075)
FORLISTING	+/-	**12.503**	(0.000)
BIG4	+	**0.775**	(0.017)
Year/Industry		yes/yes	
Likelihood ratio χ^2		**262.927**	(0.000)
Rescaled R^2		0.637	

Variable definitions (data source):

TOTASS is the natural logarithm of a firm's total assets (Worldscope), MKTCAP is the natural logarithm of a firm's market capitalization (Worldscope), GOOGLE is the natural logarithm of the number of produced hits of a search request on the search engine Google using a firm's official name including legal form (www.google.de), PRESS is the natural logarithm of the number of articles found searching for a firm's official name including legal form (LexisNexis), TQ is market value of the equity at the end of the year plus the difference between the book value of assets and the book value of equity at the end of the year, divided by the book value of the assets at the end of the year (Worldscope), BETA is a measure of risk capturing the relationship between the volatility of the stock and the volatility of the market (Worldscope), FINANCE is net cash flow from financing activities to total assets (Worldscope), LEV is total debt to total assets (Worldscope), %FORSALES is foreign sales to sales (Worldscope), ROA is EBIT to average total assets (Worldscope), CLSHELD is closely held shares to common shares outstanding (Worldscope), SEG is the number of product segments (Worldscope), LISTING is an indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse at December 31 of the considered year (Deutsche Börse), FORLISTING is an indicator variable taking the value 1 if a firm has a foreign listing (hand-collected), BIG4 is an indicator variable taking the value 1 if a company is audited by one of the BIG4 audit firms (hand-collected).

In Panel A, the significance of sample differences is assessed by t-tests and Wilcoxon tests for the means and the medians of non-nominal variables and by Chi-squared tests of nominal variables. Panel B displays results of a logistic regression. Bold typeset denotes significant difference (two-sided) below the 10 % level.

For firms that did not prepare a cash flow statement, I do not perform a multivariate analysis since the number of according observations is too low. A logistic regression of segment report preparation is displayed in Panel B of Table 9. The results show that preparing firms (1) have a higher Tobin's q, (2) have more international activities, (3) are more complex, (4) are more often listed in one of the selection indices of Deutsche Börse, (5) have more often a foreign listing and (6) are more often audited by a BIG4 audit firm. These results suggest that the decision to prepare a segment report is driven by determinants internal and external to the firm. Accordingly, the decision is driven by whether a firm has information that can be disaggregated, like complexity and foreign activities. This finding fuels the conjecture that non-preparation might be justified in the light of the materiality principle. But also external determinants like capital market pressures and related increased reporting requirements have a positive impact on the decision to prepare a segment report. The analysis also shows that the auditor plays a role in this decision, implying that BIG4 audit firms either provide a higher quality in the statement preparation process or are stronger in making their clients comply with reporting requirements. The circumstance that growth firms are more compliant can be seen against the background that these firms need to provide more transparency in order to attract finance or as a bonding measure in order to reassure stakeholders to comply with reporting requirements.

GAS compliance

Table 10 provides results of the ordered logistic regression. Results of model (a) show that higher compliance is driven by (1) size, (2) being audited by an audit firm that has an affiliation to the ASCG and (3) debt agency problems. In the models (b) and (c), compliance is driven by (1) being audited by an audit firm that has an affiliation to the ASCG, (2) debt agency problems and (3) profitability. The public exposure measures are positively associated with compliance but only significant in model (b) at common significance levels. Including size and the number of Google hits in model (a)+(b) renders both variables to be positive and non-significant. In model (a)+(c), size is better suitable in explaining compliance than public exposure.

Table 10: Pooled ordered logistic regression analysis of determinants of GAS compliance (n=405)

		Model (a) MKTCAP		Model (b) GOOGLE		Model (c) PRESS		Model (a) + (b)		Model (a) + (c)	
Independent variable	**Expected sign**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
intercept 1		**-4.374**	(0.001)	**-4.147**	(0.003)	**-3.753**	(0.003)	**-4.566**	(0.001)	**-4.358**	(0.001)
intercept 2		**-2.397**	(0.046)	**-2.172**	(0.091)	-1.825	(0.127)	**-2.571**	(0.041)	**-2.380**	(0.052)
MKTCAP	+	**0.352**	(0.017)					0.261	(0.113)	**0.362**	(0.036)
GOOGLE	+			**0.362**	(0.053)			0.231	(0.285)		
PRESS	+					0.146	(0.267)			-0.022	(0.880)
ASCGMEM	+	**1.245**	(0.041)	**1.187**	(0.060)	**1.218**	(0.055)	**1.188**	(0.049)	**1.254**	(0.044)
TQ	+/-	0.284	(0.472)	0.469	(0.227)	0.465	(0.241)	0.320	(0.426)	0.282	(0.476)
BETA	+	-0.566	(0.253)	-0.721	(0.148)	-0.538	(0.282)	-0.705	(0.168)	-0.561	(0.262)
FINANCE	+	0.584	(0.591)	0.336	(0.752)	0.537	(0.616)	0.425	(0.696)	0.589	(0.590)
LEV	+/-	**4.406**	(0.001)	**4.439**	(0.002)	**3.937**	(0.003)	**4.668**	(0.001)	**4.400**	(0.001)
%FORSALES	+	-0.544	(0.430)	-0.722	(0.302)	-0.456	(0.480)	-0.677	(0.344)	-0.555	(0.419)
ROA	+/-	1.513	(0.258)	**3.148**	(0.024)	**3.208**	(0.020)	1.958	(0.180)	1.442	(0.307)
CLSHELD	-	-0.910	(0.371)	-0.787	(0.438)	-0.808	(0.423)	-0.843	(0.415)	-0.918	(0.374)
SEG	+	0.089	(0.478)	0.124	(0.299)	0.139	(0.253)	0.089	(0.469)	0.089	(0.479)
LISTING	+	0.241	(0.643)	0.391	(0.449)	0.590	(0.214)	0.115	(0.830)	0.265	(0.607)
FORLISTING	+/-	-0.007	(0.995)	0.183	(0.891)	0.357	(0.797)	-0.115	(0.928)	0.010	(0.994)
BIG4	+	-0.361	(0.458)	-0.316	(0.528)	-0.309	(0.540)	-0.390	(0.434)	-0.351	(0.485)
Year/Industry dummies		yes/yes		yes/yes		yes/yes		yes/yes		yes/yes	
Number of observations	GAS2=1 and GAS3=1	55		55		55		55		55	
	GAS2=1 or GAS3=1	108		108		108		108		108	
	GAS2=0 and GAS3=0	242		242		242		242		242	
Likelihood ratio χ^2		**145.036**	(0.000)	**142.440**	(0.000)	**132.536**	(0.000)	**148.883**	(0.000)	**145.086**	(0.000)
Rescaled R^2		0.356		0.351		0.330		0.364		0.356	

Variable definitions (data source):

MKTCAP is the natural logarithm of a firm's market capitalization (Worldscope), GOOGLE is the natural logarithm of the number of produced hits of a search request on the search engine Google using a firm's official name including legal form (www.google.de), PRESS is the natural logarithm of the number of articles found searching for a firm's official name including legal form (LexisNexis), ASCGMEM is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG but is not a BIG4 audit firm (hand-collected), TQ is market value of the equity at the end of the year plus the difference between the book value of assets and the book value of equity at the end of the year, divided by the book value of the assets at the end of the year (Worldscope), BETA is a measure of risk capturing the relationship between the volatility of the stock and the volatility of the market (Worldscope), FINANCE is net cash flow from financing activities to total assets (Worldscope), LEV is total debt to total assets (Worldscope), %FORSALES is foreign sales to sales (Worldscope), ROA is EBIT to averaged total assets (Worldscope), CLSHELD is closely held shares to common shares outstanding (Worldscope), SEG is the number of product segments (Worldscope), LISTING is an indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse at December 31 of the considered year (Deutsche Börse), FORLISTING is an indicator variable taking the value 1 if a firm has a foreign listing (hand-collected), BIG4 is an indicator variable taking the value 1 if a company is audited by one of the BIG4 audit firms (hand-collected).

Bold typeset denotes significant difference from zero (two-sided) below the 10 % level.

In a next step, I investigate determinants of GAS 2 compliance. The results are displayed in Table 11 and Table 12. The univariate results (Table 11) show that GAS 2 compliers (1) are bigger in terms of total assets and market capitalization, (2) are more publicly exposed as measured with the Google hits and press coverage (only t-test), (3) face more usage of GAS 2 (only t-test) and GAS 3 within the respective industry, (4) are more often audited by audit firms having an affiliation to the ASCG, (5) have a higher Tobin's q (only Wilcoxon test), (6) have more debt agency problems, (7) are more complex, (8) are more often listed in one of the selection indices of Deutsche Börse and (9) are less often audited by a BIG4 audit firm.

The multivariate results (Table 12) show that compliance is significantly positively associated with (1) size, (2) peer pressure and (3) debt agency problems and is negatively associated with (4) being audited by a BIG4 audit firm. In the models (b) and (c), public exposure is positively associated with compliance while the remaining results do not materially change. The coefficient is significant in model (b) and non-significant in model (c). In the mixed model (a)+(b), adding size and public exposure as measured by the Google hits renders both variables to be positively and non-significantly associated with GAS 2 compliance while the other results stay unchanged. In the mixed model (a)+(c), compliance is positively associated with (1) size, (2) peer pressure and (3) debt agency problems and is negatively associated with (4) being audited by a BIG4 audit firm.

Table 11: Descriptive statistics and univariate analysis of determinants of GAS 2 compliance (n=405)

	GAS 2=1 (n=111)			GAS 2=0 (n=294)							
Variable	**Mean**	**Std.dev**	**Median**	**Mean**	**Std.dev**	**Median**	**Expected sign**	**t-statistic**	**p-value**	**z-statistic**	**p-value**
TOTASS	5.547	1.980	5.164	4.841	1.439	4.909	+	**3.430**	(0.001)	**2.260**	(0.012)
MKTCAP	4.610	2.318	4.047	3.772	1.640	3.690	+	**3.490**	(0.001)	**2.512**	(0.012)
GOOGLE	3.151	1.912	3.025	2.496	1.132	2.557	+	**3.400**	(0.001)	**3.345**	(0.001)
PRESS	3.040	1.954	2.833	2.629	1.591	2.708	+	**1.980**	(0.050)	1.376	(0.169)
GAS2PEER	0.297	0.216	0.302	0.242	0.132	0.256	+	**2.530**	(0.012)	1.125	(0.261)
GAS3PEER	0.289	0.228	0.256	0.218	0.159	0.241	+/-	**3.010**	(0.003)	**1.996**	(0.046)
ASCGMEM	0.198	0.400		0.092	0.289	0.000	+			**8.571**	(0.003)
TQ	1.268	0.406	1.194	1.192	0.517	1.085	+/-	1.570	(0.119)	**2.615**	(0.009)
BETA	0.576	0.563	0.420	0.541	0.536	0.490	+	0.580	(0.565)	0.364	(0.716)
FINANCE	0.002	0.102	-0.019	-0.017	0.113	-0.022	+	1.520	(0.130)	0.946	(0.344)
LEV	0.328	0.215	0.336	0.268	0.197	0.257	+/-	**2.680**	(0.008)	**2.550**	(0.011)
%FORSALES	0.390	0.247	0.381	0.349	0.292	0.347	+	1.390	(0.166)	1.538	(0.124)
ROA	0.057	0.088	0.066	0.046	0.127	0.063	+/-	0.990	(0.321)	0.731	(0.465)
CLSHELD	0.608	0.265	0.674	0.653	0.210	0.700	-	-1.630	(0.105)	-1.049	(0.294)
SEG	3.739	1.882	4.000	3.082	1.659	3.000	+	**3.240**	(0.001)	**3.377**	(0.001)
LISTING	0.306	0.463		0.204	0.404	0.000	+			**4.724**	(0.030)
FORLISTING	0.036	0.187		0.020	0.142	0.000	+/-			0.817	(0.366)
BIG4	0.414	0.495		0.588	0.493	1.000	+			**9.826**	(0.002)

Variable definitions (data source):

TOTASS is the natural logarithm of a firm's total assets (Worldscope), MKTCAP is the natural logarithm of a firm's market capitalization (Worldscope), GOOGLE is the natural logarithm of the number of produced hits of a search request on the search engine Google using a firm's official name including legal form (www.google.de), PRESS is the natural logarithm of the number of articles found searching for a firm's official name including legal form (LexisNexis), GAS2PEER is a self-constructed variable measuring the degree of GAS2 use in the industry, GAS3PEER is a self-constructed variable measuring the degree of GAS3 use in the industry, ASCGMEM is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG but is not a BIG4 audit firm (hand-collected), TQ is market value of the equity at the end of the year plus the difference between the book value of assets and the book value of equity at the end of the year, divided by the book value of the assets at the end of the year (Worldscope), BETA is a measure of risk capturing the relationship between the volatility of the stock and the volatility of the market (Worldscope), FINANCE is net cash flow from financing activities to total assets (Worldscope), LEV is total debt to total assets (Worldscope), %FORSALES is foreign sales to sales (Worldscope), ROA is EBIT to averaged total assets (Worldscope), CLSHELD is closely held shares to common shares outstanding (Worldscope), SEG is the number of product segments (Worldscope), LISTING is an indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse at December 31 of the considered year (Deutsche Börse), FORLISTING is an indicator variable taking the value 1 if a firm has a foreign listing (hand-collected), BIG4 is an indicator variable taking the value 1 if a company is audited by one of the BIG4 audit firms (hand-collected).

The significance of sample differences is assessed by t-tests and Wilcoxon tests for the means and the medians of non-nominal variables and by Chi-squared tests of nominal variables.

Bold typeset denotes significant difference (two-sided) below the 10 % level.

Table 12: Pooled logistic regression analysis of determinants of GAS 2 compliance (n=405)

		Model (a) MKTCAP		Model (b) GOOGLE		Model (c) PRESS		Model (a) + (b)		Model (a) + (c)	
Independent variable	**Expected sign**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
intercept		**-3.357**	(0.020)	**-3.578**	(0.045)	**-2.886**	(0.043)	**-3.751**	(0.033)	**-3.237**	(0.026)
MKTCAP	+	**0.345**	(0.009)					0.237	(0.112)	**0.387**	(0.015)
GOOGLE	+			**0.414**	(0.055)			0.278	(0.272)		
PRESS	+					0.092	(0.561)			-0.094	(0.554)
GAS2PEER	+	**2.875**	(0.005)	**2.884**	(0.013)	**2.831**	(0.010)	**2.891**	(0.008)	**2.818**	(0.006)
ASCGMEM	+	0.554	(0.444)	0.597	(0.430)	0.583	(0.420)	0.549	(0.462)	0.582	(0.424)
TQ	+/-	0.140	(0.759)	0.302	(0.493)	0.299	(0.512)	0.179	(0.701)	0.136	(0.764)
BETA	+	-0.494	(0.413)	-0.681	(0.240)	-0.469	(0.420)	-0.642	(0.284)	-0.479	(0.429)
FINANCE	+	1.873	(0.122)	1.464	(0.214)	1.672	(0.143)	1.635	(0.178)	1.974	(0.115)
LEV	+/-	**2.730**	(0.023)	**2.752**	(0.031)	**2.280**	(0.063)	**2.917**	(0.017)	**2.746**	(0.022)
%FORSALES	+/-	0.280	(0.709)	0.089	(0.909)	0.288	(0.685)	0.147	(0.850)	0.229	(0.761)
ROA	+/-	0.708	(0.612)	2.203	(0.120)	2.236	(0.101)	1.210	(0.399)	0.429	(0.764)
CLSHELD	-	-0.764	(0.531)	-0.549	(0.667)	-0.585	(0.617)	-0.621	(0.638)	-0.828	(0.507)
SEG	+	0.102	(0.472)	0.145	(0.295)	0.164	(0.215)	0.108	(0.457)	0.103	(0.470)
LISTING	+	-0.343	(0.586)	-0.238	(0.690)	0.167	(0.763)	-0.511	(0.435)	-0.232	(0.715)
FORLISTING	+/-	0.162	(0.889)	0.227	(0.853)	0.625	(0.629)	-0.003	(0.998)	0.223	(0.843)
BIG4	+	**-1.063**	(0.046)	**-0.901**	(0.092)	**-0.873**	(0.099)	**-1.044**	(0.054)	**-1.034**	(0.056)
Number of	GAS2=0	294		294		294		294		294	
observations	GAS2=1	111		111		111		111		111	
Likelihood ratio χ^2		**74.845**	(0.000)	**74.618**	(0.000)	**61.273**	(0.000)	**79.579**	(0.000)	**75.627**	(0.000)
Rescaled R^2		0.244		0.244		0.203		0.258		0.247	

Variable definitions (data source):

MKTCAP is the natural logarithm of a firm's market capitalization (Worldscope), GOOGLE is the natural logarithm of the number of produced hits of a search request on the search engine Google using a firm's official name including legal form (www.google.de), PRESS is the natural logarithm of the number of articles found searching for a firm's official name including legal form (LexisNexis), GAS2PEER is a self-constructed variable measuring the degree of GAS 2 use in the industry, ASCGMEM is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG but is not a BIG4 audit firm (hand-collected), TQ is market value of the equity at the end of the year plus the difference between the book value of assets and the book value of equity at the end of the year, divided by the book value of the assets at the end of the year (Worldscope), BETA is a measure of risk capturing the relationship between the volatility of the stock and the volatility of the market (Worldscope), FINANCE is net cash flow from financing activities to total assets (Worldscope), LEV is total debt to total assets (Worldscope), %FORSALES is foreign sales to sales (Worldscope), ROA is EBIT to averaged total assets (Worldscope), CLSHELD is closely held shares to common shares outstanding (Worldscope), SEG is the number of product segments (Worldscope), LISTING is an indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse at December 31 of the considered year (Deutsche Börse), FORLISTING is an indicator variable taking the value 1 if a firm has a foreign listing (hand-collected), BIG4 is an indicator variable taking the value 1 if a company is audited by one of the BIG4 audit firms (hand-collected).

Bold typeset denotes significant difference from zero (two-sided) below the 10 % level.

Finally, I investigate what drives compliance with GAS 3. The results are reported in Table 13 and Table 14. The univariate results (Table 13) regarding GAS 3 indicate that compliers (1) are bigger in terms of total assets and market capitalization, (2) are more publicly exposed as measured by the Google hits and press coverage, (3) face more usage of GAS 2 (only t-test) and GAS 3 (only t-test) within the respective industry, (4) are more often audited by audit firms having an affiliation to the ASCG, (5) have a higher Tobin's q, (6) are riskier, (7) have less financing needs, (8) have more debt agency problems, (9) are more profitable, (10) are less closely held, (11) are more complex and (12) are more often listed in one of the selection indices of Deutsche Börse.

The multivariate results (Table 14) show that compliance with GAS 3 is positively and significantly associated with (1) size and (2) debt agency problems and (3) is negatively associated with financing needs. Similar to the previous results, public exposure is positively and non-significantly associated with compliance in the models (b) and (c). In the absence of a control for size, (1) peer pressure, (2) debt agency problems and (3) listing status are positively and significantly associated with compliance. In the models (a)+(b) and (a)+(c), size is better suitable in explaining compliance than the public exposure proxy. The other results are not materially different from model (a).

Table 13: Descriptive statistics and univariate analysis of determinants of GAS 3 compliance (n=405)

	GAS 3=1 (n=107)			GAS 3=0 (n=298)							
Variable	**Mean**	**Std.dev**	**Median**	**Mean**	**Std.dev**	**Median**	**Expected sign**	**t-statistic**	**p-value**	**z-statistic**	**p-value**
TOTASS	5.871	1.883	5.534	4.734	1.422	4.791	+	**5.690**	(0.000)	**5.555**	(0.000)
MKTCAP	4.918	2.280	4.777	3.673	1.603	3.592	+	**5.210**	(0.000)	**4.873**	(0.000)
GOOGLE	3.046	1.783	2.681	2.542	1.238	2.595	+	**2.700**	(0.008)	**1.894**	(0.058)
PRESS	3.205	2.078	2.944	2.576	1.520	2.708	+	**2.870**	(0.005)	**2.224**	(0.026)
GAS2PEER	0.289	0.237	0.302	0.245	0.121	0.256	+/-	**1.810**	(0.073)	0.596	(0.551)
GAS3PEER	0.294	0.238	0.256	0.217	0.154	0.241	+	**3.150**	(0.002)	1.469	(0.142)
ASCGMEM	0.168	0.376	0.000	0.104	0.306	0.000	+			**3.051**	(0.081)
TQ	1.286	0.464	1.179	1.186	0.497	1.079	+/-	**1.810**	(0.071)	**2.760**	(0.006)
BETA	0.665	0.502	0.540	0.510	0.553	0.460	+	**2.550**	(0.011)	**2.200**	(0.028)
FINANCE	-0.026	0.081	-0.029	-0.006	0.119	-0.017	+	**-1.880**	(0.061)	**-1.778**	(0.075)
LEV	0.347	0.235	0.346	0.262	0.186	0.269	+/-	**3.380**	(0.001)	**3.139**	(0.002)
%FORSALES	0.390	0.264	0.362	0.349	0.286	0.354	+	1.300	(0.195)	1.134	(0.257)
ROA	0.068	0.083	0.079	0.043	0.127	0.057	+/-	**2.310**	(0.022)	**2.892**	(0.004)
CLSHELD	0.599	0.250	0.615	0.656	0.216	0.723	-	**-2.080**	(0.039)	**-1.783**	(0.075)
SEG	3.766	1.680	3.000	3.081	1.735	3.000	+	**3.540**	(0.001)	**3.741**	(0.000)
LISTING	0.383	0.488	0.000	0.178	0.383	0.000	+			**18.623**	(0.000)
FORLISTING	0.037	0.191	0.000	0.020	0.141	0.000	+/-			0.973	(0.324)
BIG4	0.561	0.499	1.000	0.534	0.500	1.000	+			0.234	(0.628)

Variable definitions (data source):

TOTASS is the natural logarithm of a firm's total assets (Worldscope), MKTCAP is the natural logarithm of a firm's market capitalization (Worldscope), GOOGLE is the natural logarithm of the number of produced hits of a search request on the search engine Google using a firm's official name including legal form (www.google.de), PRESS is the natural logarithm of the number of articles found searching for a firm's official name including legal form (LexisNexis), GAS2PEER is a self-constructed variable measuring the degree of GAS2 use in the industry, GAS3PEER is a self-constructed variable measuring the degree of GAS3 use in the industry, ASCGMEM is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG but is not a BIG4 audit firm (hand-collected), TQ is market value of the equity at the end of the year plus the difference between the book value of assets and the book value of equity at the end of the year, divided by the book value of the assets at the end of the year (Worldscope), BETA is a measure of risk capturing the relationship between the volatility of the stock and the volatility of the market (Worldscope), FINANCE is net cash flow from financing activities to total assets (Worldscope), LEV is total debt to total assets (Worldscope), %FORSALES is foreign sales to sales (Worldscope), ROA is EBIT to averaged total assets (Worldscope), CLSHELD is closely held shares to common shares outstanding (Worldscope), SEG is the number of product segments (Worldscope), LISTING is an indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse at December 31 of the considered year (Deutsche Börse), FORLISTING is an indicator variable taking the value 1 if a firm has a foreign listing (hand-collected), BIG4 is an indicator variable taking the value 1 if a company is audited by one of the BIG4 audit firms (hand-collected).

The significance of sample differences is assessed by t-tests and Wilcoxon tests for the means and the medians of non-nominal variables and by Chi-squared tests of nominal variables.

Bold typeset denotes significant difference (two-sided) below the 10 % level.

Table 14: Pooled logistic regression analysis of determinants of GAS 3 compliance (n=405)

		Model (a) MKTCAP		**Model (b) GOOGLE**		**Model (c) PRESS**		**Model (a) + (b)**		**Model (a) + (c)**	
Independent variable	**Expected sign**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
intercept		**-4.405**	(0.001)	**-3.744**	(0.004)	**-3.698**	(0.004)	**-4.121**	(0.003)	**-4.126**	(0.002)
MKTCAP	+	**0.399**	(0.026)					**0.486**	(0.041)	**0.461**	(0.018)
GOOGLE	+			0.060	(0.756)			-0.224	(0.403)		
PRESS	+					0.033	(0.832)			-0.167	(0.351)
GAS3PEER	+	1.848	(0.167)	**2.296**	(0.077)	**2.331**	(0.069)	1.784	(0.183)	1.669	(0.210)
ASCGMEM	+	0.869	(0.270)	0.920	(0.267)	0.925	(0.262)	0.932	(0.236)	0.923	(0.249)
TQ	+/-	-0.102	(0.802)	0.139	(0.732)	0.136	(0.745)	-0.114	(0.785)	-0.078	(0.845)
BETA	+	0.111	(0.810)	0.114	(0.812)	0.152	(0.731)	0.281	(0.604)	0.116	(0.804)
FINANCE	+	**-2.116**	(0.097)	-1.776	(0.178)	-1.734	(0.189)	-2.040	(0.115)	**-2.224**	(0.073)
LEV	+/-	**3.459**	(0.016)	**2.704**	(0.062)	**2.649**	(0.057)	**3.363**	(0.019)	**3.478**	(0.015)
%FORSALES	+	-0.015	(0.985)	-0.110	(0.885)	-0.056	(0.943)	0.165	(0.843)	-0.104	(0.898)
ROA	+/-	0.384	(0.778)	2.103	(0.126)	2.126	(0.120)	0.056	(0.970)	-0.039	(0.979)
CLSHELD	-	-0.315	(0.794)	-0.140	(0.903)	-0.148	(0.900)	-0.507	(0.659)	-0.467	(0.696)
SEG	+	0.035	(0.786)	0.114	(0.347)	0.114	(0.349)	0.017	(0.894)	0.033	(0.803)
LISTING	+	0.400	(0.454)	**0.971**	(0.059)	**0.984**	(0.055)	0.496	(0.345)	0.595	(0.279)
FORLISTING	+/-	-0.850	(0.477)	-0.103	(0.937)	-0.082	(0.952)	-0.722	(0.542)	-0.684	(0.561)
BIG4	+	0.040	(0.946)	0.171	(0.766)	0.165	(0.774)	0.044	(0.940)	0.092	(0.878)
Number of	GAS3=0	298		298		298		298		298	
observations	GAS3=1	107		107		107		107		107	
Likelihood ratio χ^2		**84.465**	(0.000)	**69.886**	(0.000)	**69.705**	(0.000)	**86.962**	(0.000)	**86.588**	(0.000)
Rescaled R^2		0.275		0.231		0.231		0.282		0.281	

Variable definitions (data source):

MKTCAP is the natural logarithm of a firm's market capitalization (Worldscope), GOOGLE is the natural logarithm of the number of produced hits of a search request on the search engine Google using a firm's official name including legal form (www.google.de), PRESS is the natural logarithm of the number of articles found searching for a firm's official name including legal form (LexisNexis), GAS3PEER is a self-constructed variable measuring the degree of GAS 3 use in the industry, ASCGMEM is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG but is not a BIG4 audit firm (hand-collected), TQ is market value of the equity at the end of the year plus the difference between the book value of assets and the book value of equity at the end of the year, divided by the book value of the assets at the end of the year (Worldscope), BETA is a measure of risk capturing the relationship between the volatility of the stock and the volatility of the market (Worldscope), FINANCE is net cash flow from financing activities to total assets (Worldscope), LEV is total debt to total assets (Worldscope), %FORSALES is foreign sales to sales (Worldscope), ROA is EBIT to averaged total assets (Worldscope), CLSHELD is closely held shares to common shares outstanding (Worldscope), SEG is the number of product segments (Worldscope), LISTING is an indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse at December 31 of the considered year (Deutsche Börse), FORLISTING is an indicator variable taking the value 1 if a firm has a foreign listing (hand-collected), BIG4 is an indicator variable taking the value 1 if a company is audited by one of the BIG4 audit firms (hand-collected).

Bold typeset denotes significant difference from zero (two-sided) below the 10 % level.

Multicollinearity

Throughout the investigation, multicollinearity might be an issue in the models (a)+(b) and (a)+(c). I refer to Wooldridge (2009) and Backhaus et al. (2008) for the subsequent discussion. While multicollinearity does not affect the entire model, inferences from the affected coefficients might be wrong. Multicollinearity arises from correlated predictors. Higher degrees of multicollinearity result in higher standard errors of the affected coefficients. Multicollinearity is less of a problem if not the variable of interest is affected but other control variables. In that case, one can still draw correct inferences for the variable of interest. This is not the case for the investigation at hand because the multicollinearity issues affect the variables size and the two proxy variables of public exposure. However, since multicollinearity results in higher standard errors, it leads to falsely reject the hypothesis that there is no significant relationship between the dependent and independent variable, working against finding significant results.

Multicollinearity can be addressed by increasing the data base or by dropping the correlated variable(s). While the first approach is not feasible for the investigation, the separate effects of size and public exposure are investigated in the models (a), (b) and (c). In the mixed models, I examine whether one of the variables is more suitable to explain compliance, making it impossible to drop one of the respective variables. For these models, I calculate the variance inflation factor (VIF) for each independent variable in an OLS equation with the same specification. The VIF gives an indication about the severity of multicollinearity. As pointed out by Wooldridge (2009), a cutoff value for VIF where multicollinearity is considered problematic is arbitrary. A commonly used cutoff point is 10. In the mixed models, the VIF on market capitalization is higher than 13 in both models, while the VIF on the public exposure proxy variable ranges between 7 and 8. In so far, only the proxy for size would be considered to be problematic using the arbitrary cutoff point of 10. However, that variable is significant in three out of four specifications, hence not indicating the danger to falsely reject the hypothesis that there is no significant relationship.

Additional tests

The subsequent section provides additional tests on GAS compliance. Tables and variable definitions are provided in the Appendix.

Fixed time and industry effects

When assessing compliance with GAS 2 and GAS 3, I did not include industry effects since I controlled for peer pressure. Including industry effects and a proxy for peer pressure results in VIF far over ten, indicating that results including industry dummies and the peer variable are pested by multicollinearity. Results of regressions containing fixed time and industry effects but not the peer pressure variable are presented in Table A.1. Compliance with GAS 2 is positively associated with (1) size, (2) financing needs and (3) debt agency problems, and negatively associated with (4) being closely held and (5) being audited by a BIG4 company. Compliance with GAS 3 is positively associated with (1) debt agency problems and negatively associated with (2) financing needs and (3) being closely held. Again, I find no significant relationship with public exposure.

Auditor

Unexpectedly, the results yield a negative and significant sign on being audited by a BIG4 audit company. Additional tests on this matter are presented in Table A.2 (GAS2) and Table A.3 (GAS3).

Ashbaugh and Warfield (2003) point out that considering Ernst & Young, KPMG, PWC and Deloitte & Touche (and Arthur Andersen) as the largest audit firms might not appropriately reflect the German auditor market. In order to address this issue, I introduce the variable BIG5 that is coded one if a firm is audited by any of the aforementioned audit firms or BDO Deutsche Warentreuhand. A negative sign pertains on the variable BIG5. The relationship is significant for GAS 2 compliance (Model (1)).

In another step, I additionally introduce a variable that captures affiliation to the ASCG. Since BDO Deutsche Warentreuhand is also a member of the ASCG, the variable ASCGMEM_BIG5 is coded 1 if a firm is audited by an audit company that is not a BIG5 audit company. A positive sign pertains on the variable ASCGMEM_BIG5. It is significant for GAS 3 compliance (Model (2)).

So far, I distinguished between audit companies that are a member of the ASCG but not a BIG4/BIG5 audit company. I forego this distinction in a next step (Model (3)). The variable ASCGMEM is one if a firm is audited by a firm that is a member of the ASCG. The association on compliance is positive and non-significant for GAS 3 compliance and negative and non-significant for GAS 2 compliance.

Audits are supposed to enhance the credibility of financial information. In this respect, audits can be considered as a feature of a firm’s corporate governance and are one instrument in enhancing the quality of a firm’s financial reporting (Sloan, 2001; Francis, Khurana and Pereira, 2003). Ashbaugh and Warfield (2003) argue that the role of audits in Germany is unclear rooting in the circumstance that reliance on debt and high concentrated ownership are distinct features of German firms. This circumstance might be reflected in the results. In order to shed more light on this observation, I proceed in the following way: I introduce a dummy variable that is one if CLSHELD is equal or higher than 51%. I interact the variable with the dummy variable BIG4. The interaction is supposed to capture two things. First, monitoring is less necessary for firms with higher concentrated ownership. Second, being audited by BIG4 company might be a stronger signal that positively reflects on a firm's corporate governance than actual compliance with GAS. Consequently, I expect a negative sign on the interacted term. For GAS 2 and GAS 3 compliance, the interacted term BIG4*CLSHELDDUM yields a non-significant and negative sign (Model (4)).

Overall, the additional tests do not yield materially different results than the prior analysis. The regressions using fixed time and industry effects suggest that higher ownership concentration has a negative impact on compliance with GAS. This should be seen against the background that parties which can be considered to be insiders to a firm have less demand for accounting information provided in annual statements since they have other means to obtain accounting information. The results also strengthen the finding that the auditor plays an important role in the decision to comply with GAS. Interestingly, being audited by one of the big four audit firms seems to have a compensating effect on compliance with GAS. On the other hand, when the auditor has an affiliation to the ASCG, this has a positive effect on compliance.

3.4.2 Anecdotal evidence of GAS compliance

This paragraph gives anecdotal evidence on GAS compliance and moreover, about some striking statements concerning (non-)compliance with GAS. Most of the cases concern additional information on GAS 4. Accordingly, six firms explicitly report that they do not comply with GAS 4. Four firms do so throughout the considered applicable time of GAS 4, i.e. 2001-2004. One firm does so from 2002-2004. The sixth firm does so only in 2002. Two firms state not to comply with GAS 4 because it does not materially affect the economic presentation of the firm. Interestingly, one of these firms stated in 2001 not to comply with GAS 4 due to an upcoming listing in SMAX where compliance with international accounting standards was required. After the listing did not take place, the firm did not start compliance but changed its non-compliance explanation. In 2001, one firm states to recognize goodwills according to GAS 4 but executes the capital consolidation according to the book value method. This pronouncement was not repeated in later financial statements. One firm stands out as it wrongly states not to comply with GAS 5 although obviously GAS 4 was meant within the context. This error was found in two consecutive years until it was corrected. Finally, one firm reports to comply with the GAS as long as the standards do not exceed German GAAP requirements. This anecdotal evidence further fuels the finding that each standards exhibits different costs and that firms make a case-to-case decision whether to comply with a standard or not.

3.4.3 Analysis of changers

In this paragraph I further investigate the incidence of GAS compliance by drawing on firms that switched from non-compliance to compliance and vice versa. The number of observations that fulfill this criterion is comparably small. Consequently, I refrain from reporting results on differences in the mean. This paragraph is especially meant to give a better understanding which changes are associated for cash flow statements and segment reports when firms start to report to be GAS compliant or when firms stop to report to be GAS compliant.

GAS 2 changers

Over the observation period, 15 firms switched from non-compliance to compliance with GAS 2. In order to assess which changes the switch brought to the cash flow statement, I use a score that consists of the seven items displayed in Table 15.

Table 15: Analysis of changes in the cash flow statement

	Start compliance (n=12)		Explicit (n=9)		General (n=3)		Stop compliance (n=5)	
Variable	**Mean**	**Std.dev**	**Mean**	**Std.dev**	**Mean**	**Std.dev**	**Mean**	**Std.dev**
(1) CFO	0.250	0.452	0.333	0.500	0.000	0.000	0.200	0.447
(2) CFI	0.250	0.452	0.333	0.500	0.000	0.000	0.000	0.000
(3) CFF	0.333	0.492	0.444	0.527	0.000	0.000	0.200	0.447
(4) CASH FUNDS	0.167	0.389	0.222	0.441	0.000	0.000	0.000	0.000
(5) CFO ARRANGEMENT	0.417	0.515	0.444	0.527	0.333	0.577	0.200	0.447
(6) CFI ARRANGEMENT	0.417	0.515	0.444	0.527	0.333	0.577	0.000	0.000
(7) CFF ARRANGEMENT	0.333	0.492	0.333	0.500	0.333	0.577	0.200	0.447
CHANGE SCORE	0.310	0.384	0.365	0.417	0.143	0.247	0.114	0.256

Variable definitions (data source):

CFO is an indicator variable taking the value 1 if a firm’s reported cash flow from operating activities in the cash flow statement changed compared to the respective cash flow reported in the previous cash flow statement, CFI is an indicator variable taking the value 1 if a firm’s reported cash flow from investing activities in the cash flow statement changed compared to the respective cash flow reported in the previous cash flow statement, CFF is an indicator variable taking the value 1 if a firm’s reported cash flow from financing activities in the cash flow statement changed compared to the respective cash flow reported in the previous cash flow statement, CASH FUNDS is an indicator variable taking the value 1 if a firm’s reported cash funds in the cash flow statement changed compared to the cash funds of the respective year in the previous cash flow statement, CFO ARRANGEMENT is an indicator variable taking the value 1 if a firm’s arrangement to calculate the CFO changed compared to the previous cash flow statement, CFI ARRANGEMENT is an indicator variable taking the value 1 if a firm’s arrangement to calculate the CFI changed compared to the previous cash flow statement, CFF ARRANGEMENT is an indicator variable taking the value 1 if a firm’s arrangement to calculate the CFF changed compared to the previous cash flow statement, CHANGE SCORE is the mean of the previous seven indicator variables.

The items (1) to (4) measure whether GAS 2 compliance brought a quantitative change that causes either the cash flow from operating, from investing or from financing activities to be calculated differently compared to the prior year. The items (5) to (7) capture whether the arrangement of each cash flow changed compared to the prior year.

In order to build the score, I need to draw on the cash flow statement prior to the change. Also, these figures need to be given in the year of change to allow a comparison. GAS 2.56 allows firms not to disclose figures for the previous reporting period in case of initial compliance with GAS 2. Two sample firms make use of this possibility. For another firm, first time compliance with GAS 2 coincides with first time preparation of a cash flow statement. I do not calculate change scores for these three firms. This yields a sample of 12 firms that changed from non-compliance to compliance. On the other hand, five firms stopped reporting to be compliant with GAS 2.

Table 15 displays the means of the different score items. The scores are shown for all firms that started compliance (start compliance sample) and stopped compliance (stop compliance sample). I further divide the start compliance sample into firms that explicitly report to comply with GAS 2 (nine firms) and firms that generally state to comply with GAS (three firms). First, the scores concerning the firms that started to comply indicate that compliance really was associated with changes in the cash flow statement. This rules out that the switch was merely a labeling process. This result looks different when distinguishing between the explicit and general subsample. Within the general subsample, only one firm actually changed the arrangement of the cash flow statement. Similarly, only one out of five firms within the stop subsample made modifications to the cash flow statement. In order to judge whether the decision to start compliance comes with changes in firm characteristics, I deploy univariate tests for the start compliance subsample. The results indicate that the firms face significantly more peer pressure in the year of change and have a smaller Tobin’s q compared to the last non-compliant business year (Table 16).

Table 16: Descriptive statistics and univariate analysis of firms starting to comply with GAS 2 (n=12)

	Previous year			**Change year**			
Variable	**Mean**	**Std.dev**	**Median**	**Mean**	**Std.dev**	**Median**	**p-value**
TOTASS	3344.360	10836.510	158.349	3217.660	10348.630	176.219	(0.622)
MKTCAP	2548.370	8465.790	92.196	2214.090	7308.610	111.161	(0.424)
PRESS	72.083	195.300	18.000	67.083	189.442	13.500	(0.217)
GAS2PEER	0.174	0.134	0.233	0.316	0.223	**0.241**	(0.016)
GAS3PEER	0.158	0.121	0.140	0.301	0.230	**0.241**	(0.004)
ASCGMEM	0.000	0.000		0.083	0.289		n.a.
TQ	1.272	0.350	1.205	1.176	0.277	**1.152**	(0.021)
FINANCE	0.055	0.116	0.053	-0.003	0.106	0.007	(0.233)
LEV	0.371	0.170	0.384	0.353	0.196	0.317	(0.470)
%FORSALES	0.277	0.274	0.258	0.310	0.275	0.299	(0.359)
ROA	0.024	0.163	0.085	0.070	0.082	0.067	(0.204)
CLSHELD	0.586	0.310	0.629	0.587	0.301	0.682	(0.438)
SEG	3.583	2.109	3.000	4.083	2.021	4.500	(0.500)
LISTING	0.417	0.515		0.250	0.452		(0.157)
FORLISTING	0.083	0.289		0.083	0.289		n.a.
BIG4	0.333	0.492		0.417	0.515		(0.317)

Variable definitions (data source):

TOTASS is the natural logarithm of a firm's total assets (Worldscope), MKTCAP is the natural logarithm of a firm's market capitalization (Worldscope), GOOGLE is the natural logarithm of the number of produced hits of a search request on the search engine Google using a firm's official name including legal form (www.google.de), PRESS is the natural logarithm of the number of articles found searching for a firm's official name including legal form (LexisNexis), GAS2PEER is a self-constructed variable measuring the degree of GAS2 use in the industry, GAS3PEER is a self-constructed variable measuring the degree of GAS3 use in the industry, ASCGMEM is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG but is not a BIG4 audit firm (hand-collected), TQ is market value of the equity at the end of the year plus the difference between the book value of assets and the book value of equity at the end of the year, divided by the book value of the assets at the end of the year (Worldscope), FINANCE is net cash flow from financing activities to total assets (Worldscope), LEV is total debt to total assets (Worldscope), %FORSALES is foreign sales to sales (Worldscope), ROA is EBIT to averaged total assets (Worldscope), CLSHELD is closely held shares to common shares outstanding (Worldscope), SEG is the number of product segments (Worldscope), LISTING is an indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse at December 31 of the considered year (Deutsche Börse), FORLISTING is an indicator variable taking the value 1 if a firm has a foreign listing (hand-collected), BIG4 is an indicator variable taking the value 1 if a company is audited by one of the BIG4 audit firms (hand-collected).

The significance of sample differences is assessed by signed rank-tests for non-nominal variables and by McNemar exact tests for nominal variables. N.a. denotes that a 2x2 tables could not be constructed for nominal variables.

Bold typeset denotes significant difference (two-sided) below the 10 % level.

GAS 3 changers

Next, I investigate the incidence of GAS 3 compliance and effects on segment reporting. Over the sample period, 15 firms switched from non-compliance to compliance with GAS 3. In order to assess the impact of compliance with GAS 3 on segment reporting, I calculate a change score by drawing on the specification given in GAS 3. According to GAS 3, for each reportable segment the following information shall be given: (a) revenue from sales to external customers and to other segments, (b) segment result including (ba) depreciation, (bb) other non-cash items, (bc) result from investment in associated enterprises, (bd) income from other investments, (c) assets including investments, (d) capital expenditure and (e) liabilities. In order to build a change score, a point is given where the segment report has been extended for one of these items. GAS 3.49 offers the possibility not to provide comparative figures for the previous year in case of initial compliance with GAS 3. One firm makes use of this possibility. This yields 14 firms that started to comply with GAS 3. Another six firms stopped to comply with GAS 3.

The means of the different items are tabulated in Table 17. The scores are shown for all firms that started compliance (start compliance sample) and stopped compliance (stop compliance sample). Again, I divide the start compliance sample into firms that explicitly report to comply with GAS 3 (ten firms) and firms that generally state to comply with GAS (four firms). The results suggest that firms starting to comply with GAS 3 make only minor changes to their segment reports. Most changes relate to provide more details concerning assets, capital expenditure and liabilities. Strikingly, firms that state to generally comply with GAS did not make any changes to their segment reports. Likewise, only one firm that stopped to report to comply with GAS 3 made changes to its segment report. Again, I assess whether changes in firm characteristics occurred in the change year. The results indicate that firms starting to comply with GAS 3 faced more peer pressure in the adoption year (Table 18).

Table 17: Analysis of changes in the segment report

	Start compliance (n=14)		Explicit (n=10)		General (n=4)		Stop compliance (n=6)	
Variable	**Mean**	**Std.dev**	**Mean**	**Std.dev**	**Mean**	**Std.dev**	**Mean**	**Std.dev**
(a) Revenue from sales to external customers and to other segments	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(b) Segment result	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
including								
(ba) Depreciation	0.071	0.267	0.100	0.316	0.000	0.000	0.000	0.000
(bc) Other non-cash items	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(bc) Result from investment in associated enterprises	0.000	0.000	0.000	0.000	0.000	0.000	0.167	0.408
(bd) Income from other investments	0.000	0.000	0.000	0.000	0.000	0.000	0.167	0.408
(c) Assets including investments	0.286	0.469	0.400	0.516	0.000	0.000	0.167	0.408
(d) Capital expenditure	0.143	0.363	0.200	0.422	0.000	0.000	0.000	0.000
(e) Liabilities	0.214	0.426	0.300	0.483	0.000	0.000	0.000	0.000
CHANGE SCORE	0.079	0.134	0.111	0.148	0.000	0.000	0.056	0.093

Notes:

The items (a) to (e) take the value 1 if a change occurred from one year to the other. The change score is the mean calculated from the nine items (a) to (e).

Table 18: Descriptive statistics and univariate analysis of firms starting to comply with GAS 3 (n=14)

	Previous year			Change year			
Variable	**Mean**	**Std.dev**	**Median**	**Mean**	**Std.dev**	**Median**	**p-value**
TOTASS	2980.290	10014.550	210.859	2872.740	9563.400	215.256	(0.626)
MKTCAP	2240.320	7828.520	41.830	1967.550	6755.210	38.222	(0.761)
PRESS	80.143	184.017	17.000	73.786	175.449	15.000	(0.623)
GAS2PEER	0.166	0.135	0.221	0.358	0.285	**0.279**	(0.002)
GAS3PEER	0.127	0.108	0.140	0.330	0.288	**0.230**	(0.001)
ASCGMEM	0.000	0.000		0.000	0.000		n.a.
TQ	1.330	0.836	1.073	1.281	0.777	1.071	(0.153)
FINANCE	0.019	0.103	-0.022	-0.029	0.074	-0.021	(0.463)
LEV	0.292	0.196	0.308	0.293	0.178	0.299	(0.952)
%FORSALES	0.442	0.331	0.534	0.459	0.291	0.590	(0.519)
ROA	0.059	0.048	0.058	0.074	0.057	0.061	(0.217)
CLSHELD	0.635	0.251	0.649	0.619	0.251	0.647	(0.496)
SEG	3.500	1.990	3.000	3.714	1.978	3.000	(0.563)
LISTING	0.429	0.514		0.286	0.469		(0.157)
FORLISTING	0.071	0.267		0.071	0.267		n.a.
BIG4	0.429	0.514	0.000	0.500	0.519	0.500	(0.317)

Variable definitions (data source):

TOTASS is the natural logarithm of a firm's total assets (Worldscope), MKTCAP is the natural logarithm of a firm's market capitalization (Worldscope), GOOGLE is the natural logarithm of the number of produced hits of a search request on the search engine Google using a firm's official name including legal form (www.google.de), PRESS is the natural logarithm of the number of articles found searching for a firm's official name including legal form (LexisNexis), GAS2PEER is a self-constructed variable measuring the degree of GAS2 use in the industry, GAS3PEER is a self-constructed variable measuring the degree of GAS3 use in the industry, ASCGMEM is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG but is not a BIG4 audit firm (hand-collected), TQ is market value of the equity at the end of the year plus the difference between the book value of assets and the book value of equity at the end of the year, divided by the book value of the assets at the end of the year (Worldscope), FINANCE is net cash flow from financing activities to total assets (Worldscope), LEV is total debt to total assets (Worldscope), %FORSALES is foreign sales to sales (Worldscope), ROA is EBIT to averaged total assets (Worldscope), CLSHELD is closely held shares to common shares outstanding (Worldscope), SEG is the number of product segments (Worldscope), LISTING is an indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse at December 31 of the considered year (Deutsche Börse), FORLISTING is an indicator variable taking the value 1 if a firm has a foreign listing (hand-collected), BIG4 is an indicator variable taking the value 1 if a company is audited by one of the BIG4 audit firms (hand-collected).

The significance of sample differences is assessed by signed rank-tests for non-nominal variables and by McNemar exact tests for nominal variables. N.a. denotes that a 2x2 tables could not be constructed for nominal variables.

Bold typeset denotes significant difference (two-sided) below the 10 % level.

3.4.4 Compliance as a routine process

Routine means that a player repeats actions due to habit or standardized processes (Cormier, Magnan and van Velthoven, 2005). The aforementioned authors show that environmental disclosure among German firms follows a routine process. Thinking of disclosure and compliance behavior as a routine process is appealing. Once initial structures have been implemented, subsequent changes should require less costs and effort. Preparing financial statements is less prone to major changes in a steady institutional setting. The results from the previous section also hint towards a routine process in preparing cash flow statements and segment reports. Cormier, Magnan and van Velthoven (2005) test whether disclosure follows a routine process by assessing if including lagged disclosure has a significant incremental explanatory power in their models. I follow this approach by including the lagged dependent variable into my models. I use a Wald test and a likelihood ratio test to assess the explanatory power of the lagged dependent variable.

The likelihood ratio test assesses whether the difference in the log-likelihood functions for an unrestricted and a restricted model is meaningful. I refer to Wooldridge (2009) for the following explanations. I use this concept to assess whether compliance with GAS is done in a routine process. In doing so, I estimate a model where the lagged decision to comply with GAS is included (unrestricted model), and the same model without the lagged decision to comply with GAS (restricted model). The likelihood ratio statistic follows a chi-square distribution. The degree of freedom is the number of restrictions in the restricted model, i. e. one in this case. A likelihood ratio test statistic that is higher than the critical value indicates that GAS compliance follows a routine process since the unrestricted model is better suitable to explain compliance. Since I need to lag the decision to comply with GAS, I estimate the models for the years 2001-2004. Results of the likelihood ratio test are displayed in Table 19. The results indicate that the decision to comply with GAS is done in a routine fashion.

The likelihood ratio test and Wald test should yield the same results. However, both tests have different assumptions. One assumption of the likelihood ratio test is that the observations are independent. This assumption is violated at the setting at hand. The Wald test does not require this assumption. Results of the Wald test are also displayed in Table 19. These results also suggest that GAS compliance is done in a routine fashion.

Table 19: Test of GAS compliance as a routine process (n=332)

Dependent variable	Model	Observations (non-compliant/compliant)	Coefficient of lagged dependent variable	p-value	-2 LOG L_r	-2 LOG L_u	LR	p-value
GAS2	Model (a)	230/94	6.278	(0.000)	314.578	117.776	196.802	(0.000)
	Model (a)+(b)	230/94	6.304	(0.000)	314.068	116.884	197.184	(0.000)
GAS3	Model (a)	231/93	6.115	(0.000)	320.912	132.302	188.610	(0.000)
	Model (a)+(b)	231/93	6.165	(0.000)	320.264	131.991	188.273	(0.000)

Notes:

Significance of the coefficient of the lagged dependent variable in the unrestricted model is assessed by a Wald test.

LR equals $2*\ln(L_u)-2*\ln(L_r)$.

4 Summary and conclusions

The purpose of this study is to identify determinants of voluntary compliance with accounting standards. I do this in a unique context, i.e. I study German firms that can choose to voluntarily follow GAS in addition to German GAAP when preparing their consolidated financial statements. I explicitly address the influence of public exposure and compliance pressure proposing two different measures to capture public exposure: press coverage and the number of hits produced by a search request on Google.

The study reveals a small amount of firms that violate German GAAP by not preparing cash flow statements or segment reports. A reasonable explanation for not preparing a cash flow statement that is in line with German GAAP seems unlikely. An analysis of firms that do not prepare segment reports suggest that the decision to prepare a segment report is driven by determinants internal and external to the firm. Accordingly, firms do not prepare a segment report when they have less information that needs to be disaggregated, which is in line with the materiality principle. Results also reveal that external factors like capital market pressures, the auditor or an elevated need for transparency as for growth firms have a positive impact on the decision to prepare a segment report.

With respect to GAS compliance, the study reveals the existence of costlier standards that firms prefer to ignore. In this regard, the study replicates the observation that firms engage into “standard picking” (Gebhardt and Heilmann, 2004a; 2004b). The results of an ordered logistic regression indicate that compliance is driven by size, the auditor’s affiliation to the institution that develops the GAS and debt agency problems. When analyzing compliance determinants with single standards, the results concerning GAS 2 indicate that size, peer pressure within the industry and debt agency problems is positively associated with compliance, and negatively with being audited by a BIG4 auditor.

Compliance with GAS 3 is positively associated with size and debt agency problems, and negatively with financing needs.

Overall, I find no relationship between compliance and public exposure. The univariate tests indicate a relationship between public exposure and compliance with GAS. This relationship does not hold in multivariate analyses. In the mixed models, size and public exposure are either not significantly associated with compliance or size is better suitable to explain compliance than public exposure. My results are only to a limited extent comparable to findings of prior literature. The positive effect of size has been identified in several studies (e.g. Meek, Roberts and Gray, 1995; Ashbaugh, 2001; Cuijpers and Buijink, 2005). It is often stated that it is not entirely clear what drives the size effect. I am not able to attribute public exposure to the size effect. Rather, the size effect dominates my measures for public exposure. Unlike Neu, Warsame and Pedwell (1998) and Cormier, Magnan and van Velthoven (2005), who find a positive relationship between media coverage and environmental disclosure or Lim and McKinnon (1993), who find a positive relationship between political visibility and voluntary disclosure by statutory authorities, compliance with GAS does not seem to be driven by public exposure.

Continuously, compliance is positively associated with higher debt agency problems. In this respect, the result suggests that compliance with GAS is used to mitigate debt agency problems. Compliance with GAS might fulfill this in two ways. First, by providing better or more reliable accounting information that allow a better assessment of the financial situation of a firm. Second, by sending a reassuring signal to creditors that the management prepares accounting information by voluntarily complying to a stricter accounting set. This might also be taken as a signal that the firm is a trustworthy contract partner. Since Germany can be considered to be a bank-oriented country where banks have more direct ways to obtain financial information than from the annual report, the second explanation seems more likely than the first. To some extent, this is also backed up by the finding that GAS 3 compliance is negatively associated with financing needs implying that compliance with GAS 3 is not used to prepare qualitatively higher accounting information for creditors.

The auditor seems to play an important role in compliance with GAS. First, compliance is higher for firms that are audited by firms having an affiliation with the ASCG. Taken together with the circumstance that peer pressure is positively associated with GAS 2 compliance, this finding suggests that influence from outside the firm is an important factor in the decision to comply with GAS. The finding is further substantiated as the results reveal a negative relationship with being audited by a BIG4 audit firm. This indicates that firms consider being audited by a big audit firm as a stronger quality signal than complying with GAS.

A striking point of the investigation is that the results are rather equivocal among the different standards. This suggests that compliance with different standards fulfills different purposes for the firms and firms decide on a case-to-case basis to comply with single standards. Anecdotal evidence that is mostly related to GAS 4 further substantiates this finding since firms give rather unconvincing reasons not to comply with the standard. Once a firm complies with a standard, the decision is repeated in a routine fashion. This conclusion is fueled by the change analysis. Firms that newly report to comply with GAS 2 or GAS 3 exhibit only few changes to their prior cash flow statements and segment reports. This is especially true for those firms that only generally state to comply with GAS. The change analysis gives further evidence that compliance is associated with peer pressure.

Taken all together, the study yields little evidence that firms voluntarily commit to compliance in order to improve their accounting practice. Of course, the underlying assumption in this context is that compliance with German Accounting Standards really improves accounting. Taking it from there, this study suggests that firms pick requirements that are easy to comply with and report according compliance. In light of low compliance costs, it seems odd that not more firms choose this practice. This observation suggests that if the underlying framework is not perceived important enough, even mere labeling processes do not take place. The implications for institutions that publish accounting standards or codices that practitioners can choose to apply on a voluntary basis are fourfold. First, even in the light of a set of rules aiming at improving corporate disclosure, non-compliance is still prevalent and additional incentives and advantages for various users need to be provided in order to get the rules accepted by practitioners. Second, in order to avoid a labeling process, partial compliance to rules should be disclosed to the users of accounting information in detail as this might be relevant with regard to comparability. Third, acceptance of the standards by other firms within the same industry can have a positive influence on compliance. Fourth, affiliated third parties to the publishing organization that are also affiliated to firms that apply the standards can enhance compliance and dissemination of the standards.

Every research comes with caveats. This investigation’s purpose is to contribute to the existing accounting literature by explicitly addressing matters of public exposure and compliance pressure when investigating voluntary compliance. Measuring public exposure is no easy endeavor. I suspect press coverage to be biased towards larger companies that are not necessarily more publicly exposed than smaller companies. I alternatively propose to measure public exposure as the number of hits produced by a search request on the search engine Google. Unfortunately, I do not have these pieces of information as for the end of the considered years. Hence, I use data from 2008. It is difficult to asses how much noise this introduces. However, this means that I consider public exposure to be relatively stable over time. Notably, both public exposure measures work into the same direction. Another issue concerns external validity. It is important to note that the considered sample consists of firms that chose to follow German GAAP instead of international accounting standards. Prior evidence suggests that companies voluntarily following IAS/IFRS are systematically different from companies that decide not to do so (Gassen and Sellhorn, 2006). Other research also implies that these IFRS firms have incentives to provide high quality accounting information (Christensen, Lee and Walker, 2008). Hence, the sample might be biased towards firms with less incentives to provide high quality accounting information which in turn might influence the decision to comply with GAS. Also, the knowledge that IFRS application would become mandatory from 2005 onwards might have a suppressing effect on GAS compliance in later stages of the sample period. In this respect, the institutional setting is quite unique. While this study benefits from its quasi-experimental design, the generalizability of the results is to be questioned. The application of results to other non-mandatory accounting standards, codices and other institutional settings should only be done with caution.

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Appendix

Table A.1: Pooled logistic regression analysis of determinants of GAS 2 and GAS 3 compliance using fixed time and industry effects (n=405)

		GAS2				**GAS3**			
		Model (a)		**Model (a) + (c)**		**Model (a)**		**Model (a) + (c)**	
Independent variable	**Expected sign**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
MKTCAP	+	**0.282**	(0.060)	**0.329**	(0.080)	0.223	(0.132)	0.254	(0.133)
PRESS	+			-0.087	(0.618)			-0.076	(0.673)
ASCGMEM	+	1.142	(0.133)	1.191	(0.129)	0.333	(0.681)	0.380	(0.649)
TQ	+/-	-0.613	(0.329)	-0.631	(0.316)	-0.303	(0.534)	-0.287	(0.550)
BETA	+	-0.875	(0.165)	-0.860	(0.177)	-0.204	(0.704)	-0.194	(0.718)
FINANCE	+	**3.016**	(0.018)	**3.110**	(0.018)	**-2.023**	(0.099)	**-2.076**	(0.081)
LEV	+/-	**2.854**	(0.022)	**2.890**	(0.020)	**3.663**	(0.007)	**3.700**	(0.007)
%FORSALES	+/-	-0.750	(0.362)	-0.802	(0.334)	-0.506	(0.568)	-0.540	(0.543)
ROA	+/-	1.313	(0.315)	1.086	(0.397)	0.807	(0.573)	0.644	(0.658)
CLSHELD	-	**-1.815**	(0.052)	**-1.824**	(0.055)	**-2.222**	(0.015)	**-2.225**	(0.016)
SEG	+	0.014	(0.917)	0.016	(0.905)	-0.068	(0.631)	-0.070	(0.621)
LISTING	+	-0.142	(0.812)	-0.054	(0.929)	0.753	(0.165)	0.834	(0.139)
FORLISTING	+/-	0.398	(0.741)	0.452	(0.699)	-0.541	(0.678)	-0.442	(0.733)
BIG4	+	**-0.932**	(0.073)	**-0.891**	(0.099)	-0.065	(0.920)	-0.027	(0.968)
Year/Industry		yes/yes		yes/yes		yes/yes		yes/yes	
Number of observations	GAS=0	294		294		298		298	
	GAS=1	111		111		107		107	
Likelihood ratio χ^2		**175.568**	(0.000)	**176.182**	(0.000)	**201.358**	(0.000)	**201.736**	(0.000)
Rescaled R^2		0.469		0.470		0.522		0.523	

Variable definitions (data source):

MKTCAP is the natural logarithm of a firm's market capitalization (Worldscope), GOOGLE is the natural logarithm of the number of produced hits of a search request on the search engine Google using a firm's official name including legal form (www.google.de), PRESS is the natural logarithm of the number of articles found searching for a firm's official name including legal form (LexisNexis), ASCGMEM is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG but is not a BIG4 audit firm (hand-collected), TQ is market value of the equity at the end of the year plus the difference between the book value of assets and the book value of equity at the end of the year, divided by the book value of the assets at the end of the year (Worldscope), BETA is a measure of risk capturing the relationship between the volatility of the stock and the volatility of the market (Worldscope), FINANCE is net cash flow from financing activities to total assets (Worldscope), LEV is total debt to total assets (Worldscope), %FORSALES is foreign sales to sales (Worldscope), ROA is EBIT to average total assets (Worldscope), CLSHELD is closely held shares to common shares outstanding (Worldscope), SEG is the number of product segments (Worldscope), LISTING is an indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse at December 31 of the considered year (Deutsche Börse), FORLISTING is an indicator variable taking the value 1 if a firm has a foreign listing (hand-collected), BIG4 is an indicator variable taking the value 1 if a company is audited by one of the BIG4 audit firms (hand-collected).

Bold typeset denotes significant difference from zero (two-sided) below the 10 % level.

Table A.2: Auditor and GAS 2 compliance

		Model (1)		Model (2)		Model (3)		Model (4)	
Independent variable	**Expected sign**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
intercept		**-3.421**	(0.002)	**-3.437**	(0.002)	**-3.279**	(0.002)	**-3.585**	(0.005)
MKTCAP	+	**0.344**	(0.030)	**0.343**	(0.031)	**0.333**	(0.035)	**0.381**	(0.016)
PRESS	+	-0.096	(0.565)	-0.097	(0.561)	-0.107	(0.509)	-0.090	(0.561)
GAS2PEER	+	**2.531**	(0.009)	**2.553**	(0.011)	**2.263**	(0.018)	**2.831**	(0.005)
ASCGMEM	+					-0.369	(0.444)		
ASCGMEM_BIG4	+							0.5705	(0.429)
ASCGMEM_BIG5	+			0.081	(0.927)				
TQ	+/-	0.218	(0.657)	0.214	(0.659)	0.125	(0.798)	0.130	(0.784)
BETA	+	-0.432	(0.425)	-0.425	(0.434)	-0.418	(0.417)	-0.413	(0.485)
FINANCE	+	1.879	(0.119)	1.899	(0.114)	**2.050**	(0.070)	1.982	(0.123)
LEV	+/-	**2.382**	(0.038)	**2.395**	(0.037)	**2.265**	(0.049)	**2.670**	(0.026)
%FORSALES	+/-	0.274	(0.729)	0.273	(0.730)	0.048	(0.953)	0.254	(0.741)
ROA	+/-	0.202	(0.885)	0.206	(0.883)	0.394	(0.777)	0.439	(0.759)
CLSHELDDUM	-	-0.353	(0.488)	-0.350	(0.492)	-0.355	(0.477)	-0.295	(0.660)
SEG	+	0.151	(0.300)	0.150	(0.304)	0.139	(0.344)	0.108	(0.438)
LISTING	+	-0.155	(0.801)	-0.156	(0.800)	0.001	(0.999)	-0.174	(0.782)
FORLISTING	+/-	0.041	(0.970)	0.049	(0.965)	-0.134	(0.902)	0.249	(0.827)
BIG4	+							-1.004	(0.211)
BIG4*CLSHELDDUM	-							-0.044	(0.960)
BIG5	+	**-0.809**	(0.088)	-0.792	(0.118)				
Number of observations	GAS2=0	294		294		294		294	
	GAS2=1	111		111		111		111	
Likelihood ratio χ^2		**61.179**	(0.000)	**61.207**	(0.000)	**53.889**	(0.000)	**75.066**	(0.000)
Rescaled R^2		0.203		0.203		0.180		0.245	

Variable definitions (data source):

MKTCAP is the natural logarithm of a firm's market capitalization (Worldscope), PRESS is the natural logarithm of the number of articles found searching for a firm's official name including legal form (LexisNexis), GAS2PEER is a self-constructed variable measuring the degree of GAS 2 use in the industry, ASCGMEM is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG (hand-collected), ASCGMEM_BIG4 is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG but is not a BIG4 audit firm (hand-collected), ASCGMEM_BIG5 is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG but is not a BIG5 audit firm (hand-collected), TQ is market value of the equity at the end of the year plus the difference between the book value of assets and the book value of equity at the end of the year, divided by the book value of the assets at the end of the year (Worldscope), BETA is a measure of risk capturing the relationship between the volatility of the stock and the volatility of the market (Worldscope), FINANCE is net cash flow from financing activities to total assets (Worldscope), LEV is total debt to total assets (Worldscope), %FORSALES is foreign sales to sales (Worldscope), ROA is EBIT to averaged total assets (Worldscope), CLSHELDDUM is an indicator varialbe taking the value 1 if closely held shares to common shares outstanding is equal or higher than 51% (Worldscope), SEG is the number of product segments (Worldscope), LISTING is an indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse at December 31 of the considered year (Deutsche Börse), FORLISTING is an indicator variable taking the value 1 if a firm has a foreign listing (hand-collected), BIG4 is an indicator variable taking the value 1 if a company is audited by one of the BIG4 audit firms (hand-collected), BIG5 is an indicator variable taking the value 1 if a company is audited by one of the BIG5 audit firms (hand-collected).

Bold typeset denotes significant difference from zero (two-sided) below the 10 % level.

Table A.3: Auditor and GAS 3 compliance

		Model (1)		Model (2)		Model (3)		Model (4)	
Independent variable	**Expected sign**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
intercept		**-4.373**	(0.000)	**-4.770**	(0.000)	**-4.416**	(0.000)	**-5.026**	(0.000)
MKTCAP	+	**0.452**	(0.025)	**0.432**	(0.024)	**0.419**	(0.037)	**0.458**	(0.019)
PRESS	+	-0.124	(0.467)	-0.161	(0.360)	-0.138	(0.432)	-0.132	(0.466)
GAS3PEER	+	1.656	(0.228)	1.951	(0.130)	1.487	(0.277)	1.698	(0.202)
ASCGMEM	+					0.216	(0.672)		
ASCGMEM_BIG4	+							0.968	(0.215)
ASCGMEM_BIG5	+			**1.704**	(0.058)				
TQ	+/-	-0.028	(0.950)	-0.107	(0.788)	-0.159	(0.729)	-0.137	(0.736)
BETA	+	0.074	(0.871)	0.277	(0.549)	0.078	(0.865)	0.145	(0.746)
FINANCE	+	**-2.526**	(0.043)	-2.119	(0.129)	**-2.278**	(0.055)	**-2.302**	(0.073)
LEV	+/-	**3.238**	(0.030)	**3.562**	(0.013)	**3.370**	(0.016)	**3.516**	(0.014)
%FORSALES	+	0.018	(0.982)	0.090	(0.911)	-0.199	(0.806)	-0.123	(0.877)
ROA	+/-	-0.237	(0.881)	-0.225	(0.877)	0.303	(0.841)	0.003	(0.998)
CLSHELDDUM	-	0.170	(0.758)	0.218	(0.705)	0.149	(0.780)	0.701	(0.273)
SEG	+	0.079	(0.537)	0.053	(0.679)	0.092	(0.481)	0.036	(0.781)
LISTING	+	0.609	(0.293)	0.615	(0.285)	0.860	(0.134)	0.719	(0.204)
FORLISTING	+/-	-0.561	(0.629)	-0.363	(0.759)	-0.696	(0.533)	-0.866	(0.475)
BIG4	+							0.794	(0.326)
BIG4*CLSHELDDUM	-							-0.960	(0.214)
BIG5	+	-0.403	(0.452)	0.005	(0.994)				
Number of observations	GAS3=0	298		298		298		298	
	GAS3=1	107		107		107		107	
Likelihood ratio χ^2		**83.199**	(0.000)	**95.199**	(0.000)	**81.753**	(0.000)	**89.164**	(0.000)
Rescaled R^2		0.275		0.306		0.267		0.289	

Variable definitions (data source):

MKTCAP is the natural logarithm of a firm's market capitalization (Worldscope), PRESS is the natural logarithm of the number of articles found searching for a firm's official name including legal form (LexisNexis), GAS2PEER is a self-constructed variable measuring the degree of GAS 2 use in the industry, ASCGMEM is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG (hand-collected), ASCGMEM_BIG4 is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG but is not a BIG4 audit firm (hand-collected), ASCGMEM_BIG5 is an indicator variable taking the value 1 if a company is audited by an audit firm that is a member of the ASCG but is not a BIG5 audit firm (hand-collected), TQ is market value of the equity at the end of the year plus the difference between the book value of assets and the book value of equity at the end of the year, divided by the book value of the assets at the end of the year (Worldscope), BETA is a measure of risk capturing the relationship between the volatility of the stock and the volatility of the market (Worldscope), FINANCE is net cash flow from financing activities to total assets (Worldscope), LEV is total debt to total assets (Worldscope), %FORSALES is foreign sales to sales (Worldscope), ROA is EBIT to averaged total assets (Worldscope), CLSHELDDUM is an indicator varialbe taking the value 1 if closely held shares to common shares outstanding is equal or higher than 51% (Worldscope), SEG is the number of product segments (Worldscope), LISTING is an indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse at December 31 of the considered year (Deutsche Börse), FORLISTING is an indicator variable taking the value 1 if a firm has a foreign listing (hand-collected), BIG4 is an indicator variable taking the value 1 if a company is audited by one of the BIG4 audit firms (hand-collected), BIG5 is an indicator variable taking the value 1 if a company is audited by one of the BIG5 audit firms (hand-collected).

Bold typeset denotes significant difference from zero (two-sided) below the 10 % level.

Accounting quality after voluntary IFRS adoption – Evidence based on provision disclosure of German firms

Tolga Davarcioglu and Ulrich Küting

Abstract: We investigate effects of voluntary IFRS adoption on accounting quality based on provision disclosure using a sample of publicly listed German firms. The investigation primarily draws on compliance with disclosure requirements and on disclosure level. We take advantage of a same firm-year approach to assess changes in our accounting quality measures resulting from the transition from German GAAP to IFRS. We find that compliance is significantly lower and that disclosure level is significantly higher under IFRS. Non-compliance under IFRS primarily stems from the circumstance that virtually no firm fulfills the restrictive demands made on disclosing qualitative pieces of information. Improvement in the disclosure level primarily stems from more detailed disclosure in the balance sheet and more quantification in the notes. Emphasizing the limitations of our approach, the results are consistent with the notion that IFRS adoption has a positive impact on the disclosure aspect of accounting quality regarding accounting for provisions. Improvement is more pronounced for firms where provisions are relatively more important in proportion to the balance sheet and where IFRS adoption has a higher impact on the provisions. At the same time, positive changes are stronger for more levered and more closely held firms that typically have less incentives to provide accounting information for a broad investor base.

Keywords: International Financial Reporting Standards (IFRS), other provisions, voluntary adoption, accounting quality, IFRS compliance, disclosure level

1 Introduction

This paper investigates changes in accounting quality stemming from voluntary International Financial Reporting Standards (IFRS) adoption based on provision disclosure. The IFRS play an outstandingly important role in the harmonization process of accounting worldwide. The increasing number of countries adopting IFRS is a prominent demonstration of this role (PWC, 2009). The IFRS are developed by the IASB with the objective to create “a single set of high quality, understandable and enforceable accounting standards to help participants in the world’s capital markets and other users make economic decisions” (IASCF, 2009). The dispersion of IFRS in various parts of the world triggered the necessity to investigate the relationship between the standards and accounting quality. Generally, recipients of accounting information are perceived to appreciate high quality (Francis et al., 2004). Several studies document a positive effect of IFRS adoption on accounting quality. Most studies draw on the earnings aspect of accounting quality (e.g. Gassen and Sellhorn, 2006; Hung and Subramanyam, 2007; Barth, Landsman and Lang, 2008). An exemption is Daske and Gebhardt (2006) who focus on the disclosure aspect of accounting quality and find that disclosure quality has significantly increased under IFRS. Yet, quality changes on distinct parts of financial statements or line items of financial statements are rarely considered. This study contributes to this line of literature by addressing changes in provision disclosure after voluntary IFRS adoption.

The investigation is carried out for a distinct setting. We examine compliance with disclosure requirements and disclosure level related to other provisions of German publicly listed firms that voluntarily adopted IFRS. The analysis is restricted to the transition year (so called same firm-year approach) and a single item of the balance sheet: other provisions. All our explanations regarding provisions under German GAAP refer to the legal status before the German Accounting Law Modernization Act (*Bilanzrechtsmodernisierungsgesetz*). However, concerning provisions, the German Accounting Law Modernization Act particularly relates to recognition and measurement but not disclosure requirements.

Our methodology is characterized by four underlyings. First, within our investigation, we focus on voluntary IFRS adopters. The advantage of doing so is that accounting rules and incentives point towards the same direction. On the one hand, adoption of IFRS is supposed to increase accounting quality. On the other hand, IFRS adopting firms are expected to gain advantages from the increased accounting quality. Hence, our results should be particularly pronounced. In this respect, our setting can be interpreted to represent an upper bound. If an increase in accounting quality can not be shown for these firms, it seems unrealistic to expect such an increase for firms that adopt IFRS by mandate.

The second underlying is that we focus on one balance sheet line item: other provisions. Limiting the study to accounting for provisions is in a clear contrast to the holistic approach pursued in related studies. We consider other provisions to be a suitable object of study because it is an item that features essential scope of discretion and uncertainty. Hence, explicit and understandable disclosure is particularly important in order to decrease information asymmetries and to provide decision-useful information. Under German GAAP, regulations concerning provisions are of a general nature and guidance can be especially found in relevant literature and commentaries. In comparison, the IFRS regulations are more explicit and also offer additional guidance of application in practice. Hence, we can develop instruments that are able to capture variation between

German GAAP and IFRS disclosure related to provisions. Additionally, we believe that focusing on a single balance sheet item is beneficial in at least four respects: (i) Our approach extents existing literature since other studies primarily investigate imposed changes in accounting after IFRS adoption by drawing on measures of earnings quality (e.g. Van Tendeloo and Vanstraelen, 2005; Goncharov and Zimmermann, 2007; Barth, Landsman and Lang, 2008). Although various studies investigate compliance with IFRS requirements (Street and Bryant, 2000; Street and Gray, 2001; Glaum and Street, 2003), not much attention has been paid to disclosure compliance around IFRS adoption (Cascino and Gassen, 2010) and how adoption affects disclosure compared to local GAAP. Daske and Gebhardt (2006) who investigate perceived disclosure quality induced by IFRS adoption is an exemption to the studies that focus on properties of earnings as evaluation metric. (ii) We do not rely on a single “fit it all” score where typically sub scores are given for categories like content, readability and style, which are then aggregated to an overall score. Rather, we develop two indices that are purposefully designed to capture compliance and disclosure related to accounting for provision. As pointed out by Daske and Gebhardt (2006), this is a time-consuming endeavor usually carried out for comparably small samples. Consequently, generalization of results is restricted. Yet, it allows us to have a clearer understanding where changes in compliance and disclosure stem from. (iii) We are able to develop indices that we consider to be appropriate in assessing the actual degree of compliance with disclosure requirements and level of disclosure related to accounting for other provisions. German GAAP rules concerning other provisions are meaningfully different from IFRS in the sample period. Since the IAS 37 disclosure requirements are more demanding compared to German GAAP rules, we are able to develop a compliance index and a disclosure index that we consider suitable to assess actual disclosed information. This allows us to by-pass the “tick-off mentality problem" (Daske et al., 2009) where firms claim to comply with a standard but do not do so in every aspect of the standard. However, as the study reveals, this advantage materialized only partly since index scores are not heterogeneous enough within accounting regimes. We address this concern by drawing on a firm's written words related to provisions in the notes to have a more heterogeneous disclosure measure. (iv) We focus on a single standard that was not prone to essential modifications during our sample period. Consequently, we avoid problems arising from changes that are continuously made to the IFRS. This is in the spirit of Paananen and Lin (2009) who argue that IFRS accounting quality suffered over time due to continuous changes of the standards.

The third underlying is that we deploy a same firm-year analysis. Prior studies exploited the advantages of conducting same firm-year analyses on IFRS adoption (e.g. Hung and Subramanyam, 2007; Clarkson et al., 2010; Verriest, Gaeremynck and Thornton, 2009). The major advantage of this approach lies in the circumstance that firms need to restate accounting data of their final local GAAP year in their first statement under IFRS (transition or adoption year) which allows a comparison of accounting data that refers to the same year. Hence, data is not manipulated by time trends and other firm developments, rather, changes originate from the treatment effect of adopting a new accounting set.

Finally, the fourth underlying is that we focus on a single country. While cross-country studies and single country studies both exhibit different advantages and disadvantages (Barth, Landsman and Lang, 2008), we consider our approach advantageous for our purpose for several reasons. (i) Under German GAAP, other provisions do not only comprise obligations towards third parties. Rather, German GAAP mandates or offers accounting choices to recognize internal obligations in certain cases. This setting guarantees enough variability with regard to the adoption of IFRS rules in comparison to

German GAAP (between accounting regime comparison). (ii) We are interested in compliance with disclosure requirements and the level of disclosure. Both can be driven by cultural and institutional factors that are constant in our setting. (iii) Germany is considered to have an efficient judicial system with adequate enforcement of accounting rules. (iv) The possibility to prepare an IFRS consolidated financial statement instead of a German GAAP statement was comparably popular (Hung and Subramanyam, 2007). This circumstance guarantees to obtain a sufficiently large sample.

For a sample of 63 publicly listed German firms, we hand-collected financial statement data and disclosure items relating to other provisions. The study comprises three parts. In the first part, we present descriptive results related to accounting for provisions. To begin, we document quantitative adoption effects. Subsequently, we investigate effects on disclosure. We document and compare compliance with disclosure requirements imposed under German GAAP (final year prior to IFRS adoption) and under IFRS (transition or adoption year). Then, we document and compare the level of disclosure related to provisions under German GAAP and under IFRS. In doing so, we construct two indices: a compliance index and a disclosure index. The compliance index is naturally derived from requirements explicitly stated under German GAAP and IFRS. The disclosure index puts its focus on presentation of mandatory and voluntary disclosure items. In the second part, we investigate what drives compliance and disclosure on a firm level. In doing so, we conduct univariate and multivariate analyses. In the third and final part, we further substantiate our finding by a change analysis. Again, we conduct univariate and multivariate analyses.

Our descriptive results reveal significant differences in accounting for provisions under German GAAP and IFRS. Like prior studies, we show that provisions are significantly lower under IFRS than under German GAAP. Next, we show that compliance with disclosure requirements is higher under German GAAP than under IFRS. However, this result primarily reflects that German GAAP requirements are considerably less explicit compared to IFRS. Non-compliance under German GAAP stems primarily from violating the classification requirements of provisions in the balance sheet. Univariate results suggest that non-compliers with this requirement are significantly bigger and significantly more closely held. Multivariate tests confirm the univariate results and also suggest that compliance is higher when a firm’s provision ratio is higher. Compliance under IFRS needs to be seen in a differentiated light. None of the sample firms comply with all disclosure requirements of IAS 37 cumulatively. Firms comply with most of the quantitative disclosure requirements of IAS 37.84. However, compliance with the qualitative disclosure requirements of IAS 37.85 presents itself in a completely different light since compliance is considerably lower. Subsequently, we draw on disclosure related to other provisions. Our results suggest that disclosure is significantly higher under IFRS than under German GAAP. Higher disclosure stems for example from the circumstance that firms provide more quantitative information in the notes under IFRS. Since disclosure measured by the indices exhibits little variation, we draw on a firm’s written words related to other provisions in the notes as a proxy for the level of disclosure. While size and being audited by a BIG4 audit firm positively influence the number of written words under German GAAP, these determinants are not significantly associated with disclosure under IFRS. Our results show that a positive change in the number of written words as a proxy for disclosure quality is significantly stronger for more closely held firms. This is consistent with our multivariate results suggesting that disclosure is significantly negatively associated with more closely held firms under German GAAP. We do not find this association under IFRS anymore.

Our study can be considered to be of a “boutique” fashion as we shed light on exclusive issues around accounting for provisions and consequences of IFRS adoption. In this respect, we add to a well established literature stream around compliance with disclosure requirements (e.g. Street, Gray and Bryant, 1999; Street and Bryant, 2000; Street and Gray, 2001; Glaum and Street, 2003) and accounting quality after IFRS adoption (e.g. Daske and Gebhardt, 2006; Gassen and Sellhorn, 2006; Barth, Landsman and Lang, 2008). We add to existing literature as we do not focus on the earnings aspect of accounting quality or overall measures of disclosure but on a single balance sheet item. Our results indicate that firms adopting IFRS have higher accounting quality with regard to their provision disclosure than under German GAAP. The improvement is most pronounced for those firms where provisions are relatively more important and for firms that typically have fewer benefits from the provision of accounting information for a broad investor basis.

The remainder of the paper proceeds as follows. Section 2 gives background information on the institutional setting in Germany and on accounting for provisions under German GAAP and IFRS. Section 3 provides a literature review, hypotheses and a model development. Section 4 describes the sample and the data. Section 5 presents the analyses and the results. Section 6 gives the conclusion. Appendix A details the derivation of the accounting quality measures. Appendix B presents the sample firms and their quality measure scores.

2 Background

2.1 Institutional setting

In Germany, the internationalization of accounting began in the early 1990's (Soderstrom and Sun, 2007). Several reasons can be identified for this process. First, German accounting was considered not to be shareholder-oriented but to be prudent in order to protect creditors (Leuz and Wüstemann, 2004). Also, an increased demand by international investors created the necessity to provide internationally accepted accounting information. Some companies attacked this issue by drawing on so called dual accounting. The idea behind dual accounting is to prepare a financial statement under local GAAP and to align it with international standards (IAS/IFRS or US GAAP) by exploiting rule-based options. Alternatively, companies prepared one statement under local GAAP and an additional statement under international accounting standards. Second, companies listed in the USA were required to reconcile their financial statements to US GAAP. Third, national stock exchange requirements forced some companies to adhere to internationally accepted accounting standards. This was e.g. the case for companies listed in Neuer Markt.[1]

A regulatory reaction on the increased demand for international accounting information was the German Capital Raising Facilitation Act (*Kapitalaufnahmeerleichterungsgesetz - KapAEG*) of 1998. Accordingly, firms were allowed to prepare a consolidated financial statement under IAS/IFRS or US GAAP instead of a German GAAP statement. In this respect, two time frames can be distinguished. The first frame denotes the time of voluntary IFRS adoption and comprises firms that chose to adopt IFRS for fiscal years starting before January 1, 2005. These firms are subject of the investigation at hand. The second frame denotes the time of mandatory adoption and comprises firms that refused to adopt IFRS until that time but are affected by the European Commission's "IAS Regulation".

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[1] Reconciliation to IFRS or US GAAP was allowed until the end of 2000. From January 1, 2001 onwards, statements had to be prepared according to IFRS or US GAAP (Zwirner, Ranker and Wohlgemuth, 2001).

2.2 Accounting for provisions under German GAAP and IFRS

2.2.1 Basics

Provisions are a subset of liabilities. Within the scope of our investigation, we examine the effects on so called other provisions. In line with German GAAP, we define other provisions as provisions except those for taxes and pensions (Jödicke, 2009). Accounting for other provisions is strongly associated with assumptions and estimations. The magnitude of these assumptions and estimations vary with the degree of uncertainty. The degree of uncertainty is influenced by considerations as whether a firm has a present obligation and if so, how to estimate the expenditure required to settle the obligation.

2.2.2 Recognition

The rules concerning the recognition of other provisions differ between German GAAP and IFRS. In the course of the next paragraph, we give an overview of the different types of other provisions under the respective accounting regime. For the sake of brevity, we do not give a detailed description of the recognition criteria of other provisions.

The relevant paragraph dealing with the recognition of other provisions under German GAAP is para. 249 HGB.[2] It offers an exhaustive enumeration of types of other provisions. These types can be classified into external obligations (towards third parties) and internal obligations. Provisions concerning external obligations comprise provisions for uncertain liabilities and provisions for onerous contracts. This classification also entails provisions for restructuring costs. Provisions concerning internal obligations comprise provisions for maintenance expenses deferred to the next financial year, provisions for land restoration expenses deferred to the next financial year and provisions for other expenses. Provisions for restructuring costs can also feature components of internal obligations.

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[2] Our explanations are prior to changes caused by the German Accounting Law Modernization Act.

IAS 37 is the core standard that deals with other provisions under IFRS. However, circumstances that fall into the scope of other standards might also lead to the recognition of other provisions (IAS 37.5; Torklus, 2007). Under IFRS, recognition of provisions for external obligations (provisions for uncertain liabilities, onerous contracts and restructuring costs) are mandatory. Table 1 summarizes the recognition of other provisions under German GAAP and IFRS.

Table 1: Recognition of other provisions under German GAAP and IFRS

Type of other provision[a]	**German GAAP**	**IFRS**
External obligations		
Provision for uncertain liabilities	mandatory	mandatory
Provision for onerous contracts	mandatory	mandatory
Provision for restructuring costs[b]	mandatory	mandatory
Internal obligations		
Provision for maintenance expenses deferred to the first three months of next financial year	mandatory	forbidden
Provision for maintenance expenses deferred to a period after the first three months of next financial year	optional	forbidden
Provision for land restoration expenses deferred to the next financial year	mandatory	forbidden
Provision for other expenses	optional	forbidden

Notes:

[a] The different types of other provisions follow the terminology used in HGB para. 249 and IAS 37.

[b] Provisions for restructuring costs can feature components of external and internal obligations.

2.2.3 Measurement

Para. 253 sect. 1 sent. 2 HGB (prior to the German Accounting Law Modernization Act) deals with the measurement of other provisions under German GAAP. Other provisions are recognized with the value that emerges after reasonable management judgment. Basically, single obligations are measured on basis of their most likely outcome plus a prudent component. In the case of a continuous range of possible outcomes where each point of that range is as likely as any other, the provision must be recognized with the highest value (Rüdinger, 2004). Large populations of similar obligations (e.g. product warranties) are measured using the expected value method plus a prudent component. Only in cases where the underlying obligation features an interest component, the obligation has to be discounted regardless from the effect of the time value of money. Expected increases in prices and costs are not allowed to be taken into account according to a BFH (Federal Fiscal Court - *Bundesfinanzhof*) decision. However, it is not uncommon among firms to take these increases into account if the increases can be reliably anticipated (German Federal Ministry of Justice, 2008). If the expenditure is expected to be reimbursed by a third party and the reimbursement has been legally incurred, the reimbursement needs to be recognized as an asset. A reimbursement that does not fulfill the criteria to be recognized as an asset might affect the book value of the provision if the reimbursement is a virtually certain future claim.

Under IFRS, the core standard IAS 37 also deals with the measurement of provisions. Provisions are measured at the best estimate. In this context, the best estimate is the amount that a firm “would rationally pay to settle the obligation at the balance sheet date or to transfer it to a third party” (IAS 37.37). The most likely outcome is regarded to be the best estimate for single obligations. But also other possible outcomes are considered if they are mostly higher or mostly lower than the most likely outcome (Friederich and Schmidt, 2008). Large populations of similar obligations are measured using the expected value method (Rüdinger, 2004). In cases where the effect of the time value of money is material, the provision needs to be discounted (Torklus, 2007). Expected increases in prices and costs need to be considered, if there is sufficient evidence that they will occur (Förschle, Kroner and Heddäus, 1999). If the expenditure is expected to be reimbursed by a third party and the reimbursement is virtually certain, the reimbursement needs to be recognized as an asset (IAS 37.53).

Summing up, accounting for provisions is essentially different under German GAAP and IFRS. This applies to recognition criteria as well as to measurement concepts. The German GAAP principles related to provisions are considered to be strongly driven by the prudence principle (Leuz and Wüstemann, 2004; Moxter, 1999). Leeways are existent in both accounting regimes. Overall, most overlap exists with regard to recognition of obligations towards third parties. Differences are perceived not to be essential on this matter. Differences in measurement are more pronounced. Notably, it is forbidden to recognize internal obligations under IFRS (Förschle, Kroner and Heddäus, 1999; Kayser, 2002).

2.2.4 Disclosure

Under German GAAP, para. 266 HGB deals with the balance sheet format. Accordingly, a separate disclosure of other provisions, provisions for taxes and provisions for pensions between equity (*Eigenkapital*) and certain liabilities (*Verbindlichkeiten*) is required. A more detailed differentiation of each provision (and any other balance sheet item) is possible but a separation into current and non-current (other) provisions is not mandatory. Generally, German GAAP does not require to provide more detailed information concerning other provisions in the balance sheet or in the notes. If the firm does not separately disclose other provisions that are material in the balance sheet, para. 285 Nr. 12 HGB requires the firm to provide explanatory information in the notes. This information does not need to be quantitative. Also, information regarding the maturity of other provisions is not mandatory.

Under IFRS, IAS 1 deals with the balance sheet format. Accordingly, the balance sheet has to include a separate line item presenting provisions. This item does not include tax provisions since these are included in the tax liabilities. While tax provisions are required to be included in the line item tax liabilities, provisions for pensions can be subsumed under the line item provisions. If this is the case, the item other provisions can be derived by disclosure provided in the notes relating to IAS 19 (Employee Benefits). Generally, a more detailed differentiation of each provision (and any other balance sheet item) is possible or might even be necessary in cases where it is relevant to an understanding of the firm’s financial position (IAS 1.55). In the notes, IAS 37 requires to present detailed quantitative and qualitative information for each class of provision. According to IAS 37.84, the quantitative information comprise: (1) the carrying amount at the beginning and end of the financial period, (2) additional provisions made in the financial period including increases to existing provisions, (3) amounts used during the financial period, (4) unused amounts reversed during the financial period, (5) increase during the financial period in the discounted amount arising from the passage of time and the effect of any change in the discount rate. A firm does not need to disclose information regarding the amount by which a provision was underfunded. According to IAS 37.85, the qualitative information comprise: (1) a brief description of the nature and the expected timing of any resulting outflows, (2) an indication of the uncertainties about the amount or timing of those outflows, (3) the amount of any expected reimbursement plus information regarding an asset that has been recognized for that expected reimbursement.

IAS 37.11 distinguishes between provisions and accruals. Accruals are liabilities recognized for received goods or services for which no consideration has been given, invoiced or formally agreed upon. Consequently, accruals need to be reported separately from other provisions. German GAAP does not explicitly address accruals. Similar matters are often treated as other provisions (Förschle, Kroner and Heddäus, 1999).

3 Literature review, hypotheses and model development

3.1 Literature review

The introduction and application of IFRS was subject of manifold research, partially producing conflicting results. Likewise, documented benefits associated with IFRS are equivocal. However, studies investigate different angles of IFRS adoption in different institutional settings. Given the purpose of our study, our literature review concentrates on studies investigating the effect of IFRS adoption on accounting quality focusing on Germany or using a cross-country approach, and on compliance with IFRS disclosure requirements, respectively. To the best of our knowledge, (other) provisions are rarely the main focus of empirical work. Torklus (2007) empirically investigates the consequences of IFRS adoption on provisions including pensions but puts his focus on quantitative effects. Cascino and Gassen (2010) address whether mandatory IFRS adoption affects comparability of financial accounting information across countries on selected balance sheet line items. Particularly, they find an increase in comparability of provisions excluding pensions.

In a cross-country study, Barth, Landsman and Lang (2008) find evidence that application of IFRS is associated with higher accounting quality measured by earnings management, timely loss recognition and value relevance of accounting amounts. Van Tendeloo and Vanstraelen (2005) and Goncharov and Zimmermann (2007) investigate the relationship between voluntary IFRS adopters and earnings management. They find little evidence that earnings management behavior is different between firms reporting under IFRS or German GAAP. Using a matched sample, results of Gassen and Sellhorn (2006) indicate that earnings quality of IFRS adopters is higher than of firms reporting under German GAAP. Overall, studies find rather an improving effect on accounting quality. Research also implies that effects depend on rigor of IFRS adoption. Results of Christensen, Lee and Walker (2008) suggest quality effects differ for voluntary IFRS adopters and firms that adopted IFRS after it became mandatory in 2005 (IFRS resisters). Accordingly, accounting quality measured by earnings management and timely loss recognition increases with voluntary IFRS adoption. The authors find no improvements for IFRS resisters. Results of Paananen and Lin (2009) substantiate the last study showing evidence that accounting quality worsened over time. They attribute this development to changes in the standards.

Daske and Gebhardt (2006) investigate disclosure quality of Austrian, German and Swiss firms that voluntarily adopted IFRS. Using quality scores from so called “beauty contests” that rank the quality of financial reports, their findings suggest that the disclosure quality of the reports increased in all three countries. Verriest, Gaeremynck and Thornton (2009) investigate which factors are associated with the IFRS adoption quality of European firms. Their results suggest that adoption quality is driven by a firm’s corporate governance. Results of Bartov, Goldberg and Kim (2005) suggest that IFRS based earnings are more value relevant than earnings produced under German GAAP.

Hung and Subramanyam (2007) find that book value restatements are value relevant but find no similar result for income restatements.

Various studies investigate compliance with disclosure requirements of IFRS. Street, Gray and Bryant (1999), Street and Bryant (2000), Street and Gray (2001) and Glaum and Street (2003) document significant non-compliance with IFRS requirements and that compliance varies across different standards. The results also suggest that the level of compliance varies with firm characteristics. The importance of compliance with IFRS disclosure requirements is demonstrated by Hodgdon et al. (2008). Their results indicate that compliance enhances financial analysts' ability to provide more accurate forecasts.

3.2 Hypotheses and model development

The focus of our study lies on compliance with disclosure requirements and on disclosure level after IFRS adoption. Therefore, our study intersects with a strand of literature that deals with IFRS adoption and accounting quality. Accounting quality is an important concept. One essential purpose of accounting information is to facilitate transactions between insiders and outsiders of a firm. Theory as well as empirical evidence support the view that recipients appreciate high quality accounting information (e.g. Watts and Zimmerman, 1986; Francis et al., 2004). However, an accepted definition of accounting quality does not prevail in literature. This is certainly attributable to the circumstance that accounting quality is not easily measurable, and ultimately, users of accounting data need to agree on the quality of provided accounting information (Jonas and Blanchet, 2000).

Generally stated, accounting quality refers to the circumstance that provided accounting information might exhibit noise in form of bias or measurement error, or both (Imhoff, 1992). Noise can stem from uncertainty in accounting data as well as from managing accounting data. In so far, studies dealing with accounting quality try to operationalize measures that are suitable to pick up quality along these dimensions. Typically, studies draw on earnings quality since earnings are believed to be of particular interest for recipients of accounting information (Schipper and Vincent, 2003). Common attributes of interest are for example persistence, predictability or variability. As a non-earnings measure, Hribar, Kravet and Wilson (2010) propose to measure accounting quality by unexplained audit fees. These examples illustrate that accounting quality is an elusive concept (Chen et. al., 2010) that comprises several components. Our perspective on accounting quality follows Cascino et al. (2010): "The quality of accounting information refers to: i) the informativeness of reported numbers, ii) the level of disclosure, and iii) the degree of compliance with generally accepted accounting standards." Within this investigation, we focus on ii) the level of disclosure and iii) the degree of compliance with accounting standards related to accounting for provisions around IFRS adoption. In this context, we are interested in accounting quality particularly with regard to disclosed information. We extend the literature by two means. On the one hand, we assess whether compliance with disclosure requirements and the level of disclosure are different under German GAAP and IFRS. On the other hand, we investigate which firm characteristics drive these accounting quality measures.

We propose the application of two indices in order to assess whether compliance with disclosure requirements and disclosure level are different under German GAAP and IFRS. In our endeavor, we face the following challenge: "Financial disclosure is an abstract concept that cannot be measured directly" (Cooke and Wallace, 1989). Indices allow to measure disclosure by drawing on various items and assessing the existence of these items. Deflation by the number of items results in a value between zero and one.

The application of indices in order to measure disclosure is widespread (e.g. Singhvi and Desai, 1971; Robbins and Austin, 1986), but not unanimous. This roots in the circumstance that more disclosure does not necessarily result in high quality disclosure (Marston and Shrives, 1991). In this respect, we follow the view that the extent of disclosure and quality in disclosed information are positively associated (Botosan, 1997). Our measures are the following:

Compliance index

We construct an index that captures to which extend a firm complies with mandatory disclosure requirements related to accounting for provisions in the process of preparing a consolidated financial statement. The measure is constructed under German GAAP and IFRS.

German GAAP requests compliance with two requirements. First, the classification of provisions needs to follow the requirements provided in para. 266 HGB. Second, additional information concerning other provisions have to be provided in the notes. Requirements are more extensive under IFRS. Accordingly, the preparer is required that (1) the classification of provisions follows IAS 1, (2) criteria of IAS 37.84 and (3) of IAS 37.85 are fulfilled. IAS 37.84 demands disclosure of quantitative pieces of information, and IAS 37.85 demands disclosure of qualitative pieces of information. The criteria need to be fulfilled cumulatively. A detailed derivation of the index is provided in Appendix A.

Disclosure index

We construct an index that captures a firm's disclosure level related to accounting for provisions in its financial statement. Unlike the first measure, this index does not exclusively draw on mandatory pieces of information. Rather, the index captures whether a firm discloses quantitative and qualitative pieces of information with regard to provisions. The index is constructed under German GAAP and IFRS. In order to ensure comparability between German GAAP and IFRS, both measures comprise five items and each item has a roughly comparable counterpart under German GAAP and IFRS.

The first three items refer to classification of provisions in the balance sheet. We assess whether (1) the balance sheet is separated into current and non-current other provisions, (2) a firm follows the balance sheet classification requirements and (3) whether a firm exceeds these requirements. The other two items refer to disclosure in the notes: (4) one item captures whether qualitative information are provided, and (5) one item captures whether quantitative information are provided. The last two items are particularly less restrictive than the cumulative requirements under IAS 37.84 and IAS 37.85 for the compliance index. A detailed derivation of the index is provided in Appendix A.

Number of words in the notes

In addition to the compliance and disclosure indices we draw on a firm’s written words related to other provisions in the notes in order to measure the disclosure level. This allows us to capture accompanying information related to other provisions. We count the number of words that are written in an individual section to other provisions within the notes.

Appendix B presents the sample firms and their individual accounting quality measure scores.

Hypotheses

Within our investigation, we assess whether the compliance index and disclosure index are higher under IFRS than under German GAAP. We make no prediction with regard to compliance for two reasons. First, compliance requirements are different among both accounting regimes. Second, prior literature shows that compliance with IFRS disclosure requirements are driven by firm characteristics (Street and Gray, 2001). We are interested in the impact of a change in the accounting regime on disclosure for provisions and keep firm characteristics comparatively stable due to the same-firm year approach. Consequently, making a priori predictions on disclosure compliance resulting from a switch of the accounting regime faces conflicting explanations. We have no reason to believe that a firm committed to high compliance might change this commitment with voluntary IFRS adoption. An assessment is more difficult for firms exhibiting low compliance under German GAAP. Depending on the reasons that cause low compliance, low compliance might prevail under IFRS because compliance mechanisms are not well pronounced. However, firms voluntarily adopting IFRS might take the switch as a fresh start to improve their accounting quality and be more inclined to comply with the new regulations right away. Also, compliance might be lower under IFRS initially because firms are adopting a new accounting regime and need to adjust to the new compliance rules first.

We expect an increase in the disclosure level under IFRS. It is the proclaimed goal to provide decision-useful information with the IFRS. Consequently, provided information shall be of high quality, understandable, transparent and comparable. According to existent literature, German GAAP is only limitedly suitable in fulfilling these claims. The expected increase should be especially apparent in our setting since we investigate voluntary IFRS adopters.

After assessing the impact of voluntary IFRS adoption on our accounting quality measures, we investigate what determinants drive these measures on a firm level. In doing so, we draw on prior literature. When we assess what drives our measures under German GAAP (IFRS) all independent variables refer to the final German GAAP year (IFRS adoption year). We use the following regression specifications:

$$\begin{aligned} AccountingQuality = {} & \beta_1 SIZE + \beta_2 PROV\ RATIO + \beta_3 LEV + \beta_4 ROA + \beta_5 MTB \\ & + \beta_6 CLSHELD + \beta_7 LISTING + \beta_8 BIG4 + industrydummies + \varepsilon \end{aligned}$$

When we assess what drives our measures under IFRS, we extend the model as follows:

$$\begin{aligned} AccountingQuality = {} & \beta_1 SIZE + \beta_2 PROV\ RATIO + \beta_3 ABS(\Delta PROV) + \beta_4 LEV \\ & + \beta_5 ROA + \beta_6 MTB + \beta_7 CLSHELD + \beta_8 LISTING + \beta_9 BIG4 \\ & + industrydummies + \varepsilon \end{aligned}$$

where SIZE is the natural logarithm of a firm's total assets (hand-collected), PROV RATIO is book value of other provisions to total assets (both hand-collected), ABS(ΔPROV) is the absolute value of transition year book value of other provisions under IFRS minus book value of other provisions under German GAAP, scaled by book value of other provisions under German GAAP (both hand-collected), LEV is total debt (Worldscope) to total assets (hand-collected), ROA is EBIT (Worldscope) to total assets (hand-collected), MTB is market capitalization (Worldscope) to book value of equity (hand-collected), CLSHELD is closely held shares to common shares outstanding (Worldscope), LISTING is an indicator variable taking the value 1 if a company is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse (Deutsche Börse), BIG4 is an indicator variable taking the value 1 if a firm is audited by one of the BIG4 audit firms (hand-collected), and *industrydummies* are indicator variables that base on the first-digit SIC code (Worldscope). *AccountingQuality* is one of our three accounting quality measures as described above. See also Appendix A and Appendix B for the accounting quality measures.

Subsequently, we discuss the control variables used in our model.

Size

We include a control for a firm's size (TOTASS) in our model. The benefits of high quality disclosure are expected to be higher for bigger firms. Several reasons are conjectured for this relationship. Bigger firms are supposed to incur relatively less costs from producing more information (e.g. Raffournier, 1995) and suffer less consequences from disclosing sensitive information to competitors (Meek, Roberts and Gray, 1995). Consequently, we expect a positive sign on our measures.

Provision ratio

We include a firm's provision ratio (PROV RATIO) in our model. Provisions represent a potential outflow of economic resources which is an important piece of information in assessing a firm's economic situation. Supposedly, the role of provisions for a firm is more pronounced when provisions take a relatively higher proportion in a firm's size. Hence, interested recipients of accounting information will put more attention on this line item when the relative importance for the economic situation is higher which in turn should positively influence disclosed information. Consequently, we expect a positive relationship between our measures and the provision ratio.

Impact of IFRS adoption (change in provisions)

We control for the impact associated with IFRS adoption on provisions (akin Verriest, Gaeremynck and Thornton, 2009). In doing so, we include the unsigned impact of IFRS adoption on provisions (ABS(ΔPROV)). The association with disclosed information seems not unanimous. On the one hand, when impact on provisions is high, this might imply that changes are more complex and providing high quality disclosure might be more demanding. Thus, a negative association with disclosure might result. On the other hand, a higher impact implies a higher necessity to disclose information on the changes. Also, it might indicate a stronger rigor to apply IFRS, which might be associated with a higher quality in disclosed information. Hence, we make no predictions on the expected sign.

Leverage

We include leverage (LEV) in our model. The interpretation of leverage on disclosure quality is not unambiguous. A high debt concentration can imply information needs of banks which in turn could cause a positive relationship between leverage and disclosure quality (Chow and Wong-Boren, 1987). On the other hand, banks are perceived as insiders to a firm with adequate information channels other than the annual statement which in turn might even cause a negative relationship with disclosure quality (Cuijpers and Buijink, 2005). Due to the ambivalent nature of leverage, we make no prediction on the association with disclosed information.

Profitability

We include a control for profitability (ROA) in our model. When profitability is low, management might prefer to disclose less information with the goal to suppress bad news or possible bad developments. On the other hand, when profitability is high, management might want to provide more disclosure in order to reflect possible good developments. Yet, there might also be strategic motives to limit disclosure. Disclosed information might be very valuable for competitors, giving management reasons for partial disclosure (Wagenhofer, 1990). Prior empirical results on the relationship between profitability and disclosure are mixed (Singhvi and Desai, 1971; Meek, Roberts and Gray, 1995; Dumontier and Raffournier, 1998). Due to the ambivalent relationship between profitability and disclosure, we do not make a prediction on our measures.

Market-to-book ratio

We include a firm's market-to-book ratio measured as a firm's market capitalization over a firm's book value of equity. This proxy is supposed to capture a firm's growth opportunities. Glaum and Street (2003) suggest that growth opportunity and compliance with disclosure requirements is not determinate. The associated higher future funding requirements can create an incentive to provide "complete, reliable and timely information" (Glaum and Street, 2003). However, challenges imposed by growth might discourage compliance with disclosure requirements. While we deem it important to control for growth opportunities, it should be kept in mind that the proxy was prone to strong variation in the market prices for the sample firms due to the stock market downturn of 2002. The circumstance that 18 of our sample firms have a market-to-book ratio smaller than 1 should be seen against this background. 14 of these firms had their IFRS adoption in 2002.

Ownership structure

Since the ownership structure of a firm influences monitoring activities, it is also important for disclosure quality. Where ownership is more condense, it is easier to maintain a closer relationship with a firm's manager and to obtain information by other means than the annual report. On the other hand, firms featuring a more dispersed ownership are expected to have a higher need to provide their investors with high quality financial reporting (Cuijpers and Buijink, 2005). Consequently, we expect a negative sign on our measures when firms are more closely held (CLSHELD).

Listing status

Capital market pressures have been found to be associated with disclosure (e.g. Cooke, 1989; Dumontier and Raffournier, 1998; Street and Bryant, 2000). We control whether a firm is listed in one of the selection indices of Deutsche Börse (LISTING). Being listed in one of these selection indices is associated with requirements to size and market capitalization as well as higher disclosure requirements. Also, members of the selection indices compete for investors, which induces a need to produce high quality accounting disclosure. We expect a positive sign on our measures.

Auditor

Auditors are an important corporate governance instrument in Germany (Ashbaugh and Warfield, 2003). We include the indicator variable BIG4 that is one if a firm is audited by Arthur Andersen (only for the years 2000 and 2001), Ernst & Young, KPMG, PWC or Deloitte & Touche. Several reasons speak for a positive relationship between being audited by a BIG4 audit firm and disclosure. Larger auditing firms are believed to have the possibility to access a broader range of knowledge and have superior training concerning international accounting standards. Also, large audit firms are believed to convince their clients to comply with accounting and disclosure requirements in order to demonstrate their independence (Street and Gray, 2001). We expect a positive sign on our measures.

Industry

Membership to a certain industry might affect disclosure for several reasons. First, certain pieces of information can be more important in one industry than in another. Second, firms in some industries might prefer not to share sensitive information with their competitors. Meek, Roberts and Gray (1995) find that firms belonging to the oil, chemical and mining industry provide more non-financial information than other industries. Disclosure concerning provisions might differ across industries in so far that certain industries need to recognize provisions that are not prevalent in other industries (e.g. provisions related to environmental restoration). In order to control for industry effects, we include industry dummies.

4 Sample and data

4.1 Sample selection

Our sample consists of 63 German listed companies that voluntarily adopted IFRS for the first time. We consider adoption years 2000 until 2004. We start in 2000 because this was the first full fiscal year in which IAS 37 had to be applied. The final year is determined by the IAS Regulation that mandates IFRS adoption for fiscal years starting in 2005. We define the adoption year as the year when IFRS "are applied in full for the first time as the primary accounting basis" (SIC-8.3). This is contrary to IFRS 1 that defines the date of transition to IFRS as the "beginning of the earliest period for which an entity presents full comparative information under IFRSs in its **first IFRS financial statements**" (IFRS 1 Appendix 1; emphasis not added).

We identify voluntary IFRS adopters that have their adoption year between 2000 and 2004 using the Worldscope database and the item "accounting standards followed"

(WS 07536). In order to enhance the identification of voluntary IFRS adopters, we rely on updated data used in Gassen and Sellhorn (2006). We start with all observations in the Worldscope Universe between 1999 and 2004. We make the following modifications to derive our final sample: First, we delete all observations where the Worldscope item "accounting standards followed" is missing. Second, we delete observations where the Worldscope item "accounting standards followed" is unavailable for the lagged year. Third, we delete firms that did not change their accounting regime from German GAAP to IFRS. Fourth, we delete all financial firms as indicated by their SIC code since these firms underlie specific accounting requirements (Dumontier and Raffournier, 1998). Finally, we delete all firms, where we could not obtain consolidated financial statements for the final German GAAP year and the adoption year. This yields a final sample of 63 firms for which we have the IFRS financial statement of the adoption year including comparative IFRS accounting numbers for the final German GAAP year and the last financial statement under German GAAP. Table 2 summarizes the sample selection.

Table 2: Sample selection (in number of distinct firms)

	Action	Number of firms
Worldscope Universe 1999-2004		**1418**
minus: firms where the Worldscope item "accounting standards followed" (WS 07536) is missing	-233	1185
minus: firms where the Worldscope item "accounting standards followed" (WS 07536) is unavailable for the previous year	-100	1085
minus: firm that did not change accounting standards from German GAAP to IFRS	-957	128
minus: financial firms	-26	102
minus: financial statements were unavailable	-39	63
Final Sample		**63**

Table 3 displays in which years our sample firms adopted IFRS. The time trend shows an increase of adopters with the year 2002 marking the peak of IFRS adoption in our sample. More than half of our sample firms adopted IFRS in the years 2001 or 2002.

Table 3: Number of German firms switching from German GAAP to IFRS by year (n=63)

Year	2000	2001	2002	2003	2004	
Number	6	14	20	9	14	Σ 63

The following is important to note for our sample derivation: First, for firms where the fiscal year does not coincide with the calendar year, we assign the firm to the year when the fiscal year started. For example, fiscal years starting January 1, and September 1, 2002 are both treated as belonging to the year 2002. On the one hand, this is consistent with the IAS Regulation, which mandates companies to adopt IFRS on financial years starting on or after January 1, 2005 (European Commission, 2002). On the other hand, this is consistent with the classification used in Gassen and Sellhorn (2006). Second, following Gassen and Sellhorn (2006), we consider firms that are required to prepare consolidated financial statements under IFRS due to national stock exchange requirements as voluntary adopters because these firms could have chosen segments without these requirements. Third, we verify that both financial statements belonging to each adopter are consolidated financial statements and we verify that all identified firms are actual voluntary adopters by inspecting the notes and the audit report. The adoption year was initially misclassified for eight companies, because the information in the item "accounting standards followed" was miscoded. We adjusted the adoption year for these eight companies. Also, we deleted ten firms where the information was miscoded because these firms were using German GAAP or IFRS throughout the sample period.

Fourth, we need to acknowledge that we are possibly unable to identify voluntary IFRS adopters due to other potential existing miscodings.

4.2 Data

Our sample of voluntary IFRS adopters is comparably small. While this is a downside with respect to the power of statistical tests, it enables us to evasively hand-collect data from the financial statements. For each firm, we hand-collected the following financial data from the statements: (1) total assets, (2) equity (including non-controlling interests), and (3) other provisions. Next, we evasively collected data in order to construct our accounting quality measures. The collected pieces of information relate to provided disclosure around other provisions. We also collected information on a firm's auditor. In order to complement our analyses, we also draw on information provided by Worldscope.

5 Empirical analyses

5.1 Quantitative effects of IFRS adoption on provisions

Table 4 displays descriptive statistics for the sample firms. Panel A shows firm descriptives for the final German GAAP year and Panel B for the IFRS adoption year. All accounting variables, which are not truncated by definition are winsorized by their 5% and 95% interval to account for outliers. Table 5 shows correlations between the dependent and independent variables for the final German GAAP year and Table 6 for the IFRS adoption year.

Our focus on publicly listed firms, coverage on Worldscope and the sample selection process causes a bias towards bigger and more mature firms. The descriptive statistics illustrate that firm characteristics are kept comparable stable due to the same firm-year approach from Panel A to Panel B. Notably, correlations show a negative correlation between the quality measures and size except for the number of words in the notes under German GAAP as well as under IFRS. Also, all quality measures are negatively correlated with a more condensed ownership structure under German GAAP. This relationship is not that distinct under IFRS. Likewise noteworthy is the circumstance that compliance under IFRS is positively and significantly correlated with being audited by a large audit firm while it is not significant under German GAAP.

Table 4: Descriptive statistics of the sample firms (n=63)

Variable	Mean	Std.dev	Minimum	25th percintile	Median	75th percintile	Maximum
Panel A							
MKTCAP	1,377.820	2,587.870	15.962	106.196	298.996	812.955	9,397.500
SALES	3,009.360	5,557.740	21.465	191.578	814.404	1,982.200	19,952.640
%FORSALES	0.425	0.284	0.000	0.136	0.423	0.713	0.812
LEV	0.235	0.153	0.000	0.091	0.233	0.350	0.489
ROA	0.056	0.077	-0.162	0.036	0.065	0.095	0.177
MTB	2.144	1.484	0.699	1.046	1.508	2.968	5.566
CLSHELD	0.496	0.265	0.000	0.300	0.516	0.679	0.990
AGE	68.444	54.671	0.000	27.000	56.000	119.000	253.000
LISTING	0.587	0.496					
BIG4	0.667	0.475					
Panel B							
MKTCAP	1,705.410	3,469.560	17.136	69.300	257.337	676.544	12,544.550
SALES	3,222.850	6,051.580	29.712	213.818	783.749	2,168.500	22,032.290
%FORSALES	0.410	0.276	0.000	0.143	0.408	0.697	0.807
LEV	0.250	0.151	0.004	0.112	0.267	0.361	0.483
ROA	0.058	0.049	-0.026	0.022	0.051	0.095	0.142
MTB	1.746	1.166	0.436	0.870	1.518	2.349	4.859
CLSHELD	0.496	0.250	0.000	0.313	0.509	0.673	0.990
AGE	69.444	54.671	1.000	28.000	57.000	120.000	254.000
LISTING	0.556	0.501					
BIG4	0.667	0.475					

Variable definitions (data source):

MKTCAP is a firm’s market capitalization in M€ (WC08001), SALES is a firm’s sales in M€ (WC01001), %FORSALES is foreign sales (WC07101) to sales (WC01001), LEV is total debt (WC03255) to total assets (hand-collected), ROA is EBIT (WC18191) to total assets (hand-collected), MTB is market capitalization (WC08001) to book value of equity (hand-collected), CLSHELD is closely held shares to common shares outstanding (WC08021), AGE is a firm’s age calculated as observation year minus the year of foundation (WC18272), LISTING is an indicator variable taking the value 1 if a firm is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse (Deutsche Börse), BIG4 is an indicator variable taking the value 1 if a firm is audited by one of the BIG4 audit firms (hand-collected).

Notes:

Panel A shows firm descriptives of the final German GAAP year and Panel B shows firm descriptives of the IFRS adoption year.

Table 5: Pearson/Spearman correlations between dependent/independent variables for the last German GAAP year(n=63)

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
(1) HGB COMPLIANCE		**0.934**	**0.711**	-0.164	**-0.422**	-0.089	0.175	-0.035	0.047	**-0.398**	0.073	0.024
(2) HGB266	**0.934**		**0.619**	**-0.251**	**-0.505**	-0.074	0.182	-0.075	0.153	**-0.399**	0.060	-0.069
(3) HGB DISCLOSURE	**0.698**	**0.603**		0.032	**-0.276**	-0.054	0.105	-0.147	0.116	**-0.410**	0.149	0.095
(4) WORD RANKING	**-0.240**	**-0.344**	-0.085		**0.396**	**0.334**	-0.031	0.166	0.153	-0.088	0.152	**0.239**
(5) TOTASS	**-0.423**	**-0.508**	**-0.277**	**0.419**		**0.364**	-0.026	**0.286**	0.082	0.161	0.167	0.130
(6) PROV RATIO	-0.121	-0.088	-0.084	**0.333**	**0.349**		**-0.378**	0.069	-0.038	-0.049	0.035	0.014
(7) LEV	0.179	0.187	0.088	-0.075	-0.038	**-0.395**		0.053	0.054	**-0.223**	0.201	0.009
(8) ROA	-0.029	-0.029	-0.128	0.161	0.139	0.032	0.033		**0.303**	**0.250**	**0.355**	-0.046
(9) MTB	-0.041	0.047	0.010	-0.002	0.038	-0.033	0.070	**0.337**		0.100	0.006	-0.013
(10) CLSHELD	**-0.380**	**-0.378**	**-0.380**	-0.082	0.135	-0.034	-0.195	**0.224**	0.160		**-0.390**	0.201
(11) LISTING	0.073	0.060	0.153	0.125	0.150	0.082	0.191	**0.264**	-0.103	**-0.390**		-0.182
(12) BIG4	0.024	-0.069	0.093	0.190	0.152	-0.019	0.021	0.062	-0.058	0.203	-0.182	

Variable definitions (data source):

HGB COMPLIANCE is the compliance index (compare Appendix for computation), HGB266 is an indicator variable taking the value one if a firm complies with para. 266 HGB, HGB DISCLOSURE is the disclosure index (compare Appendix for computation), WORD RANKING is a ranking of the number of written words in the notes related to other provisions where rank 1 is given to the highest number, TOTASS is the natural logarithm of a firm's total assets (hand-collected), PROV RATIO is other provisions to total assets (both hand-collected), LEV is total debt (Worldscope) to total assets (hand-collected), ROA is EBIT (Worldscope) to total assets (hand-collected), MTB is market capitalization (Worldscope) to book value of equity including non-controlling interests (hand-collected), CLSHELD is closely held shares to common shares outstanding (Worldscope), LISTING is an indicator variable taking the value 1 if a firm is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse (Deutsche Börse), BIG4 is an indicator variable taking the value 1 if a firm is audited by one of the BIG4 audit firms in the final German-GAAP year (hand-collected).

Notes:

Pearson (Spearman) correlations are displayed in the upper (lower) part of the correlation matrix, above (below) the diagonal.

Bold typeset denotes significant correlations below the 10 % level.

All variables refer to the final German-GAAP year.

Table 6: Pearson/Spearman correlations between dependent/independent variables for the IFRS adoption year(n=63)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) IFRS COMPLIANCE		**0.761**	**0.646**	-0.017	0.118	-0.005	0.067	0.019	-0.004	-0.074	0.142	0.033	**-0.300**	**0.385**
(2) IAS1	**0.756**		**0.847**	**-0.214**	0.114	**-0.267**	-0.033	0.079	-0.147	0.023	0.079	0.002	**-0.288**	0.114
(3) IFRS DISCLOSURE	**0.630**	**0.838**		-0.166	0.144	-0.203	-0.167	0.128	-0.063	0.017	0.088	-0.003	**-0.360**	0.121
(4) WORD RANKING	-0.024	-0.179	-0.139		**0.643**	**0.225**	0.186	-0.035	0.093	-0.164	0.068	-0.012	0.013	0.149
(5) CHANGE WORD RANKING	0.106	0.114	0.141	**0.729**		-0.140	0.012	-0.003	0.198	-0.084	0.087	0.040	-0.087	-0.003
(6) TOTASS	0.043	**-0.232**	-0.166	0.154	-0.128		**0.272**	0.019	0.048	0.186	0.147	0.062	**0.263**	0.203
(7) PROV RATIO	0.052	-0.064	**-0.232**	0.133	-0.007	**0.268**		**-0.600**	-0.138	0.027	-0.093	0.018	0.057	0.068
(8) ABS(ΔPROV)	-0.004	0.044	0.134	-0.070	-0.026	0.097	**-0.570**		-0.134	0.129	**0.238**	-0.045	0.010	0.061
(9) LEV	-0.019	-0.133	-0.047	0.120	0.198	0.010	-0.110	-0.097		-0.183	-0.018	**-0.296**	0.164	-0.005
(10) ROA	-0.062	0.017	-0.022	-0.075	-0.089	**0.215**	0.070	0.100	-0.176		**0.392**	**0.228**	0.104	0.005
(11) MTB	0.145	0.074	0.098	-0.035	0.094	0.081	-0.144	0.154	0.011	**0.431**		0.196	-0.108	-0.023
(12) CLSHELD	0.041	-0.008	-0.007	-0.033	0.031	0.032	0.014	0.021	**-0.273**	**0.221**	**0.239**		**-0.322**	**0.209**
(13) LISTING	**-0.299**	**-0.288**	**-0.367**	0.092	-0.087	**0.266**	0.075	-0.018	0.163	0.115	**-0.218**	**-0.302**		-0.090
(14) BIG4	**0.391**	0.114	0.129	0.118	-0.003	**0.232**	0.056	0.110	-0.022	0.012	-0.035	**0.210**	-0.090	

Variable definitions (data source):

IFRS COMPLIANCE is the compliance index (compare Appendix for computation), IAS1 is an indicator variable taking the value one if a firm complies with IAS 1, IFRS DISCLOSURE is the disclosure index (compare Appendix for computation), WORD RANKING is a ranking of the number of written words in the notes related to other provisions where rank 1 is given to the highest number, CHANGE WORD RANKING is a ranking of the relative change in written words in the notes related to other provisions where rank 1 is given to the highest positive change, TOTASS is the natural logarithm of a firm's total assets (hand-collected), PROV RATIO is other provisions to total assets (both hand-collected), ABS(ΔPROV) is the unsigned value of transition year book value of provisions under IFRS minus book value of provisions under German GAAP scaled by book value of provisions under German GAAP, LEV is total debt (Worldscope) to total assets (hand-collected), ROA is EBIT (Worldscope) to total assets (hand-collected), MTB is market capitalization (Worldscope) to book value of equity including non-controlling interests (hand-collected), CLSHELD is closely held shares to common shares outstanding (Worldscope), LISTING is an indicator variable taking the value 1 if a firm is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse (Deutsche Börse), BIG4 is an indicator variable taking the value 1 if a firm is audited by one of the BIG4 audit firms (hand-collected).

Notes:

Pearson (Spearman) correlations are displayed in the upper (lower) part of the correlation matrix, above (below) the diagonal.

Bold typeset denotes significant correlations below the 10 % level.

The number of observations for the variable CHANGE WORD RANKING amounts to 60 since this variable could not be calculated for the full sample.

All variables refer to the IFRS adoption year.

In Panel A of Table 7 we display absolute changes for (1) total assets, (2) equity (including non-controlling interests), (3) other provisions, (4) equity ratio and (5) provision ratio under German GAAP (HGB) and IFRS (IFRS-HGB) for the same fiscal year. As expected, total assets and equity are on average larger under IFRS than under German GAAP. This result is comparable to Hung and Subramanyam (2007). Among other, this is due to the recognition criteria for intangible assets and noticeable more fair value measurement under IFRS. In contrast, other provisions are smaller under IFRS. All these results are in line with prior literature (Burger, Fröhlich and Ulbrich, 2004; Burger et al., 2005; Leker, Mahlstedt and Kehrel, 2008). The results regarding the provision ratio (deflation by total assets) indicate an average decrease. This effect is driven by the fact that the numerator decreases while the denominator increases. Equity to total assets increases on average. All absolute changes except for the equity ratio are significantly different from zero at conventional significance levels. The non-significance of the effect on the equity ratio needs to be seen against the background that the numerator as well as denominator increase on average.

In Panel B of Table 7, we report relative changes for the same items. In line with prior literature (e.g. Burger, Fröhlich, Ulbrich, 2004; Leker, Mahlstedt and Kehrel, 2008), we compute the percentage change as the difference of the IFRS value and the German GAAP value divided by the German GAAP value. The percentage changes show that on average (1) total assets increase by 11.2%, (2) equity including minority interest increases by 16.3%, (3) other provisions decrease by 29.2%, (4) equity ratio increases by 4.3% and (5) provision ratio decreases by 36.2% under IFRS. All percentage changes except for the equity ratio are significantly different from zero at conventional significance levels.

Table 7: Descriptive statistics and univariate analysis of balance sheet figures (n=63)

Panel A: Absolute changes

	IFRS-HGB			**HGB**							
Variable	**Mean**	**Std.dev**	**Median**	**Mean**	**Std.dev**	**Median**	**Expected sign**	**t-statistic**	**p-value**	**s-statistic**	**p-value**
TOTASS	2,899.350	5,779.760	600.887	2,488.160	4,899.200	590.433	+	**2.653**	(0.010)	**871.500**	(0.000)
EQUMI	724.029	1,251.090	269.321	649.987	1,158.700	228.431	+	**1.736**	(0.088)	**599.500**	(0.000)
PROV	184.631	355.670	28.169	310.710	646.060	40.974	-	**-2.723**	(0.008)	**-804.500**	(0.000)
EQUMI RATIO	0.365	0.139	0.338	0.361	0.141	0.344	+-	0.583	(0.562)	75.500	(0.601)
PROV RATIO	0.069	0.045	0.054	0.108	0.061	0.092	-	**-6.932**	(0.000)	**-943.500**	(0.000)

Panel B: Relative changes

	Mean	**Std.dev**	**Median**	**Expected sign**	**t-statistic**	**p-value**	**s-statistic**	**p-value**
ΔTOTASS	0.112	0.106	0.101	+	**8.439**	(0.000)	**853.500**	(0.000)
ΔEQUMI	0.163	0.296	0.092	+	**4.379**	(0.000)	**638.500**	(0.000)
ΔPROV	-0.292	0.297	-0.243	-	**-7.801**	(0.000)	**-830.500**	(0.000)
ΔEQUMI RATIO	0.043	0.232	0.003	+-	1.470	(0.147)	95.500	(0.508)
ΔPROV RATIO	-0.362	0.271	-0.334	-	**-10.605**	(0.000)	**-941.500**	(0.000)

Variable definitions (data source):

TOTASS is a firm's total assets in M€ (hand-collected), EQUMI is a firm's equity including non-controlling interests in M€ (hand-collected), PROV is a firm's other provisions in M€ (hand-collected), EQUMI RATIO is equity including non-controlling interests to total assets (both hand-collected), PROV RATIO is other provisions to total assets (both hand-collected).

Notes:

IFRS-HGB denotes the restated final German GAAP year under IFRS.

The relative changes in Panel B are computed as the difference of the IFRS value and the German GAAP value scaled by the German GAAP value.

The difference in means is based on pairwise t-tests. The difference in medians is based on signed rank-tests.

Bold typeset denotes significant difference (two-sided) below the 10 % level.

5.2 Analysis of accounting quality

5.2.1 Descriptive analysis

Table 8 displays descriptive statistics of the accounting quality measures. In Panel A we display absolute changes for the (1) compliance index, (2) disclosure index and (3) number of words for the final German GAAP year and the IFRS adoption year. We report relative changes in our measures in Panel B. The absolute and the relative changes show that on average (1) compliance significantly decreased and (2) disclosure as well as (3) the number of words significantly increased. In detail, compliance decreased from 60.3% to 29.6%, the disclosure measure increased from 37.1% to 60.3% and the number of words increased from 40.9 to 71.7 words on average. Expressed as relative changes, compliance decreased by 54% while disclosure and the number of words increased by 84.7% and 128.1%, respectively. This results demonstrates that IFRS adoption goes along with an increased disclosure for our sample firms.

Notably, under German GAAP as well as under IFRS, three firms do not report any words relating to other provisions in an individual section. However, these firms are not identical. We cannot calculate percentage changes for observations where written words under German GAAP equal zero, hence we report the change for the remaining 60 firms. The relevant IFRS firms provide their information exclusively in a tabular form. Words given in a tabular form are not counted as words related to other provisions within the notes since this results in an overlap with the other disclosure items.

Table 8: Descriptive statistics and univariate analysis of the accounting quality measures (n=63)

Panel A: Absolute changes

	IFRS			**HGB**							
Variable	**Mean**	**Std.dev**	**Median**	**Mean**	**Std.dev**	**Median**	**Expected sign**	**t-statistic**	**p-value**	**s-statistic**	**p-value**
COMPLIANCE	0.296	0.255	0.333	0.675	0.240	0.500	+-	**-9.827**	(0.000)	**-930.000**	(0.000)
DISCLOSURE	0.603	0.242	0.600	0.371	0.143	0.400	+	**7.227**	(0.000)	**568.500**	(0.000)
WORD	71.714	58.695	60.000	40.889	29.916	34.000	+	**4.810**	(0.000)	**622.500**	(0.000)

Panel B: Relative changes

	Mean	**Std.dev**	**Median**	**Expected sign**	**t-statistic**	**p-value**	**s-statistic**	**p-value**
ΔCOMPLIANCE	-0.540	0.412	-0.333	+-	**-10.389**	(0.000)	**-903.000**	(0.000)
ΔDISCLOSURE	0.847	0.976	1.000	+	**6.884**	(0.000)	**578.500**	(0.000)
ΔWORD (n=60)	1.281	2.354	0.517	+	**4.213**	(0.000)	**600.500**	(0.000)

Variable definitions (data source):

COMPLIANCE is the disclosure compliance measure (compare Appendix for computation), DISCLOSURE is the disclosure index (compare Appendix for computation), WORD is the number of words in the notes relating to the item other provisions (hand-collected).

Notes:

The relative changes in Panel B are computed as the difference of the IFRS value and the German GAAP value scaled by the German GAAP value.

The difference in means is based on pairwise t-tests. The difference in medians is based on signed rank-tests.

Bold typeset denotes significant difference (two-sided) below the 10 % level.

In Table 9 we show descriptive statistics of the unique items that form our indices. Panel A displays the composition of the indices. In Panel B, we break down the compliance and disclosure indices. Our results reveal that non-compliance under German GAAP primarily stems from violating para. 266 which requires a separate disclosure of other provisions, provisions for taxes and provisions for pensions in the balance sheet. Non-compliance under IFRS primarily stems from the restrictive requirements of IAS 37.85. As our results reveal, none of our sample firms fulfill all criteria of IAS 37.85 cumulatively. Only one firm reports on uncertainties about the amount or about the timing of outflows.

Breaking down the disclosure index shows that low scores stem from the circumstance that no firm exceeds the classification requirements of para. 266, and that no firm makes a separation into current and non-current provisions in the balance sheet. Approximately only half the sample firms quantify other provisions in the notes. These are the essential reasons for the difference in the disclosure scores under German GAAP and IFRS. Significantly more firms quantify their other provisions in the notes under IFRS than under German GAAP.

In Panel C we document whether accruals have been subsumed under other provisions. Accordingly, approximately 59% of the sample firms do not distinguish between provisions and accruals. Furthermore, only one firm reports on underfunded provisions.

We further highlight disclosure under IFRS (Panel A of Table 9). We classify disclosure into three pieces. The first piece (DISCLOSURE BS) represents the average fulfillment of possible classifications in the balance sheet. The second piece (DISCLOSURE 37.84) represents the average fulfillment of the quantitative items required in IAS 37.84 (not cumulatively). The score is comparably high (88.6%) which stems from the circumstance that the majority of the firms provide information such as book value of provisions at the beginning and the end of the period or the amounts used and not used. A neuralgic point of IAS 37.84 is the provision of information with regard to the increase during the period in the discounted amount. The third and final piece (DISCLOSURE 37.85) represents the average fulfillment of the qualitative items required in IAS 37.85 (not cumulatively). With 35.3%, the score is considerably lower than the previous score. This stems from the mentioned qualitative requirements that firms violate more often than the quantitative requirements.

Table 9: Descriptive statistics of indices and index items (n=63)

Panel A

Score	Mean	Description
HGB COMPLIANCE	0.675	266, QUALITATIVE
IFRS COMPLIANCE	0.296	IAS1, IAS 37.84, IAS 37.85
HGB DISCLOSURE	0.371	CNC, 266, 266+, QUALITATIVE, QUANTITATIVE
IFRS DISCLOSURE	0.603	CNC, IAS1, IAS1+, QUALITATIVE, QUANTITATIVE
DISCLOSURE BS	0.365	CNC, IAS1, IAS1+
DISCLOSURE 37.84	0.886	BVB, BVE, ADD, USE, NUSE, PV
DISCLOSURE 37.85	0.353	NAT, TIM, UNCER, REIM

Panel B

Variable (German GAAP)	Mean	Variable (IFRS)	Mean	s-statistic	p-value
CNC	0.000	**CNC**	0.397	n.a.	n.a.
266	0.381	**IAS1**	0.413	0.200	(0.655)
266+	0.000	**IAS1+**	0.286	n.a.	n.a.
QUALITATIVE	0.968	**QUALITATIVE**	0.984	0.333	(0.564)
QUANTITATIVE	0.508	**QUANTITATIVE**	0.937	**27.000**	(0.000)
		IAS 37.84	0.476		
		BVB	0.968		
		BE	0.984		
		ADD	0.952		
		USE	0.952		
		NUSE	0.937		
		PV	0.524		
		IAS 37.85	0.000		
		NAT	0.984		
		TIM	0.349		
		UNCER	0.016		
		REIM	0.063		

Panel C

		ACC	0.587		
		UFUND	0.016		

Notes:

A description of each variable is provided in the Appendix A. The significance of differences is assessed by McNemar exact tests; n.a. denotes that a 2x2 tables could not be constructed. Bold typeset denotes significant difference (two-sided) below the 10 % level.

Table 10 shows a frequency table of our two indices under German GAAP and IFRS, and the introduced sub scores of IFRS disclosure. As can be seen from the compliance index under German GAAP, no firm violates both requirements of the index. And as discussed, non-compliance mostly stems from violating para. 266 which requires to separately disclose other provisions, provisions for taxes and provisions for pensions between equity and certain liabilities. Thus, for further analysis, compliance under German GAAP can be treated as a binary variable. Also, since non-compliance primarily stems from violating para. 266, we further investigate which firms tend to (non-) comply with this paragraph. The frequency table in combination with Table 9 shows that the distribution of scores exhibits little variation. This concerns for example HGB DISCLOSURE, DISCLOSURE 37.84 and DISCLOSURE 37.85. Most of the variation in IFRS DISCLOSURE comes from the items that relate to classification in the balance sheet. Thus, we do not conduct multivariate tests with these disclosure measures but focus on a firm's written words related to other provisions in the notes as a substitute to proxy for the level of disclosure in our subsequent analysis.

Table 10: Frequency table of accounting quality indices (n=63)

Score	Frequency	Percent	Score	Frequency	Percent
HGB COMPLIANCE			**IFRS COMPLIANCE**		
0.000	0	0.000	0.000	22	34.920
0.500	41	65.080	0.333	26	41.270
1.000	22	34.920	0.667	15	23.810
Σ	63	100.000	1.000	0	0.000
			Σ	63	100.000
HGB DISCLOSURE			**IFRS DISCLOSURE**		
0.000	0	0.000	0.000	0	0.000
0.200	21	33.330	0.200	2	3.180
0.400	30	47.620	0.400	28	44.440
0.600	12	19.050	0.600	11	17.460
0.800	0	0.000	0.800	11	17.460
1.000	0	0.000	1.000	11	17.460
Σ	63	100.000	Σ	63	100.000
			DISCLOSURE BS		
			0.000	28	44.440
			0.333	12	19.050
			0.667	12	19.050
			1.000	11	17.460
			Σ	63	100.000
			DISCLOSURE 37.84		
			0.000	1	1.590
			0.167	0	0.000
			0.333	1	1.590
			0.500	1	1.590
			0.667	0	0.000
			0.833	30	47.620
			1.000	30	47.620
			Σ	63	100.000
			DISCLOSURE 37.85		
			0.000	1	1.590
			0.250	37	58.730
			0.500	23	36.510
			0.750	2	3.170
			1.000	0	0.000
			Σ	63	100.000

Notes:

A description of each variable is provided in Table 9.

5.2.2 Level analysis

Compliance index

We first investigate which firm characteristics drive the level of compliance with disclosure requirements. Since variation in the compliance index stems from compliance with para. 266, we restrict our analysis on compliance with this paragraph. Results of an univariate analysis are displayed in Table 11. Accordingly, compliant firms are (1) smaller and (2) less closely held. A logistic regression (Table 12) shows that compliant firms (1) are smaller, (2) are less closely held and (3) have a higher provision ratio. The result that bigger firms are less compliant seems striking. Also, the sign of LISTING and BIG4 is negative. We explain these results by the circumstance that bigger firms tend to disclose more information related to their provisions in the notes while being less extensive in their balance sheet. The sign of LISTING and BIG4 need to be seen in light of positive correlations with size.

Table 11: Univariate analysis of compliance (n=63)

Panel A

	HGB 266=1 (n=24)			**HGB 266=0 (n=39)**						
Variable	**Mean**	**Std.dev.**	**Median**	**Mean**	**Std.dev.**	**Median**	**t-statistic**	**p-value**	**z-statistic**	**p-value**
TOTASS	5.171	1.328	4.847	7.025	1.693	6.802	**-4.570**	(0.000)	**-3.992**	(0.000)
PROV RATIO	0.102	0.064	0.086	0.112	0.059	0.100	-0.580	(0.562)	-0.687	(0.492)
LEV	0.270	0.151	0.306	0.213	0.152	0.216	1.440	(0.154)	1.465	(0.143)
ROA	0.048	0.099	0.060	0.060	0.061	0.066	-0.520	(0.605)	-0.219	(0.826)
MTB	2.431	1.826	1.471	1.967	1.221	1.517	1.100	(0.278)	0.361	(0.718)
CLSHELD	0.362	0.239	0.332	0.578	0.248	0.584	**-3.400**	(0.001)	**-2.972**	(0.003)
LISTING	0.625	0.495	1.000	0.564	0.502	1.000			0.227	(0.634)
BIG4	0.625	0.495	1.000	0.692	0.468	1.000			0.303	(0.582)

Panel B

	IAS 1=1 (n=26)			**IAS 1=0 (n=37)**						
Variable	**Mean**	**Std.dev.**	**Median**	**Mean**	**Std.dev.**	**Median**	**t-statistic**	**p-value**	**z-statistic**	**p-value**
TOTASS	5.906	1.745	6.077	6.874	1.746	6.641	**-2.170**	(0.034)	**-1.822**	(0.068)
PROV RATIO	0.064	0.050	0.057	0.067	0.040	0.073	-0.260	(0.798)	-0.496	(0.620)
ABS(ΔPROV)	0.333	0.310	0.258	0.289	0.261	0.230	0.620	(0.539)	0.342	(0.732)
LEV	0.224	0.153	0.247	0.268	0.148	0.270	-1.160	(0.252)	-1.040	(0.298)
ROA	0.059	0.052	0.050	0.057	0.048	0.053	0.180	(0.860)	0.126	(0.900)
MTB	1.854	1.225	1.541	1.670	1.133	1.389	0.620	(0.541)	0.580	(0.562)
CLSHELD	0.496	0.255	0.529	0.495	0.250	0.509	0.020	(0.988)	-0.056	(0.956)
LISTING	0.385	0.496	0.000	0.676	0.475	1.000			**5.239**	(0.022)
BIG4	0.731	0.452	1.000	0.622	0.492	1.000			0.819	(0.366)

Variable definitions (data source):

TOTASS is the natural logarithm of a firm's total assets (hand-collected), PROV RATIO is other provisions to total assets (both hand-collected), ABS(ΔPROV) is the unsigned value of transition year book value of provisions under IFRS minus book value of provisions under German GAAP scaled by book value of provisions under German GAAP, LEV is total debt (Worldscope) to total assets (hand-collected), ROA is EBIT (Worldscope) to total assets (hand-collected), MTB is market capitalization (Worldscope) to book value of equity including non-controlling interests (hand-collected), CLSHELD is closely held shares to common shares outstanding (Worldscope), LISTING is an indicator variable taking the value 1 if a firm is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse (Deutsche Börse), BIG4 is an indicator variable taking the value 1 if a firm is audited by one of the BIG4 audit firms (hand-collected).

Notes:

The significance of sample differences is assessed by t-tests and Wilcoxon tests for the means and the medians of non-nominal variables and by Chi-squared tests of nominal variables.

Bold typeset denotes significant difference (two-sided) below the 10 % level.

In Panel A all variables refer to the final German GAAP year.

In Panel B all variables refer to the IFRS adoption year.

Table 12: Multivariate analysis of compliance (n=63)

				IFRS
Independent variable	**Expected sign**	**HGB266 Coefficient**	**IAS1 Coefficient**	**IAS1 Coefficient**
HGB266	?			**1.8907**
				(0.021)
TOTASS	+	**-1.966**	**-0.415**	-0.180
		(0.004)	(0.084)	(0.507)
PROV RATIO	+	**23.608**	**20.139**	14.503
		(0.071)	(0.092)	(0.282)
ABS(ΔPROV)	?		(2.185)	(1.452)
			(0.143)	(0.393)
LEV	?	7.614	0.820	-2.213
		(0.117)	(0.722)	(0.453)
ROA	?	10.209	3.591	1.366
		(0.227)	(0.639)	(0.872)
MTB	?	0.507	0.243	0.061
		(0.186)	(0.518)	(0.877)
CLSHELD	-	**-5.497**	-1.191	-0.802
		(0.044)	(0.395)	(0.604)
LISTING	+	-0.931	-1.073	-1.237
		(0.468)	(0.136)	(0.102)
BIG4	+	-0.338	**1.477**	1.246
		(0.750)	(0.084)	(0.155)
Industry dummies		yes	yes	yes
Likelihood ratio $\chi 2$		**49.794**	20.281	**26.146**
		(0.000)	(0.208)	(0.072)
Rescaled R^2		0.728	0.367	0.453

Results of logistic regressions.

Independent variable: indicator variable HGB266 or indicator variable IAS1

Variable definitions (data source):

TOTASS is the natural logarithm of a firm's total assets (hand-collected), PROV RATIO is other provisions to total assets (both hand-collected), ABS(ΔPROV) is the unsigned value of transition year book value of provisions under IFRS minus book value of provisions under German GAAP scaled by book value of provisions under German GAAP, LEV is total debt (Worldscope) to total assets (hand-collected), ROA is EBIT (Worldscope) to total assets (hand-collected), MTB is market capitalization (Worldscope) to book value of equity including non-controlling interests (hand-collected), CLSHELD is closely held shares to common shares outstanding (Worldscope), LISTING is an indicator variable taking the value 1 if a firm is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse (Deutsche Börse), BIG4 is an indicator variable taking the value 1 if a firm is audited by one of the BIG4 audit firms (hand-collected).

Notes:

Bold typeset denotes significant difference from zero (two-sided) below the 10% level.

In specification HGB266 all variables refer to the final German GAAP year. In specification IAS1 all variables refer to the IFRS adoption year.

Most firms comply with the requirements of IAS 37.84. On the other hand, no firm cumulatively fulfills requirements of IAS 37.85. Hence, we focus on compliance with IAS 1. This neatly fits into the preceding analysis of compliance with para. 266 as both deal with classification requirements in the balance sheet. Similar to our findings under German GAAP, Table 11 shows that compliant firms are smaller. Also, these firms are less often listed in one of the selection indices of Deutsche Börse. LISTING again seems to capture a notion of size. Our multivariate analysis (Table 12) shows that compliant firms are smaller, have a higher provision ratio and are more often audited by a BIG4 audit firm. Although results under IFRS are quite comparable with those under German GAAP, the model exhibits a low fit. An additional test suggests that firms that complied with para. 266 are also more likely to comply with IAS 1. The fit of this specification is much higher.

Disclosure index

Next, we analyze the disclosure index. For this purpose, we divide the sample into firms with poor and good disclosure. We define a firm to have good disclosure when the disclosure index is equal or higher than 60%. This is equal to fulfilling three out of five items. Only 12 firms fulfill this criterion under German GAAP. Univariate tests (Table 13) suggest that firms with good disclosure are (1) smaller and (2) less closely held. Of course, this result needs to be seen against the background that the disclosure index is primarily driven by the requirements of para. 266. Applying the same threshold to the index under IFRS yields a subsample of 33 firms with good disclosure. Univariate tests suggest that those firms are significantly (1) smaller, (2) have a lower provision ratio and (3) are less often listed in one of the selection indices of Deutsche Börse. The IFRS results are interesting against the background that ownership structure as measured by closely held shares is not significantly different between the two subsamples under

IFRS. Again, the results based on our disclosure index as measure for accounting quality demonstrate that the distribution of the scores only allows a limited interpretation. Thus, we do not conduct multivariate tests with this disclosure measure but focus on the written words to other provisions in the notes.

Table 13: Univariate analysis of disclosure (n=63)

Panel A

	HGB GOOD DISCLOSURE (n=12)			**HGB POOR DISCLOSURE (n=51)**						
Variable	**Mean**	**Std.dev.**	**Median**	**Mean**	**Std.dev.**	**Median**	**t-statistic**	**p-value**	**z-statistic**	**p-value**
TOTASS	5.351	1.598	5.609	6.546	1.781	6.478	**-2.130**	(0.037)	**-1.900**	(0.058)
PROV RATIO	0.103	0.066	0.089	0.109	0.060	0.092	-0.330	(0.740)	-0.490	(0.624)
LEV	0.267	0.150	0.279	0.227	0.154	0.228	0.810	(0.420)	0.753	(0.452)
ROA	0.038	0.116	0.048	0.060	0.066	0.066	-0.630	(0.543)	-0.534	(0.593)
MTB	2.535	1.938	1.411	2.052	1.364	1.517	0.820	(0.428)	0.508	(0.612)
CLSHELD	0.306	0.227	0.311	0.541	0.254	0.563	**-2.930**	(0.005)	**-2.818**	(0.005)
LISTING	0.667	0.492	1.000	0.569	0.500	1.000			0.385	(0.535)
BIG4	0.750	0.452	1.000	0.647	0.483	1.000			0.463	(0.496)

Panel B

	IFRS GOOD DISCLOSURE (n=33)			**IFRS POOR DISCLOSURE (n=30)**						
TOTASS	6.105	1.794	6.236	6.880	1.739	6.564	**-1.740**	(0.088)	-1.356	(0.175)
PROV RATIO	0.055	0.047	0.040	0.078	0.037	0.076	**-2.050**	(0.044)	**-2.306**	(0.021)
ABS(ΔPROV)	0.350	0.284	0.316	0.259	0.274	0.158	1.290	(0.202)	1.342	(0.180)
LEV	0.246	0.154	0.269	0.254	0.149	0.257	-0.190	(0.851)	-0.145	(0.885)
ROA	0.053	0.051	0.048	0.063	0.047	0.059	-0.780	(0.438)	-1.019	(0.308)
MTB	1.784	1.188	1.293	1.703	1.159	1.550	0.270	(0.785)	0.172	(0.863)
CLSHELD	0.496	0.248	0.553	0.496	0.256	0.507	0.000	(0.999)	-0.041	(0.967)
LISTING	0.394	0.496	0.000	0.733	0.450	1.000			**7.331**	(0.007)
BIG4	0.727	0.452	1.000	0.600	0.498	1.000			1.146	(0.285)

Variable definitions (data source):

TOTASS is the natural logarithm of a firm's total assets (hand-collected), PROV RATIO is other provisions to total assets (both hand-collected), ABS(ΔPROV) is the unsigned value of transition year book value of provisions under IFRS minus book value of provisions under German GAAP scaled by book value of provisions under German GAAP, LEV is total debt (Worldscope) to total assets (hand-collected), ROA is EBIT (Worldscope) to total assets (hand-collected), MTB is market capitalization (Worldscope) to book value of equity including non-controlling interests (hand-collected), CLSHELD is closely held shares to common shares outstanding (Worldscope), LISTING is an indicator variable taking the value 1 if a firm is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse (Deutsche Börse), BIG4 is an indicator variable taking the value 1 if a firm is audited by one of the BIG4 audit firms (hand-collected).

Notes:

The significance of sample differences is assessed by t-tests and Wilcoxon tests for the means and the medians of non-nominal variables and by Chi-squared tests of nominal variables.

Bold typeset denotes significant difference (two-sided) below the 10% level.

In Panel A all variables refer to the final German-GAAP year.

In Panel B all variables refer to the IFRS adoption year.

Number of words in the notes

For all of our tests, we rank the number of words. Higher ranks are given to firms that disclose more written words. For our univariate results, we divide the sample into firms that disclose few and many words. Since we have an uneven sample size and two firms share the same rank at the natural separation line of 31 to 32, we divide the sample into 30 and 33 firms. Univariate results (Table 14) suggest that firms writing more words are significantly (1) bigger and (2) have a higher provision ratio under German GAAP. We find no significant differences for the IFRS subsamples. Multivariate results (Table 15) show that higher disclosure is significantly associated with (1) size and (2) being audited by a BIG4 firm under German GAAP. Under IFRS, disclosure is significantly negatively associated with profitability. Our results concerning size and auditor are in line with our expectations. Although size is not unequivocally interpretable, it features the notion that benefits of more disclosure are higher for bigger firms. Several reasons are conceivable for this finding. For one, it can stem from cheaper disclosure production. Also, the public interest in bigger and more visible firms is higher which in return can result in more disclosure for example to legitimate their existence and activities. That being audited by a BIG4 firm is positively associated with disclosure is in line with the notion that these firms either bring a broader range of knowledge into the statement preparation process or are more powerful in influencing disclosure decisions. Our finding concerning profitability is less intuitive and might be explained by disclosure costs. First of all, current competitors can use a high level of disclosure for their own future planning. Second, a profitable firm might attract potential competitors and hence prefer to reduce disclosure. For example, Wagenhofer (1990) argues that partial disclosure can be an equilibrium when a firm is faced by an opponent that might undertake an adverse action like a market entry and comes to the conclusion that partial disclosure of favor-able information can be used to lower the probability that the opponent takes the adverse action. To some extent, this might be applicable for provision disclosure since profitable firms might try to provide little explicit information, hence allowing for more leeway for example in the measurement of provisions and making assessments by competitors more difficult.

Table 14: Univariate analysis of number of written words (n=63)

Panel A										
	HGB MANY WORDS (n=30)			**HGB FEW WORDS (n=33)**						
Variable	**Mean**	**Std.dev.**	**Median**	**Mean**	**Std.dev.**	**Median**	**t-statistic**	**p-value**	**z-statistic**	**p-value**
TOTASS	6.879	1.747	6.703	5.809	1.714	5.775	**2.450**	(0.017)	**2.306**	(0.021)
PROV RATIO	0.125	0.065	0.127	0.093	0.053	0.084	**2.120**	(0.038)	**1.845**	(0.065)
LEV	0.229	0.144	0.241	0.240	0.162	0.228	-0.270	(0.788)	-0.165	(0.869)
ROA	0.063	0.072	0.067	0.049	0.082	0.056	0.690	(0.495)	0.943	(0.346)
MTB	2.243	1.376	1.695	2.054	1.592	1.508	0.500	(0.618)	0.840	(0.401)
CLSHELD	0.461	0.270	0.506	0.527	0.260	0.563	-0.980	(0.329)	-0.977	(0.329)
LISTING	0.633	0.490	1.000	0.545	0.506	1.000			0.501	(0.479)
BIG4	0.700	0.466	1.000	0.636	0.489	1.000			0.286	(0.593)
Panel B										
	IFRS MANY WORDS (n=30)			**IFRS FEW WORDS (n=33)**						
TOTASS	6.708	1.716	6.625	6.262	1.868	6.292	0.980	(0.329)	1.039	(0.299)
PROV RATIO	0.072	0.041	0.072	0.060	0.046	0.057	1.070	(0.290)	1.136	(0.256)
ABS(ΔPROV)	0.260	0.267	0.144	0.350	0.290	0.309	-1.280	(0.205)	-1.307	(0.191)
LEV	0.251	0.139	0.263	0.249	0.163	0.267	0.070	(0.943)	0.062	(0.951)
ROA	0.055	0.047	0.054	0.060	0.051	0.050	-0.350	(0.729)	-0.096	(0.923)
MTB	1.599	1.017	1.414	1.879	1.287	1.518	-0.950	(0.346)	-0.613	(0.540)
CLSHELD	0.505	0.273	0.507	0.487	0.231	0.553	0.300	(0.768)	0.344	(0.731)
LISTING	0.600	0.498	1.000	0.515	0.508	1.000			0.458	(0.499)
BIG4	0.733	0.450	1.000	0.606	0.496	1.000			1.146	(0.285)

Variable definitions (data source):

TOTASS is the natural logarithm of a firm's total assets (hand-collected), PROV RATIO is other provisions to total assets (both hand-collected), ABS(ΔPROV) is the unsigned value of transition year book value of provisions under IFRS minus book value of provisions under German GAAP scaled by book value of provisions under German GAAP, LEV is total debt (Worldscope) to total assets (hand-collected), ROA is EBIT (Worldscope) to total assets (hand-collected), MTB is market capitalization (Worldscope) to book value of equity including non-controlling interests (hand-collected), CLSHELD is closely held shares to common shares outstanding (Worldscope), LISTING is an indicator variable taking the value 1 if a firm is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse (Deutsche Börse), BIG4 is an indicator variable taking the value 1 if a firm is audited by one of the BIG4 audit firms (hand-collected).

Notes:

The significance of sample differences is assessed by t-tests and Wilcoxon tests for the means and the medians of non-nominal variables and by Chi-squared tests of nominal variables.

Bold typeset denotes significant difference (two-sided) below the 10% level.

In Panel A all variables refer to the final German-GAAP year.

In Panel B all variables refer to the IFRS adoption year.

Table 15: Multivariate analysis of number of written words (n=63)

		HGB	IFRS	
Independent variable	**Expected sign**	**WORD RANKING Coefficient**	**WORD RANKING Coefficient**	**WORD RANKING Coefficient**
TOTASS	+	**0.034**	0.024	0.021
		(0.079)	(0.192)	(0.259)
PROV RATIO	+	0.932	0.625	1.022
		(0.130)	(0.436)	(0.367)
ABS(ΔPROV)	?			0.074
				(0.615)
LEV	?	0.157	-0.058	-0.012
		(0.519)	(0.808)	(0.962)
ROA	?	0.352	**-1.066**	**-1.091**
		(0.455)	(0.100)	(0.096)
MTB	?	0.017	0.012	0.010
		(0.424)	(0.689)	(0.753)
CLSHELD	-	-0.132	0.028	0.044
		(0.331)	(0.835)	(0.753)
LISTING	+	0.021	-0.002	-0.003
		(0.769)	(0.971)	(0.959)
BIG4	+	**0.119**	-0.005	-0.007
		(0.082)	(0.940)	(0.915)
Industry dummies		yes	yes	yes
F-Value		**10.370**	**6.760**	**6.280**
		(0.000)	(0.000)	(0.000)
Adj. R^2		0.360	0.238	0.242

Results of OLS regression.

Dependent variable: WORD RANKING (a ranking of the number of written words in the notes related to other provisions where rank 1 is given to the highest number)

Variable definitions (data source):

TOTASS is the natural logarithm of a firm's total assets (hand-collected), ABS(ΔPROV) is the unsigned value of transition year book value of provisions under IFRS minus book value of provisions under German GAAP scaled by book value of provisions under German GAAP, PROV RATIO is other provisions to total assets (both hand-collected), LEV is total debt (Worldscope) to total assets (hand-collected), ROA is EBIT (Worldscope) to total assets (hand-collected), MTB is market capitalization (Worldscope) to book value of equity including non-controlling interests (hand-collected), CLSHELD is closely held shares to common shares outstanding (Worldscope), LISTING is an indicator variable taking the value 1 if a firm is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse (Deutsche Börse), BIG4 is an indicator variable taking the value 1 if a firm is audited by one of the BIG4 audit firms (hand-collected).

Notes:

Bold typeset denotes significant difference from zero (two-sided) below the 10% level.

In the HGB specification all variables refer to the final German GAAP year. In the IFRS specification all variables refer to the IFRS adoption year.

5.2.3 Change analysis

We further substantiate our findings by investigating whether certain firm characteristics are associated with particular strong changes in disclosure measured by the number of words. In doing so, we rank the percentage changes in number of words induced by the IFRS adoption. Higher ranks are given to firms with higher positive changes. Since we calculate the percentage change as IFRS words minus German GAAP words deflated by German GAAP words, we loose those observations where the German GAAP value is zero and a percentage change cannot be calculated (three observations).

Univariate results are displayed in Table 16. Although dividing the sample equally into 30 firms would be natural, two firms share the same rank at the natural separation line. For this reason, we divide the sample into firms with a strong change (n=29) and firms with a weak change (n=31). We find no significant differences for the firm characteristics of these subsamples. Next, we assess what drives the change in a multivariate test. Results are displayed in Table 17. Our findings suggest that firms where improvement is more pronounced have (1) a higher provision ratio, (2) more absolute changes in their provisions, (3) are more levered and (4) more closely held.

An additional test suggests that changes are less pronounced for firms that had a high ranking under German GAAP (p-value of 0.225). This implies that IFRS adoption led to an increase in written words for our sample firms that had fewer written words under German GAAP. A second additional test suggests a positive association (p-value of 0.304) between higher disclosure and firms that adopted IFRS in 2003 or 2004 (late adopters).

Overall, these results suggest that improvement in disclosure is particularly strong for those firms where the importance of provisions is more important and where the IFRS adoption has a higher impact on the provisions. In this respect, the analysis reveals that to some extent disclosure improvement is driven by the relative importance of the line item in proportion to the balance sheet. However, the findings also show that improvement is more pronounced for firms that are more levered and more closely held. These are firms that typically are more financed by banks and are owned by large (family) blockholders, respectively. These groups can be considered to be closer to a firm than for example an individual investor. As a result, these groups do not primarily need to rely on financial statements in order to obtain financial information since it is easier for them to contact the management and get information in a more direct way. Consequently, more levered and more closely held firms have less incentives to provide high quality disclosure in their financial statements. In that respect, the results suggest that voluntary IFRS adoption goes along with an increase in disclosure quality for those firms that typically have less incentives to provide high quality disclosure.

Table 16: Univariate analysis of change in written words (n=60)

	WORDS STRONG RANK CHANGE (n=29)			WORDS WEAK RANK CHANGE (n=31)						
Variable	**Mean**	**Std.dev.**	**Median**	**Mean**	**Std.dev.**	**Median**	**t-statistic**	**p-value**	**z-statistic**	**p-value**
TOTASS	6.521	1.626	6.600	6.661	1.890	6.641	-0.310	(0.761)	-0.377	(0.706)
PROV RATIO	0.068	0.046	0.069	0.061	0.044	0.059	0.600	(0.549)	0.525	(0.599)
ABS(ΔPROV)	0.299	0.291	0.235	0.343	0.271	0.309	-0.600	(0.553)	-0.695	(0.487)
LEV	0.276	0.138	0.281	0.218	0.158	0.223	1.510	(0.138)	1.472	(0.141)
ROA	0.054	0.048	0.051	0.060	0.051	0.053	-0.400	(0.690)	-0.289	(0.773)
MTB	1.735	1.143	1.293	1.648	1.097	1.518	0.300	(0.765)	0.429	(0.668)
CLSHELD	0.524	0.284	0.560	0.463	0.221	0.505	0.930	(0.357)	0.939	(0.348)
LISTING	0.517	0.509	1.000	0.613	0.495	1.000			0.558	(0.455)
BIG4	0.724	0.455	1.000	0.677	0.475	1.000			0.156	(0.693)

Variable definitions (data source):

TOTASS is the natural logarithm of a firm's total assets (hand-collected), PROV RATIO is other provisions to total assets (both hand-collected), ABS(ΔPROV) is the unsigned value of transition year book value of provisions under IFRS minus book value of provisions under German GAAP scaled by book value of provisions under German GAAP, LEV is total debt (Worldscope) to total assets (hand-collected), ROA is EBIT (Worldscope) to total assets (hand-collected), MTB is market capitalization (Worldscope) to book value of equity including non-controlling interests (hand-collected), CLSHELD is closely held shares to common shares outstanding (Worldscope), LISTING is an indicator variable taking the value 1 if a firm is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse (Deutsche Börse), BIG4 is an indicator variable taking the value 1 if a firm is audited by one of the BIG4 audit firms in the final German GAAP year (hand-collected).

Notes:

The significance of sample differences is assessed by t-tests and Wilcoxon tests for the means and the medians of non-nominal variables and by Chi-squared tests of nominal variables.

Bold typeset denotes significant difference (two-sided) below the 10% level.

All variables refer to the IFRS adoption year.

Table 17: Multivariate analysis of change in written words (n=60)

	CHANGE WORD RANKING		
Independent variable	**Coefficient**	**Coefficient**	**Coefficient**
HGB WORD RANKING		-14.7639	
		(0.225)	
LATE			6.2863
			(0.304)
TOTASS	-1.512	-0.925	-1.890
	(0.322)	(0.560)	(0.230)
PROV RATIO	**159.255**	**171.899**	**146.113**
	(0.027)	(0.018)	(0.045)
ABS(ΔPROV)	**19.738**	**19.678**	17.224
	(0.065)	(0.065)	(0.116)
LEV	**53.569**	**52.175**	**53.790**
	(0.002)	(0.003)	(0.002)
ROA	-32.647	-34.969	-40.227
	(0.553)	(0.524)	(0.469)
MTB	1.987	1.973	1.758
	(0.437)	(0.438)	(0.493)
CLSHELD	**19.871**	**18.223**	**20.750**
	(0.049)	(0.071)	(0.041)
LISTING	-0.289	0.465	3.299
	(0.958)	(0.933)	(0.613)
BIG4	-1.816	-0.560	-1.240
	(0.739)	(0.919)	(0.821)
Industry dummies	no	no	no
F-Value	**19.290**	**17.680**	**17.490**
	(0.000)	(0.000)	(0.000)
Adj. R^2	0.773	0.780	0.778

Results of OLS regression.

Dependent variable: CHANGE WORD RANKING (ranking of the relative change in written words in the notes related to other provisions where rank 1 is given to the highest positive change

Variable definitions (data source):

TOTASS is the natural logarithm of a firm's total assets (hand-collected), ABS(ΔPROV) is the unsigned value of transition year book value of provisions under IFRS minus book value of provisions under German GAAP scaled by book value of provisions under German GAAP, PROV RATIO is other provisions to total assets (both hand-collected), LEV is total debt (Worldscope) to total assets (hand-collected), ROA is EBIT (Worldscope) to total assets (hand-collected), MTB is market capitalization (Worldscope) to book value of equity including non-controlling interests (hand-collected), CLSHELD is closely held shares to common shares outstanding (Worldscope), LISTING is an indicator variable taking the value 1 if a firm is listed in one of the selection indices DAX, MDAX or SDAX of Deutsche Börse (Deutsche Börse), BIG4 is an indicator variable taking the value 1 if a firm is audited by one of the BIG4 audit firms (hand-collected).

Notes:

Bold typeset denotes significant difference from zero (two-sided) below the 10% level.

All variables (except HGB WORD RANKING) refer to the IFRS adoption year.

6 Summary and conclusion

This study investigates accounting quality based on provision disclosure around voluntary IFRS adoption. The topic that we address in this paper is important since the IFRS play an outstandingly important role worldwide. Adoption of IFRS is particularly discussed in the light of an increase in accounting quality. Generally spoken, accounting quality comprises the informativeness of reported numbers, the degree of compliance with accounting rules and the level of disclosure (Cascino et al., 2010). Within this study, we put our focus on compliance with disclosure requirements and on the level of disclosure around accounting for provisions.

Taking advantage of a same firm-year approach reveals that the balance sheet item ‘other provisions’ is significantly smaller under IFRS compared to German GAAP. It is not possible to clearly pinpoint the causes for this effect. Three causes are conceivable: First, under IFRS, only obligations towards third parties are allowed to be recognized. Second, unlike to the IFRS, recognition and measurement of provisions under German GAAP is considered to be strongly driven by the prudence principle. Third, transactions that are regularly subsumed as accruals under IFRS are regularly reported as other provisions under German GAAP.

Our main focus lies on disclosure related to other provisions. We are particularly interested in compliance with disclosure requirements and the level of disclosure. We document that compliance is lower under IFRS than under German GAAP. We do not draw further conclusions from this observation since German GAAP and IFRS requirements are profoundly different from each other. Non-compliance under German GAAP primarily stems from violating para. 266 which puts restrictions on the classification of provisions in the balance sheet. This is the reason why we restrict the analysis concerning compliance to that paragraph. Our results suggest that compliant firms are significantly smaller, less closely held and have a higher provision ratio. Non-compliance under IFRS primarily stems from the restrictive requirements of IAS 37.85. As our results reveal, no firm cumulatively fulfills requirements of IAS 37.85. On the other hand, most firms comply with the requirements of IAS 37.84. Subsequently, we focus on compliance with IAS 1 that also deals with classification of provisions in the balance sheet. Our multivariate analysis shows that compliant firms are smaller, have a higher provision ratio and are more often audited by a BIG4 audit firm. Overall, results under German GAAP are quite comparable with those under IFRS. We explain our results by the circumstance that bigger firms tend to disclose more information related to their provisions in the notes while being less extensive in their balance sheet. An additional test suggests that firms that complied with para. 266 are also more likely to comply with IAS 1.

In order to assess disclosure level, we construct an index where each item of the measure is supposed to capture a comparable counterpart under German GAAP and IFRS. We find that IFRS adoption leads to a significant increase in the level of disclosure in our sample. Breaking down the disclosure index shows that under IFRS, more firms have a higher disclosure index because they exceed the classification requirements in the balance sheet, make a separation into current and non-current provisions in the balance sheet and quantify other provisions in the notes. Low variation in the disclosure index prevents to specify meaningful regressions. Hence, we draw on the number of words written in the notes related to other provisions in order to find a reasonable proxy for the level of disclosure. Again, we find a significant increase under IFRS compared to German GAAP. Disclosure level under German GAAP is positively and significantly driven by size and being audited by a BIG4 audit firm. Both observations are not uncommon in the disclosure literature; while the finding concerning size is not unequivocally interpretable, the finding concerning the auditor suggests that bigger audit firms either provide more profound knowledge into the statement preparation process or are more powerful in influencing disclosure decisions. The circumstance that disclosure level is negatively and significantly associated with profitability under IFRS might reflect a strategic motive.

Our study gives some interesting insights into accounting for provisions and IFRS adoption. As already suggested by prior literature, our results demonstrate that non-compliance is a prevalent issue in accounting under IFRS (Street and Bryant, 2000; Street and Gray, 2001; Glaum and Street, 2003). Compliance with German GAAP disclosure requirements is higher for our sample firms. The lower compliance under IFRS needs to be seen in light of more detailed disclosure requirements. Notably, a closer look reveals that non-compliance concerning accounting for provisions primarily stems from missing qualitative information. In stark contrast to the quantitative disclosure requirements of IAS 37.84, no firm cumulatively fulfills the qualitative requirements of IAS 37.85. Non-compliance with this item can be traced back to the circumstance that only 22 firms report on the expected timing of resulting outflows of economic benefits and only one firm reports on uncertainty about the amount or timing of those outflows. Only four firms report on the amount of any expected reimbursement. Apparently, firms are either unwilling to provide these kind of information or it is difficult to do so. With regard to the level of disclosure, we find an increase with IFRS adoption. In this respect, it is notable that the increase in the disclosed information can be traced back to the circumstance that firms disclose more quantitative information and report more words relating to provisions in the notes. In so far, the increase in disclosure level clearly stems from the circumstance that the IFRS requirements are more explicit than under German GAAP.

Accounting quality can be considered under the angle of the informativeness of reported numbers, the degree of compliance with accounting rules and the level of disclosure. Against this background, our study puts the focus on compliance with disclosure requirements and the level of disclosure related to other provisions. We find that compliance under IFRS is significantly lower than under German GAAP. This finding points towards a decrease in accounting quality, particularly with regard to comparability of disclosure between IFRS firms. This finding needs to be put into perspective against the finding that disclosure level is significantly higher under IFRS. On a first glance, this would be in line with the notion that IFRS provide more decision-useful information, though, our test design does not allow to make such an inference. It should be especially kept in mind that usefulness of disclosure and disclosure requirements are not necessarily aligned. An example for this is disclosure concerning whether the amount by which other provisions are underfunded is provided. While several voices in the literature deem this an important useful piece of information, only one sample firm provides it in its notes.

Our study suggests that compliance with disclosure requirements and that disclosure level are negatively associated with being more closely held under German GAAP. This finding does not persist under IFRS. Furthermore, our change analysis of disclosure (measured by written words) reveals that positive changes are significantly more pronounced for firms where the importance of provisions is more important and where the IFRS adoption has a higher impact on provisions. While these findings suggest that improvement is driven by the relative importance of the line item, the results also reveal that positive changes are stronger for firms that are more closely held and more levered. Under the assumption that our proxy captures accounting quality and not noise, this result is in line with the notion that IFRS adoption leads to an increase in accounting quality especially for those firms that typically have fewer incentives to provide accounting information for a broad investor basis. Yet, particularly this finding might be driven by a self-selection process of firms inclined to provide more information. Extending our research to mandatory IFRS appliers would be a natural next step.

Our results need cautious interpretation in the light of some restricting circumstances. First, our results apply to voluntary IFRS adopters. Prior literature documents that voluntary and mandatory adopters are different from each other (Christensen, Lee and Walker, 2008). This aspect might be particularly important in our setting since IFRS adoption is regularly discussed in the light to provide more recipients with information of higher accounting quality. Consequently, our result suggesting that IFRS provide more information with regard to provision accounting might be much less pronounced or even non-existent for mandatory IFRS appliers. Second, we examine a single item of the balance sheet. We consider this as a strength of the study since it allows us to construct clear-cut measures that arise naturally from the standards and to hand-collect data which guarantees that our data fulfills the criteria that we put on our measures. Yet, this also implies that all our conclusions are restricted to one balance sheet item: other provisions. Third, we conduct a small sample investigation which clearly reduces the power of statistical tests. Fourth, the application of our results to other countries might be restricted especially since Germany was among the first countries to allow voluntary adoption of IFRS. Fifth, observed adoption effects might be biased because the sample firms aspired to align German GAAP accounting towards the upcoming IFRS adoption. However, this would result in finding less differences in our measures. Finally, while it is a benefit that accounting for provisions was not subject of changes in our sample period, firms could apply SIC-8 or IFRS 1. The latter is less restrictive with regard to the principle of the retrospective application of all IAS/IFRS. We do not consider possible effects that arise from following the one or the other.

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Appendix A: Derivation of accounting quality indices

Background on the derivation of the accounting quality indices

Following Torklus (2007), we consider several aspects in the derivation of the accounting quality indices: First, a possible weighting of each item of the index. We weight each item of the indices equally because weighting causes a loss of objectivity (Dhaliwal, 1980; Cooke, 1989). Second, in some cases it is difficult to assess whether the criteria and requirements we demand with regard to voluntary and mandatory disclosure are met. Generally, variables capturing quantitative information are easier to assess. We regard these variables to be true if corresponding amounts are presented in the statement. Variables capturing qualitative information are more difficult to assess uniformly. We attack this issue to some extent by relying on search strings we defined prior to the data collection.[1] Third, we are aware that not provided information does not imply that accounting rules have been violated. For example, a firm that does not provide information about the impact of interest is not considered as a violator when it does not provide data with regard to the expected timing of outflows in the financial statement or whether the time value of money is material. In cases of doubt, this procedure is in favor of the firm (Cooke, 1989; Street and Gray, 2001; Ghicas, 2003; Glaum and Street, 2003). Possible ambiguous disclosure was discussed among the coders and could be resolved in any case.

Derivation of the compliance index

Background on the compliance index

The purpose of the compliance index is to capture a firm's compliance with explicit requirements under German GAAP as well as under IFRS. These requirements may concern classification requirements of other provisions in the balance sheet or additional information in the notes. Since IFRS requirements are more explicit under IFRS, the IFRS index consists of more items than the German GAAP index. An illustration and a detailed description of each index is provided below.

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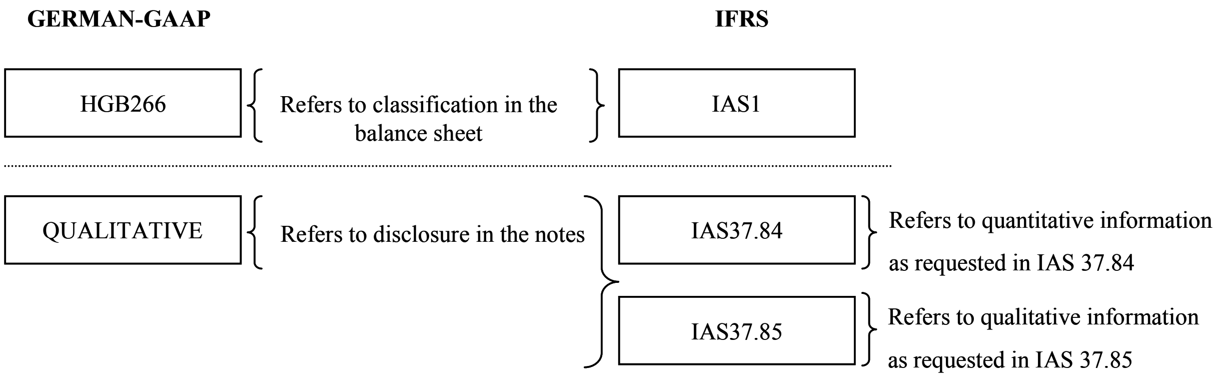
[1] For example, we use this method when assessing conformity with items of IAS 37.85.


GERMAN-GAAP
IFRS
HGB266
Refers to classification in the balance sheet
IAS1
QUALITATIVE
Refers to disclosure in the notes
IAS37.84
Refers to quantitative information as requested in IAS 37.84
IAS37.85
Refers to qualitative information as requested in IAS 37.85

Compliance index under German GAAP

The compliance index under German GAAP comprises two items and is calculated as follows:

$$COMPLIANCE = \frac{HGB266 + QUALITATIVE}{2}$$

German GAAP requires the preparer of a financial statement to provide two mandatory pieces of information related to other provisions. First, the classification of provisions needs to follow the classification of para. 266 HGB. Accordingly, a firm's balance sheet needs to separately disclose other provisions, provisions for taxes and provisions for pensions. Further, provisions need to be disclosed between the items equity and certain liabilities. The indicator variable HGB266 takes the value one if a firm complies with this requirement.

The second requirement deals with disclosure in the notes. Generally, German GAAP does not require a firm to give additional information on its other provisions in the notes. However, if the firm does not separately disclose material other provisions in the balance sheet, para. 285 Nr. 12 HGB requires the firm to provide explanatory information in the notes. Since it is common practice not to separately disclose other provisions in the balance sheet, we expect that every sample firm needs to comply with para. 285 Nr. 12 HGB. Accordingly, the indicator variable QUALITATIVE takes the value one if a firm provides qualitative information on its other provisions in the notes.

The compliance index under German GAAP is the mean of the two aforementioned indicator variables.

Compliance index under IFRS

The compliance index under IFRS comprises three items and is calculated as follows:

$$COMPLIANCE = \frac{IAS1 + IAS37.84 + IAS37.85}{3}$$

First, a firm needs to devote a separate line item presenting provisions separately from tax liabilities including tax provision according to IAS 1. IAS1 is an indicator variable taking the value one if a firm fulfills this criterion. The remaining two items of the index deal with disclosure in the notes. IAS 37.84 deals with quantitative disclosure requirements. The pieces of information to be given are the amount (1) of the book value at the beginning of the period, (2) of the book value at the end of the period, (3) of additional provisions made in the period, (4) used during the period and (5) reversed during the period. Also, a firm needs to disclose (6) the impact of interest effects on other provisions. It is possible that the time value of money is not material and thereby a firm does not need to make such a disclosure. Consequently, we distinguish between cases where disclosure is necessary and given, and disclosure is necessary but not given. We classify a firm to be compliant with this piece of information where such disclosure is not necessary and where we are not able to ascertain whether such disclosure would be necessary. Since IAS 37.84 requests all these pieces of information, the indicator variable IAS37.84 is one if a firm provides all these items.

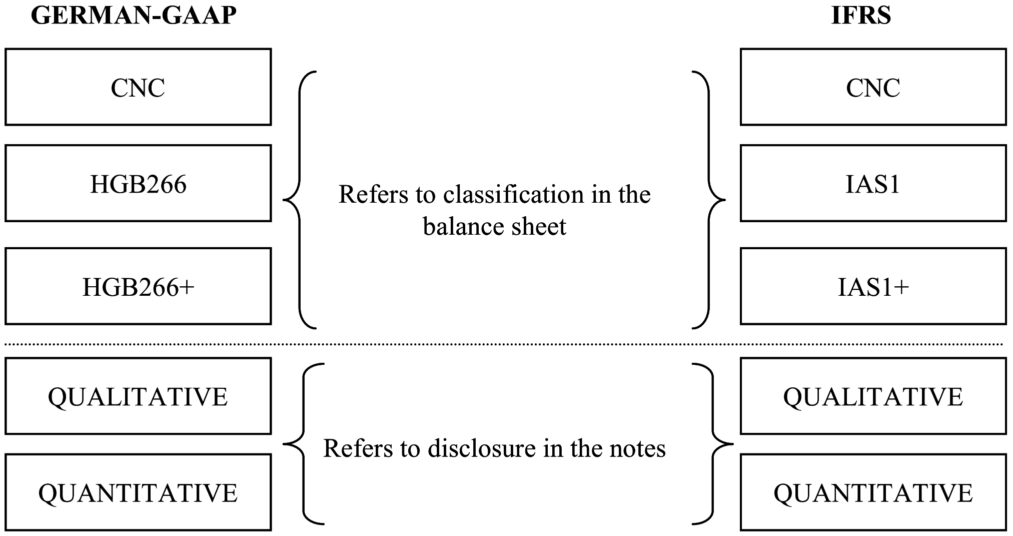
IAS 37.85 deals with qualitative disclosure requirements. The pieces of information to be given concern (1) the nature of the obligation, (2) the expected timing of outflows, (3) uncertainties about the amount or timing of outflows and finally (4) expected reimbursements. The indicator variable IAS37.85 takes the value one if a firm provides all these items.

The compliance index under IFRS is the mean of the three aforementioned indicator variables.

Derivation of the disclosure index

Background on the disclosure index

The purpose of the disclosure index is to capture a firm’s disclosure level under German GAAP and under IFRS. While the advantage of the compliance index lies in its proximity to the accounting rules, it has two downfalls in our endeavor to compare both accounting regimes with regard to disclosure level. First, the compliance index under German GAAP comprises less items than under IFRS. Additionally, the requirements under German GAAP are less restrictive since the IFRS requirements need to be fulfilled cumulatively. Consequently, reaching high compliance under German GAAP is easier than under IFRS. Second, the compliance index does not reflect whether disclosed information exceed disclosure requirements. In order to build a contrastable index, we ensure that the information index under German GAAP and IFRS comprises roughly comparable counterparts. An illustration and a detailed description of each index is provided below.


GERMAN-GAAP
IFRS
CNC
HGB266
HGB266+
Refers to classification in the balance sheet
CNC
IAS1
IAS1+
QUALITATIVE
QUANTITATIVE
Refers to disclosure in the notes
QUALITATIVE
QUANTITATIVE

Disclosure index under German GAAP

The disclosure index under German GAAP is calculated as follows for each firm:

$$DISCLOSURE = \frac{CNC + HGB266 + HGB266 + +QUALITATIVE + QUANTITATIVE}{5}$$

The indicator variable CNC takes the value one if other provisions are separated into current and non-current provisions in the balance sheet. The indicator variable HGB266 takes the value one if the balance sheet provides a separate disclosure of other provisions, provisions for taxes and provisions for pensions and if the provisions are reported between the items equity and certain liabilities. The indicator variable HGB266+ takes the value one if the minimum requirements of para. 266 HGB are exceeded, for example by further breaking down other provisions into (at least two) subcategories in the balance sheet. HGB266+ can only take the value one for firms where HGB266 is one.

The other two items refer to disclosure in the notes. The indicator variable QUALITATIVE takes the value one if a firm provides qualitative information in the notes. The indicator variable QUANTITATIVE takes the value one if a firm provides quantitative information in the notes.

DISCLOSURE is the mean of the five aforementioned indicator variables.

Disclosure index under IFRS

The disclosure index under IFRS is calculated as follows:

$$DISCLOSURE = \frac{CNC + IAS1 + IAS1 + +QUALITATIVE + QUANTITATIVE}{5}$$

The indicator variable CNC takes the value one if other provisions are separated into current and non-current provisions in the balance sheet. The indicator variable IAS1 takes the value one, if the balance sheet shows at least a separate line item presenting provisions separately from tax liabilities including tax provisions. The indicator variable IAS1+ assesses whether the balance sheet classification exceeds requirements of IAS 1. It takes the value one if a firm exceeds the classification requirements, for example by providing a separate line item for other provisions and pensions. IAS1+ can only take the value one for firms where IAS1 is one.

The other two items refer to disclosure in the notes. The indicator variable QUALITATIVE takes the value one if a firm provides qualitative information in the notes. The indicator variable QUANTITATIVE takes the value one if a firm provides quantitative information in the notes.

DISCLOSURE is the mean of the five aforementioned indicator variables.

Table A.1: Summary of hand-collected variables

German GAAP	IFRS	Explanation	Coding
CNC	CNC	Are other provisions separated into current/non-current provisions in the balance sheet?	0: no, 1: yes
266	IAS1	Does the classification of provisions follow para. 266 HGB/IAS 1?	0: no, 1: yes
266+	IAS1+	Does the classification of provisions exceed the requirements of para. 266 HGB/IAS 1?	0: no, 1: yes (only where 266 or IAS1 equals 1)
QUALITATIVE	QUALITATIVE	Are additional information concerning other provisions provided in the notes?	0: no, 1: yes
QUANTITATIVE	QUANTITATIVE	Are other provisions quantified in the notes?	0: no, 1: yes
	BVB	Is the book value of other provisions at the beginning of the period given in the notes?	0: not disclosed, 1: disclosed
	BVE	Is the book value of other provisions at the end of the period given in the notes?	0: not disclosed, 1: disclosed
	ADD	Is the amount of additional provisions made in the period given in the notes?	0: not disclosed, 1: disclosed
	USE	Is the amount of used provisions during the period given in the notes?	0: not disclosed, 1: disclosed
	NUSE	Is the amount of not used provisions during the period given in the notes?	0: not disclosed, 1: disclosed
	PV	Is the impact of interest effects on other provisions given in the notes?	0: necessary but not disclosed, 1: disclosed, 2: not necessary, 3: assessment not possible
	NAT	Is a description of the nature of the obligation given in the notes?	0: not disclosed, 1: disclosed under the section, 2: disclosed somewhere else in the notes
	TIM	Is a description of the expected timing of outflows given in the notes?	0: not disclosed, 1: disclosed under the section, 2: disclosed somewhere else in the notes
	UNCER	Is an indication of the uncertainties about the amount or timing of outflows given in the notes?	0: not disclosed, 1: disclosed under the section, 2: disclosed somewhere else in the notes
	REIM	Is an indication of expected reimbursements given in the notes?	0: not disclosed, 1: disclosed
	ACC	Are accruals subsumed under provisions?	0: assessment impossible, 1: yes
	UFUND	Is the amount by which other provisions were underfunded given in the notes?	0: not disclosed, 1: disclosed

Notes:
All variables have been hand-collected

Appendix B: Sample firms and accounting quality measures

Table B.1: Sample firms and accounting quality measures

	Compliance		Disclosure		Words	
Firm name	**HGB**	**IFRS**	**HGB**	**IFRS**	**HGB**	**IFRS**
ADITRON AG	50%	33%	20%	40%	38	105
ANDREAE-NORIS ZAHN AG	50%	33%	40%	100%	33	70
AUDI AG	50%	33%	20%	40%	75	220
AXEL SPRINGER VERLAG AG	50%	33%	40%	100%	20	25
BMW AG	50%	33%	40%	40%	134	119
BAYWA AG	50%	33%	20%	40%	65	89
BERTRANDT AG	100%	67%	40%	80%	26	93
BERU AG	50%	0%	40%	40%	11	88
BILFINGER BERGER AG	50%	0%	20%	20%	35	24
BIOTEST AG	100%	33%	40%	80%	16	125
CEAG AG	50%	0%	20%	60%	36	167
CELESIO AG	50%	67%	20%	100%	18	145
CEWE COLOR HOLDING AG	50%	0%	40%	40%	87	98
COR AG INSURANCE TECHNOLOGIES	50%	33%	40%	80%	64	76
DIS DEUTSCHER INDUSTRIE SERVICE AG	100%	33%	60%	80%	29	31
DRAEGERWERK AG	50%	67%	20%	100%	40	98
ENBW AG	50%	33%	40%	40%	110	288
ESCADA AG	100%	0%	60%	40%	29	34
FUCHS PETROLUB AG	50%	0%	40%	40%	32	74
GESCO AG	100%	33%	40%	80%	26	148
GILDEMEISTER AG	100%	33%	60%	40%	106	77
GRAPHIT KROPFMUEHL AG	100%	0%	60%	40%	0	17
H&R WASAG AG	50%	0%	20%	40%	26	150
HANS EINHELL AG	100%	0%	40%	60%	19	21
HAWESKO HOLDING AG	100%	0%	60%	40%	38	44
HORNBACH HOLDING AG	50%	33%	20%	60%	29	44
HORNBACH BAUMARKT AG	50%	67%	20%	60%	25	45
HUGO BOSS AG	100%	33%	60%	40%	128	116
JENOPTIK AG	100%	67%	60%	100%	26	60
JOH. FRIEDRICH BEHRENS AG	100%	67%	40%	100%	29	64

KAMPA AG	50%	33%	40%	80%	21	35
KARSTADT QUELLE AG	50%	0%	20%	60%	34	26
KOENIG & BAUER AG	100%	33%	40%	80%	29	44
KOLBENSCHMIDT-PIERBURG AG	50%	33%	40%	40%	62	100
KSB AG	50%	0%	20%	40%	34	67
KUKA AG	100%	67%	60%	100%	42	54
KWS SAAT AG	50%	33%	20%	40%	22	0
LEIFHEIT AG	50%	33%	40%	100%	78	15
LINDE AG	50%	0%	20%	40%	48	94
LUDWIG BECK AM RATHAUSECK AG	50%	0%	40%	60%	36	60
METRO AG	50%	33%	40%	40%	21	13
NORDDEUTSCHE AFFINERIE AG	50%	0%	20%	60%	76	27
PORSCHE AUTOMOBIL HOLDING SE	50%	67%	20%	80%	53	58
PROGRESS-WERK OBERKIRCH AG	100%	0%	40%	20%	37	32
PROSIEBENSAT.1 MEDIA AG	50%	0%	40%	60%	39	86
RATIONAL AG	50%	0%	20%	40%	0	13
RHEINMETALL AG	50%	67%	40%	60%	30	65
RHOEN-KLINIKUM AG	100%	67%	60%	80%	14	53
RTV FAMILY ENTERTAINMENT AG	100%	67%	40%	100%	16	8
S.A.G. SOLARSTROM AG	100%	67%	60%	80%	7	10
SARTORIUS AG	50%	0%	40%	40%	8	86
SGL CARBON AG	50%	33%	40%	40%	108	246
SILICON SENSOR INTERNATIONAL AG	100%	67%	60%	100%	9	88
SOFTWARE AG	100%	33%	40%	100%	53	12
SOLAR-FABRIK AG	100%	67%	60%	60%	22	31
STADA ARZNEIMITTEL AG	100%	0%	40%	40%	52	114
T-ONLINE INTERNATIONAL AG	50%	33%	40%	60%	44	28
TAKKT AG	50%	0%	20%	40%	37	42
TERREX HANDELS AG	50%	67%	20%	80%	0	26
VILLEROY & BOCH AG	50%	0%	20%	40%	61	83
VK MUEHLEN AG	50%	33%	20%	40%	24	0
VOLKSWAGEN AG	50%	33%	40%	40%	42	0
WINKLER & DUENNEBIER AG	50%	33%	40%	40%	67	147

Multiple board appointments and firm performance - German evidence

Tolga Davarcioglu

Abstract: I investigate the effect of multiple board appointments on firm performance for a sample of publicly listed German firms. The incidence of multiple board appointments is investigated from several angles since multiple board appointments can be characterized along numerous dimensions and their effect on firm performance is not unequivocally predictable. First, I contrast the Busyness Hypothesis versus the Reputation Hypothesis. Busyness is measured by the number of additional board appointments while several director characteristics are used to measure reputation. Second, I examine the presence of directors featuring bank affiliations on firm performance. Directors are classified as bankers when they have an appointment on the board of a bank. Finally, I investigate the presence of directors featuring international board appointments on firm performance, and international activities, respectively. Directors are classified as international when they have an appointment on a non-domestic board. A distinct feature of the study lies in characterizing the same directors along different dimensions. Although my results are mixed, I cautiously conclude that multiple board appointments negatively affect firm performance. Director characteristics that are expected to have a positive influence on firm performance do not counteract this finding.

Keywords: board of directors, multiple board appointments, interlocking directorates, firm performance, foreign sales

1 Introduction

This paper investigates the effect of multiple board appointments on firm performance for a sample of publicly listed German firms. Multiple board appointments are perceived to reduce the effectiveness of monitoring tasks (Bernhardt, 1994; Schwalbach, 2004). Brandeis (1914) formulates one reason for this perception as follows: “The practice of interlocking directorates is the root of many evils. It offends laws human and divine. Applied to rival corporations, it tends to the suppression of competition and to violation of the Sherman law. Applied to corporations which deal with each other, it tends to disloyalty and to violation of the fundamental law that no man can serve two masters. In either event it tends to inefficiency; for it removes incentive and destroys soundness of judgment.” The German legislator also seems to regard multiple board appointments as problematic since the German law restricts the number of appointments on a supervisory board to ten or fifteen, respectively, if five are intergroup appointments. Internationally, different organizations propose different numbers of maximum board appointments. For example, the Council of Institutional Investors suggests that a director should not serve on more than five for-profit company boards. The number should not exceed two for directors with full time jobs and one for the CEO (Council of Institutional Investors, 2009). The Business Roundtable on the other hand does not specify a limitation on the number of directorships but points towards the necessity to reason whether accepting an additional board position might compromise present responsibilities (Business Roundtable, 2005).

Theory suggests competing explanations for the occurrence of directors holding multiple directorships and the impact on firm performance (Loderer and Peyer, 2002). Multiple board appointments come with a conflict of interest and time restraints for the director to execute the job adequately and responsibly. On the other hand, the occurrence of multiple board appointments might indicate that directors have a good reputation and can draw on ample work experience and valuable networks that are beneficial for the firm. The competing theoretical explanations are also reflected in empirical results (Ferris, Jagannathan and Pritchard, 2003; Fich and Shivdasani, 2006).

The purpose of this paper is to investigate the effect of multiple board appointments on firm performance where different perspectives are taken in order to characterize individuals holding multiple board appointments. The empirical investigation comprises three parts. In the first part of the investigation, I contrast the Busyness Hypothesis versus the Reputation Hypothesis (Core, Holthausen and Larcker, 1999; Ferris, Jagannathan and Pritchard, 2003; Fich and Shivdasani, 2006). Under the Busyness Hypothesis, directors with multiple board appointments are expected to have a negative impact on firm performance since directors are likely to be overcommitted and thus not able to fulfill their responsibilities due to time constraints. I follow the established approach to measure busyness by a director’s number of board appointments. Under the Reputation Hypothesis, multiple board appointments are the results of firms demanding skilled directors who are expected to enhance firm performance. I propose different measures in order to proxy for director skills since director skills are hardly observable. For this purpose, I identify whether an individual has been entrusted with the position to be the chairman of a supervisory board (COS). I assume that this position is given to particularly skilled and experienced individuals, and assess the impact of having several of these individuals on a board. Taking into account that the CEO and the COS hold important positions in a firm, I also examine the effect that the sample firm’s CEO or COS has multiple board appointments (Loderer and Peyer, 2002) on firm performance. Finally, I propose two scores in order to capture a board’s busyness and reputation. The busyness score is designed with the purpose to account for which individual holds multiple appointments, i.e. the CEO, other management members, the COS or other supervisory board members. At the same time, the score reflects the type of position held on the other board. The reputation score aims at capturing the skills and experience that a director provides to a board.

In the second part, I examine the relationship between bank representation on a firm's board and firm performance. Finding individuals that are a director on a bank's management or supervisory board on a non-financial firm's board is a common observation (Dittmann, Maug and Schneider, 2010). Yet, reasons for or implications of this observation are controversial. Following the expertise argument, bank directors might provide valuable advice especially in the area of financing or investing (Byrd and Mizruchi, 2005). Alternatively, bank representatives might monitor equity or debt. A position on a firm's board allows close supervision of the management, gives access to important corporate information and thus, permits a better assessment of the firm's financial situation (Kroszner and Strahan, 2001). Bank representatives might also use their board position in order to promote bank related services (Dittmann, Maug and Schneider, 2010). In so far, bank representation on non-financial firms and impact on firm performance is non-trivial.

In the third and final part, I contribute to the existing literature by identifying board members, who also serve on non-domestic boards and analyze the relationship with firm performance. Drawing on this characteristic in order to shed light between the relationship of firm performance is interesting as it neatly demonstrates the potential conflict that is inherent to multiple board appointments (Graybow, 2008): "'Someone who has exposure to other cultures and countries is probably helpful' to have on boards, said

Charles Elson, director of the Weinberg Center for Corporate Governance at the University of Delaware. ‘The problem with it is, frankly, time and space.’” International appointments are more time consuming since more traveling occurs, especially if transatlantic flights are required. This might increase the chance that a director is not able to attend board meetings or reduce the likelihood that the director actively participates in committees. Also, directors will need to go through documents that in many cases will not be their native language. Additional challenges may arise from differing accounting and corporate governance rules. On the plus side, international directors might be helpful in providing a different and more sophisticated perspective on the economy of their home country and on related institutional matters. Additionally, they might be helpful in establishing a network abroad and to facilitate business relations. I assess the occurrence of directors holding international appointments on firm performance. Furthermore, I propose a more specific proxy. I examine whether these directors fulfill a strategic goal by establishing ties to companies abroad and facilitating foreign operations measured by foreign sales.

In order to answer my research question, I exploit the German setting. I consider it to be especially suitable when addressing the effects of international board appointments. Internationalization of the board is not as common as in other countries (Kuck, 2006). This is partly attributable to the circumstance that a certain percentage of the supervisory board has to consist of employee representatives which often implies that German is the language of board meetings. Schmid and Daniel (2007) find that the management and supervisory board’s degree of internationalization of the German DAX-30 firms does not reflect their extensive international operations. This circumstance helps ensuring enough variability in firms that have more and less internationalized boards. The sample consists of 151 publicly listed German firms observed during 2004-2006.

My results do not allow an unequivocal interpretation. In the first part of the analysis, I find mostly negative signs on my variables of interest. In this respect, my findings support the Busyness Hypothesis. However, I only find a statistical significant result for multiple board appointments held by the sample firms' chairmen. In the second part of the investigation, I find a positive and non-significant impact of having directors featuring bank affiliations on firm performance. In the last part, I find a negative and marginally non-significant relationship between directors that feature international board appointments and firm performance. Overall, my results are in line with the notion that directors having ulterior commitments are harmful for firm performance. However, the results are not stable for alternative performance measures. Using return on assets and return on sales partly yields positive signs on my variables of interest. In this respect, my results suggest a difference in the effect of multiple board appointments on market and accounting based performance measures.

From a broad perspective, this study contributes to a well-established literature dealing with board structure (Hermalin and Weisbach, 1988; Fich and White, 2005; Linck, Netter and Yang, 2008), multiple board appointments (Booth and Deli, 1996; Ferris and Jagannathan, 2001) and consequences of multiple board appointments on corporate issues like CEO compensation (Hallock, 1997; Fich and White, 2003), board meeting attendance (Jiraporn et al., 2009) or board committee membership (Jiraporn, Singh and Lee, 2009). More specifically, this study adds to a growing body of literature that investigates the relationship between firm performance and particular aspects and characteristics of board directors like director diversity (Carter, Simkins and Simpson, 2003), director busyness (Ferris, Jagannathan and Pritchard, 2003; Fich and Shivdasani, 2006), directors' bank affiliations (Booth and Deli, 1999; Dittmann, Maug and Schneider, 2010), directors being employee and union representatives (Fauver and Fuerst, 2006), gender diversity (Campbell and Mínguez-Vera, 2008; Adams and Feirrera, 2009), directors having political ties (Hillman, 2005) or the importance of directors' social ties (Hwang and Kim, 2009). Particularly, the paper complements concurrent research of Masulis, Wang and Xie (2010) who investigate the presence of foreign independent directors on corporate boards. They focus on the geographic location of directors and their distance to a firm's headquarter and how this affects a firm's corporate governance and performance. In this respect, the paper also adds to a literature stream highlighting the importance of geographical distance on corporate aspects like dividend payout behavior (John, Knyazeva and Knyazeva, 2011), acquisition decisions (Uysal, Kedia and Panchapagesan, 2008) or information gathering by board directors (Alam et al., 2010).

The remainder of the paper proceeds as follows. Section 2 reviews prior literature and presents the research questions. Section 3 provides information regarding the German setting. Section 4 presents the sample, the data, the research design, the analyses and the results. Section 5 concludes. The Appendix contains regression results with the board variables being lagged.

2 Prior literature and research questions

The literature body dealing with multiple board appointments is comparably huge. With regard to the purpose of this study, I first present perspectives on the occurrence of multiple board appointments. Subsequently, I present a literature review on relevant studies that predominantly deal with multiple board appointments and firm performance.

2.1 Perspectives on multiple board appointments

The phenomenon of directors holding multiple board seats has been widely investigated. Multiple board appointments can be considered as a special branch of the board of director's literature.[1] I refer to a director as any individual that serves on a board of directors. Particularly, I do not distinguish between one-tier and two-tier boards, inside and outside directors or executive and non-executive directors within this section. The German two-tier system is highlighted in the subsequent section.

A director holding multiple appointments is called an interlock. Because holding multiple board seats connects boards with each other, the term interlocking directorate is also commonly used. This is different from the occurrence of two directors serving on the boards of the same two firms who are called mutual, double or dual interlocks (Fich and White, 2003). Fearing the danger of arrangements between competitors, Section 8 of the Clayton Act of 1914 prohibited interlocking directorates between competing firms in the United States. Dooley (1969) is among the early studies that investigate director interlocks. The academic interest in interlocking can be explained by the vast variety of possible reasons that can lead to interlocked companies. At the same time, this is the reason why the interlock literature offers several competing models to explain the existence of interlocking and why it is not possible to detach the competing models in a clear cut way. Mizruchi (1996) provides an extensive summary of issues and literature related to interlocks. Roughly, it is possible to distinguish between three perspectives: inter-organizational, integrative and individual.

The inter-organizational perspective assumes the existence of a resource dependence between organizations (e.g. Burt, 1980). Interlocks are considered to allow an exchange of information or resources between organizations. Models of this perspective emphasize the importance of capital, which is constantly demanded by non-financial organizations. As a consequence, a firm wants to access some sort of financial service from a financial corporation. This creates a dependency of the non-financial firm, giving the financial corporation the opportunity to place an interlock to monitor the dependent firm. Co-opting models (e.g. Koenig, Gogel and Sonquist, 1979) emphasize that constituting interlocks among firms reduces environmental uncertainty e.g. by squeezing out competitors or fixing prices. Accordingly, interlocks are considered as parts of partial alliances that facilitate cooperation among firms.

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[1] Zahra and Pearce (1989), Johnson, Daily and Ellstrand (1996) and Adams, Hermalin and Weisbach (2010) give a general overview of extant research related to boards of directors.

The integrative perspective stresses to think in classes and elites (e.g. Mintz and Schwartz, 1981; Palmer, 1983). In the context of the Finance Capital Model, financial and non-financial corporations are assumed to be equally powerful. The presence of interlocks helps to interconnect these corporations by means of ownership and relationships among the corporations. As a consequence, not single pairs of corporations are connected but entire economic groups. Similar, the Class Hegemony Model (e.g. Koenig, Gogel and Sonquist, 1979) assumes the existence of upper and lower classes. Members of the same classes are thought to share the same views and beliefs, forming a common code. Regarding the board as a place where members of higher classes meet, interlocks are considered to allow influential occupations with the objective to support and achieve mutual goals (comparable to social cohesion as in Mizruchi (1996)). The Management Control Model stresses that the power lies within the hands of the management. Directors are considered to be a source of advice or criticism for the management, but do not take an active part in directing a firm’s daily business. Consequently, interlocks are especially attributed for their characteristics.

The individual perspective puts the focus on individual goals and benefits. In the Legitimacy Model, the interlock is perceived to signal investors the firm’s ties to other important organizations. The focus does not lie on material resources but on how the association is publicly perceived. Zajac (1988) proposes another approach, also labeled Career Advancement Model. Accordingly, a director's benefits from sitting on a board are prestige, power and additional income (Bazerman and Schoorman, 1983). This view puts more emphasis on the individual who chooses to accept additional appointments and expects companies to select potential directors by their individual characteristics and not by their contribution to link companies.

2.2 Literature review

This paper builds on prior literature dealing with directors holding multiple board appointments and their effect on firm performance. The amount of relevant studies in this area prohibits a complete overview of extant international research. Rather, this section aims at giving an overview of the topic's broadness and the underlying complexity of research in this area; an extensive survey is provided by Mizruchi (1996). The section on empirical evidence concerning multiple board appointments in Germany aims at being as complete as possible.

Findings in prior literature suggest a positive (e.g. Pennings, 1980) as well as a negative (Fligstein and Brantley, 1992) association between interlocking and firm performance. Dalton et al. (1998) acknowledge that this might be partly attributable to the nature of the performance measure since the academic literature is discordant with respect to board decisions and their impact on accounting and market-based measures of performance. Mizruchi (1996) points out that the ambiguous results might reflect the uncertainty of the causal order between interlocking and performance. Firms might exhibit a low performance because directors holding multiple appointments are too busy with the result that their duties for the firms are compromised. However, it is also conceivable that firms exhibiting low performance try to attract directors with a wide network. Prior results suggest that unprofitable firms feature more interlocks (Mizruchi and Stearns, 1988). Also, financial distress might increase the necessity to monitor capital (Richardson, 1987).

Results of more recent work on the topic are similarly mixed. Ferris, Jagannathan and Pritchard (2003) do not find a negative association between the number of board memberships of a director and subsequent firm performance or a negative market reaction to the appointment of a director with multiple appointments. On the other hand, they show a significant positive association between prior performance and the number of directorships. Fich and Shivdasani (2006) show a significant negative relationship between outside directors with multiple board appointments and market-to-book ratios as well as with measures of operating performance. Results from Perry and Peyer (2005) suggest that the effect of accepting an additional directorship on firm value depends on whether the sending firm has higher agency problems, and also, on what kind of firm the appointment is accepted. Core, Holthausen and Larcker (1999) find that CEO compensation is higher for firms where outside directors serve on multiple boards. Their results also suggest that this is part of contracting inefficiencies, which negatively affect firm performance.

Several studies look on certain director characteristics and how these directors affect firm performance. For example, Hillman (2005) investigates the presence of politicians on boards and finds a positive association with market-based performance. Results of Adams and Ferreira (2009) suggest that gender diversity can have a positive effect on board effectiveness and firm performance. In a concurrent study, Masulis, Wang and Xie (2010) put their focus on U.S. directors that have their residence in foreign countries. Their findings suggest that these directors can bring valuable expertise with regard to corporate decisions that involve their home country but are also associated with monitoring deficiencies. Overall, their findings suggest that firms with these type of directors have a poorer performance.

Although the occurrence of interlocking in the German institutional setting has been discussed in numerous studies (Ziegler, 1984; Albach and Kless, 1982; Biehler and Ortmann, 1985; Heinze, 2002), empirical evidence on the relationship between interlocks and firm performance is scarce. Pfannschmidt (1995) finds positive but mostly insignificant correlations between accounting based performance measures and interlocking directorates. Beyer (1996) uses a sample of 694 firms and finds no evidence that interlocked and not interlocked firms are significantly different from each other with regard to firm profitability. Balsmeier, Buchwald and Peters (2009) investigate the relationship between multiple board appointments held by the CEO and the chairman of the supervisory board and firm performance using panel data of 57 firms for the period 1996-2006 (where data is available for every even year). Their findings suggest a concave relationship between the number of appointments held by the CEO and firm performance. Specifically, they find that more than two additional appointments are negatively associated with firm performance. They also find that chairmen of supervisory boards who serve on other management boards monitor firms with higher performance. This finding does not hold for appointments held in other supervisory boards. Miczaika and Witt (2004) show significant negative correlations between multiple board appointments and shareholder return. Schreyögg and Papenheim-Tockhorn (1995) investigate whether the supervisory board is an instrument to create inter-organizational ties. They take the results of their broken-tie analysis as indication that certain ties between firms are deliberately used in order to facilitate long-term cooperation opportunities.

Dittmann, Maug and Schneider (2010) put their focus on bankers on German boards. Their findings between bank representation and firm performance is mixed. They suggest that bankers promote their own business and provide financial expertise. Fauver and Fuerst (2006) investigate employee representation on German boards. Their findings indicate that employee representation is beneficial as it improves monitoring and reduces agency costs. Balsmeier and Peters (2009) analyze the relationship between multiple board appointments and management compensation. They conclude that management compensation is higher in firms where the management features more personal ties. Not directly related to interlocking, Bresser and Thiele (2008) investigate executive continuity, i.e. a CEO’s appointment to be chairman of the supervisory board. They find no evidence that this affects firm performance.

2.3 Research question

The general research question of this study is whether multiple board appointments have a positive or negative effect on firm performance. Given the numerous possible reasons of why individuals might hold multiple board appointments, it seems pointless to attribute their existence to one single purpose. Rather, it seems more plausible that holding multiple board appointments fulfills several tasks, which cannot be detached in a clear-cut way on individual or firm levels. This view is supported by results from Booth and Deli (1996). In order to reflect these different perspectives on multiple board appointments, I investigate the incidence of multiple board appointments from several angles. The primary goal of this study is to contribute to a growing body of literature that investigates the relationship between firm performance and particular characteristics of board directors by considering directors that have non-domestic appointments. In order to give a more comprehensive understanding of the effect of multiple board appointments on firm performance, I also draw on prior findings of related research. Particularly, I contrast the Busyness Hypothesis versus the Reputation Hypothesis. Here, I especially address the measurement of busyness which seems to be an essential driver of prior mixed results (Fich and Shivdasani, 2006). The investigation is completed by drawing on directors having bank affiliations and their impact on firm performance.

3 The institutional setting in Germany

I restrain the following explanations to corporations (*Aktiengesellschaft*) since it is the legal form of interest within the scope of this investigation. Those firms feature a two-tier board. German corporations are run by the management board (*Vorstand*), which is monitored by the supervisory board (*Aufsichtsrat*). The two boards are separated which means that no individual is allowed to serve on both boards of the same firm simultaneously.

Regulations concerning the management board can be found in the paragraphs 76-94 AktG (Stock Corporation Law - *Aktiengesetz*). Members of the management board are appointed by the supervisory board for a maximum period of five years. The supervisory board can agree to a prolongation of the tenure. The management board may comprise only one individual. Firms that possess more than three million Euro in capital stock have to appoint at least two individuals unless corporate statutes state otherwise. If several individuals have been elected to the management board, they lead the firm conjointly. Management compensation comprises a fixed salary and may be extended by variable components.

The management board is of essential importance to a firm and its performance since it is entrusted with its leadership in own responsibility. A catalog of tasks or a legal definition of leadership does not exist. In this respect, the management controls and coordinates the firm. It needs to develop corporate strategies and implement these into the day-to-day operations. However, some duties are legally determined. Particularly, the management is responsible for the preparation of financial statements and for calling the annual general meeting. The German law does not state any restrictions with regard to additional board appointments.

Regulations concerning the supervisory board can be found in the paragraphs 95-116 AktG. Members of the supervisory board are either a shareholder representative or an employee representative. The board consists of at least three and a maximum of 21 members (para. 95 AktG). Members of supervisory boards are also allowed to establish several smaller committees in order to make their work more efficient (para. 107 sect. 3 AktG). The board's composition depends on the firm's size. A firm with less than 500 employees features only shareholder representatives. If the number of employees is more than 500 but less than 2000, the board features two-third shareholder and one-third employee representatives. A board features the same number of employee and shareholder representatives in a firm with more than 2000 employees. The tenure is five years, if not a shorter time period is specified in the firm's statutes. The board has to elect one chairman and at least one vice-chairman.

The supervisory board is supposed to act in favor of the firm's interests. Its tasks can be classified into monitoring and supervising activities. It has to monitor the management board with respect to efficiency and correctness and is entrusted with according rights to ensure this task (para. 111 AktG). Among others, the supervisory board is entitled to attend annual general meetings, inspect proposed resolutions or to demand reports from the management. In addition to these activities, today's supervisory boards are expected to give the management advice (Kuck, 2006). Within this scope, the supervisory board needs a clear idea of the firm's business goals. Although the supervisory board nominates and appoints members of the management board, once the management is in charge, it leads the firm in its own responsibility. It is in the supervisory board's discretion to choose the intensity of supervision, which generally will depend on the firm's economic situation (Kuck, 2006). While the supervisory board is not allowed to engage into executive decisions, relevant business decisions need the supervisory board's approval. In order to fulfill its task, para. 110 sect. 3 AktG specifies the board to meet at least twice every half-year. According to para. 100 sect. 2 AktG, a member of the supervisory board is allowed to hold a total of ten directorships plus additional five in intergroup companies. Para. 102 sect. 1 AktG restricts the duration of a directorship to a maximum of five years. There is no maximum number of reelections to the supervisory board. The law provides no restrictions with regard to compensation. However, the compensation needs to be adequate with regard to board tasks and the firm's economic situation (para. 113 sect. 1 AktG).

The position of the chairman of the supervisory board comes with additional responsibilities. Particularly, he represents the supervisory board towards the management board and shall be available as contact person between the two parties. He is also responsible for the coordination and the execution of monitoring activities. For instance, he prepares and leads board meetings (Lutter and Krieger, 2008). In firms where the board equally consists of employee and shareholder representatives, the chairman has a double voting right. Since the chairman in these firms usually is a shareholder representative (para. 29 sect. 2 MitbestG) this allows shareholder representatives to overrule employee representatives.

4 Empirical analyses

4.1 Sample selection and data

The sample is derived from the Worldscope Universe. The investigation comprises the years 2004-2006. Accordingly, I take all observations that belong into this time frame as a starting point and make the following modifications: Observations with unavailable variables that are needed for the empirical analyses are deleted. Second, all financial firms as indicated by their SIC code are deleted since the importance of the board may be less pronounced for financial firms due to regulatory effects (Fich and Shivdasani, 2006). Third, firms where the fiscal year end is not December 31 are deleted. This ensures that the collected data on additional director appointments refers to the same point of time. Fourth, firms where a financial statement could not be obtained for at least one year and as a consequence, information on additional appointments was unavailable, are deleted. Fifth, firms where observations for three consecutive years could not be obtained in order to build a balanced panel are deleted. Sixth, firms that are not the parent firm are deleted. Finally, firms where the financial statement is available, but no information on additional appointments is provided, are deleted. This procedure yields a sample of 453 firm-year observations of 151 distinct firms. Table 1 summarizes the sample selection.

Table 1: Sample selection

	Action	Observations
Worldscope Universe 2004-2006		**2,654**
minus: Worldscope variables unavailable	-1,305	1,349
minus: financial companies	-294	1,055
minus: fiscal year end unequal December 31	-170	885
minus: financial statement unavailable	-170	715
minus: 3 consecutive years unavailable	-130	585
minus: company is not parent company	-81	504
minus: additional appointments unavailable	-51	453
Final Sample		**453 (151 unique firms)**

4.2 Data description

4.2.1 Director characteristics

All data concerning director characteristics and board appointments are hand-collected from the annual consolidated financial statements. Table 2 displays summary statistics for the sample firms' directors (4,408 director years; 1,838 unique individuals). Approximately 6.7% of the directors are female and 30.0% have a doctoral and/or professorial degree, including honorary degrees. 17.2% of the directors hold a position as chairman of a supervisory board (this can but does not need to be in a sample firm). The average director holds 2.1 board seats. The number of board seats is counted after deletion of intergroup board appointments. An intergroup appointment materializes if a director serves on the board of a sample firm and on the board of a firm controlled by the sample firm at the same time. Also, appointments in charitable institutions or non-for-profit organizations are eliminated (Fich and Shivdasani, 2006). Although the aforementioned authors provide no explanation for this procedure, it appears reasonable that such appointments are different with respect to imposed time restrictions. Additionally, selection criteria in order to serve for example on charitable organizations might be less competitive.

Table 2: Director characteristics (4,408 director years; 1,838 unique individuals)

Variable	Mean	Std.dev	Min	25th	Median	75th	Max
FEMALE	0.067	0.251					
ACADEMIC	0.300	0.458					
COS	0.172	0.377					
SEAT	2.114	1.769	1.000	1.000	1.000	3.000	11.000
SBSEAT	1.709	1.857	0.000	1.000	1.000	2.000	10.000
MBSEAT	0.405	0.518	0.000	0.000	0.000	1.000	3.000
NATSEAT	1.888	1.499	1.000	1.000	1.000	2.000	10.000
INTSEAT	0.226	0.848	0.000	0.000	0.000	0.000	10.000

Variable definitions (data has been hand-collected from annual consolidated financial statements):
FEMALE is an indicator variable taking the value 1 if an individual is female, ACADEMIC is an indicator variable taking the value 1 if an individual has a doctoral and/or professorial degree, COS is an indicator variable taking the value 1 if an individual is the chair of a supervisory board, SEAT is the total number of an individual's seats in supervisory and management boards, SBSEAT is the number of an individual's seats in supervisory boards, MBSEAT is the number of an individual's seats in management boards, NATSEAT is the number of an individual's seats in German supervisory and management boards, INTSEAT is the number of an individual's seats in non-domestic supervisory and management boards.

As evidenced by Panel A of Table 3, holding multiple board seats is not a common phenomenon. The majority of the sample directors (57%) serve on one board. Similar observations are made e.g. by Dooley (1969), Ferris, Jagannathan and Pritchard (2003) and Jiraporn et al. (2009). Panel B evidences that appointments on non-domestic boards are not a common phenomenon, either. Approximately 88% of the directors have no international appointments. From the remaining directors, around 7.5% hold one international directorship, which illustrates that multiple non-domestic appointments are even rarer.

Table 3: Distribution of directorships

Panel A

Number of directorships	Frequency	Percent	Cumulative Percentage
1	2,511	56.96	56.96
2	730	16.56	73.53
3	416	9.44	82.96
4	277	6.28	89.25
5	192	4.36	93.60
6	112	2.54	96.14
7	69	1.57	97.71
8	55	1.25	98.96
9	27	0.61	99.57
10	16	0.36	99.93
11	3	0.07	100.00

Panel B

Number of international directorships	Frequency	Percent	Cumulative Percentage
0	3,882	88.07	88.07
1	332	7.53	95.60
2	94	2.13	97.73
3	38	0.86	98.59
4	26	0.59	99.18
5	4	0.09	99.27

4.2.2 Firm characteristics

Table 4 shows the membership of the sample firms to industries. The industry classification bases on the SIC division structure. Most sample firms belong to the divisions Manufacturing (47.7%) and Services (32.5%).

Table 4: Sample firms by industry group (n=151 (unique firms))

Industry group	n	%
Division A: Agriculture, Forestry, And Fishing	0	0
Division B: Mining	2	1.32
Division C: Construction	2	1.32
Division D: Manufacturing	72	47.68
Division E: Transportation, Communications, Electric, Gas, And Sanitary Services	9	5.96
Division F: Wholesale Trade	13	8.61
Division G: Retail Trade	3	1.99
Division H: Finance, Insurance, And Real Estate	*0*	*0*
Division I: Services	49	32.45
Division J: Public Administration	1	0.66

Notes:

Industry classification bases on the SIC division structure. No firm belongs to Division H since all Finance, Insurance and Real Estate firms were deleted from the sample.

Descriptive statistics for the sample firms are displayed in Table 5. All variables, which are not truncated by definition are winsorized by their 1% and 99% interval to account for outliers. Restrictions imposed to the sample selection process (e.g. coverage on Worldscope and financial statements are available for three consecutive years) biases the sample towards larger firms, as evidenced by variables capturing a firm's size or age. The shown Tobin's q is comparable to that of Dittmann, Maug and Schneider (2010). Their reported mean is 1.54 (sample: 1.55) and median is 1.24 (sample: 1.30).

Table 5: Descriptive statistics of the sample firms (n=453)

Variable	Mean	Std.dev	Min	25th	Median	75th	Max
TOTASS	4,150.060	18,599.930	6.344	57.038	150.660	510.992	133,565.000
MKTCAP	1,478.700	4,428.930	4.272	35.309	105.427	494.900	33,715.090
SALES	2,912.510	10,110.520	3.663	53.296	183.733	671.735	61,347.010
%FORSALES	0.400	0.283	0.000	0.142	0.393	0.618	1.000
TQ	1.551	0.846	0.429	1.063	1.296	1.728	6.507
SALESGROWTH	0.073	0.258	-0.788	-0.024	0.063	0.150	1.427
CAPEX	0.044	0.046	0.000	0.015	0.033	0.057	0.347
R&D	0.034	0.059	0.000	0.000	0.007	0.046	0.302
ROA	0.057	0.142	-0.573	0.025	0.074	0.111	0.402
LEV	0.197	0.182	0.000	0.029	0.155	0.311	0.767
CLSHELD	0.452	0.258	0.000	0.258	0.466	0.646	0.984
AGE	51.940	50.198	3.000	13.000	28.000	83.000	201.000
SEGMENT	3.351	1.510	1.000	2.000	3.000	4.000	8.000

Variable definitions (data source):

TOTASS is a firm's total assets in M€ (Worldscope), MKTCAP is a firm's market capitalization in M€ (Worldscope), SALES is a firm's sales in M€ (Worldscope), %FORSALES is foreign sales to sales (Worldscope), TQ is the market value of the firm's equity at the end of the year plus the difference between the book value of the firm's assets and the book value of the firm's equity at the end of the year, divided by the book value of the firm's assets at the end of the year (Worldscope), SALESGROWTH is a firm's sales in t minus sales in t-1 to sales in t-1 (Worldscope), CAPEX is capital expenditures (additions to fixed assets) to total assets (Worldscope), R&D is a firm's research and development expense to total assets (Worldscope), ROA is a firm's EBIT to total assets (Worldscope), LEV is a firm's total debt to total assets (Worldscope), CLSHELD is a firm's closely held shares to common shares outstanding (Worldscope), AGE is a firm's age (Worldscope), SEGMENT is a firm's number of product segments (Worldscope).

Panel A of Table 6 displays board related characteristics. A firm's average two-tier board consists of 10.2 members. Hereof, 7.2 individuals belong to the supervisory board and 3 individuals belong to the management board. Supervisory boards meet approximately 5 times per year on a regular basis and 0.3 times on an irregular basis. Supervisory boards are allowed to establish several committees in order to make their work more efficient. Typical examples are the audit committee (deals mostly with accounting-related topics) or the compensation committee (deals with management compensation). On average, the sample firms establish 1.5 committees.

Table 6: Board related characteristics (n=453)

Variable	Mean	Std.dev	Min	25th	Median	75th	Max
Panel A							
BOARDSIZE	10.221	5.794	2.000	6.000	8.000	13.000	29.000
SPVSIZE	7.269	4.931	1.000	3.000	6.000	11.000	21.000
MGNSIZE	2.951	1.391	0.000	2.000	3.000	4.000	10.000
REGMEET	4.903	1.276	2.000	4.000	5.000	5.000	12.000
IRGMEET	0.307	0.842	0.000	0.000	0.000	0.000	6.000
COMMITTEE	1.468	1.440	0.000	0.000	1.000	3.000	6.000
Panel B							
BOARDTIES	12.751	14.104	0.000	4.000	8.000	17.000	75.000
NATBOARDTIES	10.333	11.869	0.000	3.000	6.000	13.000	60.000
INTBOARDTIES	2.417	4.132	0.000	0.000	1.000	3.000	21.000
COSSEATS	2.236	2.244	0.000	0.000	2.000	4.000	10.000
%BUSYD	0.263	0.180	0.000	0.125	0.250	0.400	0.750
BUSYBOARD	0.130	0.337					
%COSD	0.076	0.095	0.000	0.000	0.000	0.143	0.500
COSBOARD	0.459	0.499					
%INTD	0.115	0.142	0.000	0.000	0.080	0.190	0.750
INTBOARD	0.035	0.185					
%BANKD	0.045	0.079	0.000	0.000	0.000	0.077	0.400
BANKBOARD	0.316	0.465					

Variable definitions (data has been hand-collected from annual consolidated financial statements):

Panel A:

BOARDSIZE is the size of a firm's supervisory board and management board as of December 31 of the respective year, SPVSIZE is the size of a firm's supervisory board as of December 31 of the respective year, MGTSIZE is the size of a firm's management board as of December 31 of the respective year, REGMEET is the number of a firm's regular board meetings, IRGMEET is the number of firm's irregular board meetings, COMMITTEE is the number of a firm's established committees by the supervisory board.

Panel B:

BOARDTIES is the number of ties established by board members to other boards, NATBOARTIES is the number of ties established by board members to German supervisory or management boards, INTBOARDTIES is the number of ties established by board members to non-domestic supervisory or management boards, COSSEATS is the number of additional seats hold by the chair of the supervisory board, %BUSYD is busy board members to board members, BUSYBOARD is an indicator variable taking the value 1 if more than 50% or more of the board members are busy, %COSD is board members holding the position of a chair of supervisory board in other firms to board members, COSBOARD is an indicator variable taking the value 1 if at least one director holds a chair of a supervisory board in another firm, %INTD is directors with international board appointments to board members, INTBOARD is an indicator variable taking the value 1 if more than 50% or more of the board members have international appointments, %BANKD is directors serving on a bank's supervisory or management board to board members, BANKBOARD is an indicator variable taking the value 1 if at least one director also serves on a bank's supervisory or management board.

Panel B of Table 6 provides information with regard to ties established by members of the board holding multiple directorships. On average, a board establishes about 12.7 ties to other boards. Only 7.6% of the boards feature directors without any ties, 54.9% of the boards establish between one and ten ties to other boards, the remaining 37.5% of the boards have more than ten ties to other boards. From the ties, 10.3 are connections to domestic boards and 2.4 are connections to non-domestic boards. Notably, 43.7% of the boards do not feature a tie to a non-domestic board, 41.7% establish between one and five ties to non-domestic boards and the remaining 14.6% have more than five ties to non-domestic boards; this indicates that international ties are clustered around a small group of the sample firms. On average, the chairman of the supervisory board establishes 2.2 ties to other boards. More specifically, 29.6% of the sample chairmen have no additional board appointment, 60.5% establish between one and five ties to other boards and the remaining 9.9% establish more than five ties to other boards.

Prior literature dealing with multiple board appointments typically classifies directors into “busy” and “non-busy”. A busy director is defined as holding three or more board appointments (Core, Holthausen and Larcker, 1999; Ferris, Jagannathan and Pritchard, 2003; Fich and Shivdasani, 2006). On average, the percentage of busy directors on a firm’s board is 26.3%. Fich and Shivdasani (2006) suggest to alternatively assess the prevalence of busyness within a board by using an indicator variable that is one if 50% or more of all board directors have been identified as being busy. Using this approach shows that 13% of the boards are busy.

Next, I assess the presence of chairmen of supervisory boards (COS) on the sample firms’ boards. On average, 7.6% of the directors (that are not the chairman of a supervisory board of a sample firm) hold at least one chairman position in another firm. As an alternative measure, the indicator variable COSBOARD is one if an individual who is chairman of a supervisory board on another firm sits on the sample firm's board. Accordingly, 45.9% of the sample firms have at least one individual on their board who is the chairman of another supervisory board.

In order to assess a board's international orientation, I use a similar approach as used for identifying a board's busyness. I classify a director as being "international", if the director holds at least one appointment on a non-domestic board. Throughout the study, internationalization of a director or a board refers to ties abroad. I do not use the same threshold used for identifying busy directors because having international appointments is not as prevalent as having multiple board seats. On average, the percentage of international directors on a firm's board is 11.5%. Measuring internationalization of a board by an indicator variable that is one if 50% or more of all board directors are international shows that 3.5% of the boards are international.

I classify a board to feature bank representation if an individual on the board also serves on the supervisory or management board of a bank. Accordingly, the percentage of bank representatives on the sample firm's board is 4.5%. In comparison, Dittmann, Maug and Schneider (2010) find that 8.8% of the directors are bankers. However, they classify a director to be a banker if the individual is or was a member of the management board of a bank and calculate their ratio based to the total number of shareholder representatives, only. Similar to the approach of capturing busyness and internationalization of a board, I also use an indicator variable to measure bank prevalence. The respective indicator variable is 1, if at least one director is a bank representative. 31.6% of the sample firms have at least one bank representative on their board. A comparable approach by the aforementioned authors yields 46% boards with bank representation.

4.2.3 Correlations

Table 7 displays correlations between board related variables and firm characteristics. The figures show a positive and significant correlation between firm and board size and the occurrence of multiple board appointments. Notably, the correlations show a negative relationship between the different measures of multiple board appointments and Tobin’s q except for the percentage of international directors. Likewise, return on assets is negatively correlated with the measures except for the presence of bank directors. Overall, the correlations give a first indication of a possible negative relationship between the occurrence of multiple board appointments and firm performance.

Table 7: Pearson/Spearman correlations between dependent/independent variables (n=453)

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**	**(17)**	**(18)**
(1) TQ		**0.296**	**-0.120**	-0.052	**-0.098**	**-0.111**	**0.108**	-0.054	-0.014	-0.076	**0.254**	-0.050	**0.290**	-0.020	**0.205**	**-0.294**	-0.055	0.015
(2) ROA	**0.476**		0.070	**-0.118**	**-0.115**	0.057	**-0.143**	**-0.134**	**-0.219**	**0.147**	**0.356**	**0.363**	**0.269**	**0.147**	**-0.352**	-0.026	0.059	**0.126**
(3) %FORSALES	**-0.107**	0.055		**0.178**	**0.110**	**0.117**	**0.244**	**0.193**	**0.221**	**0.158**	**0.217**	**0.289**	**-0.079**	0.014	0.051	**0.092**	-0.074	**0.151**
(4) %BUSYD	-0.018	-0.043	**0.188**		**0.513**	**0.358**	**0.493**	**0.783**	**0.747**	**0.292**	**0.297**	**0.281**	-0.030	0.044	**0.130**	0.024	**-0.110**	**0.173**
(5) %COSD	**-0.078**	**-0.093**	**0.112**	**0.514**		**0.267**	**0.243**	**0.562**	**0.421**	**0.288**	**0.241**	**0.250**	-0.067	**0.085**	0.014	-0.005	**-0.113**	**0.117**
(6) %BANKD	-0.034	0.070	**0.114**	**0.342**	**0.298**		**0.120**	**0.402**	**0.285**	**0.470**	**0.425**	**0.481**	-0.047	**0.081**	**-0.142**	**0.117**	**-0.108**	**0.274**
(7) %INTD	0.019	-0.051	**0.273**	**0.475**	**0.257**	**0.173**		**0.483**	**0.721**	**0.168**	**0.208**	**0.115**	0.023	-0.019	**0.312**	**-0.080**	**-0.150**	0.077
(8) BUSYSCORE	-0.011	**-0.100**	**0.216**	**0.788**	**0.536**	**0.378**	**0.429**		**0.788**	**0.311**	**0.309**	**0.288**	-0.053	0.012	**0.104**	0.009	**-0.138**	**0.218**
(9) REPUTATIONSCORE	-0.026	**-0.117**	**0.232**	**0.747**	**0.407**	**0.294**	**0.616**	**0.783**		**0.231**	**0.260**	**0.192**	-0.040	-0.056	**0.294**	-0.055	**-0.156**	**0.128**
(10) BOARDSIZE	0.032	**0.130**	**0.145**	**0.283**	**0.360**	**0.470**	**0.287**	**0.312**	**0.237**		**0.766**	**0.827**	0.043	**0.186**	**-0.155**	**0.099**	-0.076	**0.254**
(11) MKTCAP	**0.366**	**0.412**	**0.189**	**0.264**	**0.257**	**0.432**	**0.242**	**0.271**	**0.229**	**0.701**		**0.863**	**0.189**	**0.187**	**-0.121**	-0.039	**-0.172**	**0.293**
(12) SALES	0.017	**0.380**	**0.253**	**0.239**	**0.265**	**0.463**	**0.193**	**0.255**	**0.181**	**0.754**	**0.821**		**0.124**	**0.222**	**-0.311**	**0.195**	**-0.119**	**0.316**
(13) SALESGROWTH	**0.307**	**0.382**	-0.025	-0.056	**-0.097**	-0.045	-0.015	**-0.086**	**-0.087**	0.050	**0.283**	**0.158**		0.018	0.009	**-0.136**	**-0.089**	-0.027
(14) CAPEX	0.043	**0.261**	**0.097**	**0.116**	**0.181**	**0.162**	0.067	**0.110**	0.033	**0.379**	**0.314**	**0.395**	0.075		**-0.128**	**0.236**	0.077	**0.111**
(15) R&D	**0.193**	**-0.083**	**0.261**	**0.159**	0.040	**-0.097**	**0.175**	**0.139**	**0.255**	0.022	**0.091**	**-0.099**	0.056	-0.065		**-0.279**	**-0.120**	**-0.097**
(16) LEV	**-0.294**	-0.048	**0.148**	0.076	0.039	**0.159**	0.017	0.073	0.017	**0.172**	0.003	**0.273**	**-0.202**	**0.280**	**-0.243**		-0.013	**0.153**
(17) CLSHELD	**-0.105**	0.024	-0.069	**-0.122**	**-0.116**	**-0.086**	**-0.140**	**-0.142**	**-0.142**	-0.053	**-0.182**	**-0.085**	**-0.112**	0.066	**-0.245**	-0.025		**-0.123**
(18) SEGMENT	0.046	**0.166**	**0.148**	**0.171**	**0.120**	**0.249**	**0.125**	**0.217**	**0.159**	**0.158**	**0.268**	**0.277**	0.005	**0.141**	-0.055	**0.181**	**-0.133**	

Variable definitions (data source):

TQ is the market value of the firm's equity at the end of the year plus the difference between the book value of the firm's assets and the book value of the firm's equity at the end of the year, divided by the book value of the firm's assets at the end of the year (Worldscope), ROA is a firm's EBIT to total assets (Worldscope), %FORSALES is foreign sales to sales (Worldscope), %BUSYD is busy board members to board members, %COSD is board members holding the position of a chair of supervisory board to board members, %BANKD is directors serving on a bank's supervisory or management board to board members, %INTD is directors with international board appointments to board members, BUSYSCORE is a score that captures the busyness of a board (calculation as described), REPUTATIONSCORE is a score that captures the reputation/skill of a board (calculation as described), BOARDSIZE is the size of a firm's supervisory board and management board as of December 31 of the respective year, MKTCAP is the natural logarithm of a firm's market capitalization (Worldscope), SALES is the natural logarithm of a firm's sales (Worldscope), SALESGROWTH is a firm's sales in t minus sales in t-1 to sales in t-1 (Worldscope), CAPEX is a firm's capital expenditures (additions to fixed assets) to total assets (Worldscope), R&D is a firm's research and development expense to total assets (Worldscope), LEV is a firm's total debt to total assets (Worldscope), CLSHELD is a firm's closely held shares to common shares outstanding (Worldscope), SEGMENT is a firm's number of product segments (Worldscope).

Notes:

Pearson (Spearman) correlations are displayed above (below) the diagonal. Bold typeset denotes significant correlations below the 10 % level.

4.3 Multiple board appointments and firm performance

4.3.1 Methodology

Throughout the study, I deploy firm and year fixed effects. The inclusion of fixed effects mitigates effects of unobserved heterogeneity. Fich and Shivdasani (2006) point towards the importance to estimate firm-fixed effect regressions in a related setting. Using firm-fixed effects in this setting is a comparable conservative method. Since board composition is substantially different across firms and strong changes do not occur from year to year, much of the cross-sectional variation is removed. Hermalin and Weisbach (1991) point towards the importance to reason whether inferences should be made within or between firms on the investigation of firm performance and board composition. Zhou (2001) suggests that fixed effects estimators might be unsuitable to detect a relationship of managerial ownership on firm performance because changes in managerial ownership are too small. I consider the firm and year fixed effects specifications to be more conservative that work against finding a relationship between the board composition variables and performance.

Endogeneity constitutes a problem throughout the investigation. Directors holding multiple board appointments might positively or negatively affect firm performance. Likewise, poorly performing firms might try to attract directors holding multiple appointments to draw on their experience and networks. On the other hand, banks might feel a stronger urge to monitor their loans when firms exhibit poor performance. When investigating the relationship on foreign sales, an increase might be the result of directors using their international networks to enhance international activities. On the other hand, firms that are already in the process of increasing foreign sales might seek directors with international board appointments. Likewise, directors serving on internationally oriented firms might be more internationally exposed, resulting in offers to serve on international boards. I address the endogeneity problem in a separate section.

In order to test my hypotheses, I draw on firm performance measures used in prior literature. I use Tobin's q (TQ), which is a commonly used measure in this line of literature (e.g. Yermack, 1996; Fauver and Fuerst, 2006; Dittman, Maug and Schneider, 2010). Following Fich and Shivdasani (2006), the definition used is "the market value of the firm's equity at the end of the year plus the difference between the book value of the firm's assets and the book value of the firm's equity at the end of the year, divided by the book value of the firm's assets at the end of the year".[1]

The idea behind Tobin's q is that it puts the expected firm's market value in relation to the replacement cost of tangible assets (Lang and Stulz, 1994). When financial markets are assumed to be efficient, Tobin's q captures the contribution of intangible assets to the firm's market value via market expectations. The intangible assets are composed of several components like investment opportunities or reputational capital. The board can directly affect the nominator and the denominator of Tobin's q as it is responsible for the firm's investments. Also, the board can be viewed as an intangible asset itself with a positive or negative value. Models drawing on this relationship assume that good management and good corporate governance have a positive impact on Tobin's q. A drawback of Tobin's q lies in the circumstance that it can also proxy for other firm characteristics. For example, it can capture a firm's investment opportunities, especially when underinvestment prevails due to liquidity shortage. Although a control for investment opportunities is included in the models, I also use alternative measures of firm performance which are discussed later.

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[1] Fich and Shivdasani (2006) closely follow Smith and Watts (1992).

Studies that investigate boards in the Anglo-American setting often include additional controls, particularly board size, board committees and board meetings. I do not consider these controls to be suitable in the setting at hand. Board size is strongly driven by a firm's size and number of employees. As a matter of fact, board size exhibits a high correlation with the size measures (Table 7). Including both variables into my model specifications results in VIFs far over 10, introducing the risk that results are pested by multicollinearity issues. Also, the number of board meetings and number of board committees are partly regulatory driven. German supervisory boards meet at least four times per year by law. The German Corporate Governance Codex stipulates to establish committees. Overall, including these variables exhibit the danger to include mechanistically driven controls or to be endogenous. In this respect, my proposed base model is a comparable parsimonious specification that strongly follows Dittmann, Maug and Schneider (2010), whose study is also set in a German institutional setting.

The base model specification is as follows:

Model (1)

$$
\begin{aligned}
TQ = \; & \beta_1 VariableOfInterest + \beta_2 SALES + \beta_3 SALESGROWTH + \beta_4 CAPEX \\
& + \beta_5 R\&D + \beta_6 LEV + \beta_7 CLSHELD + \beta_8 SEGMENT + \varepsilon
\end{aligned}
$$

It is conventional to control for several value drivers that can influence Tobin's q. Specifically, I control for firm size (SALES), measured as the natural logarithm of sales; sales growth (SALESGROWTH), measured as sales minus last year's sales to last year's sales; capital expenditures (CAPEX), measured as capital expenditures to property, plant and equipment to total assets; research and development intensity (R&D), measured as research and development expense to total assets; leverage (LEV), measured as total debt to total assets; ownership structure, measured as closely held shares to common shares outstanding (CLSHELD) and the number of product segments (SEGMENT). These variables are all provided by Worldscope. Table 8 displays the results of estimating Model 1 without board variables. The model exhibits a reasonable fit with sales growth, research and development intensity, leverage and ownership structure significantly contributing to the model fit.

Table 8: Tobin's q base model (n=453)

Independent variable	Coefficient
SALES	0.031
	(0.779)
SALESGROWTH	**0.392**
	(0.001)
CAPEX	1.287
	(0.143)
R&D	**2.346**
	(0.012)
LEV	**-0.793**
	(0.020)
CLSHELD	**0.408**
	(0.070)
SEGMENT	-0.017
	(0.611)
Fixed effects	Firm, Year
F-statistic	**11.070**
	(0.000)
R^2	0.857

Dependent Variable: Tobin's q (Worldscope)

Variable definitions (data source):

SALES is the natural logarithm of a firm's sales (Worldscope), SALESGROWTH is a firm's sales in t minus sales in t-1 to sales in t-1 (Worldscope), CAPEX is a firm's capital expenditures (additions to fixed assets) to total assets (Worldscope), R&D is a firm's research and development expense to total assets (Worldscope), LEV is a firm's total debt to total assets (Worldscope), CLSHELD is a firm's closely held shares to common shares outstanding (Worldscope), SEGMENT is a firm's number of product segments (Worldscope).

Notes:

Bold typeset denotes significant difference from zero (two-sided t-test) at significance levels of 0.01, 0.05 and 0.10, respectively; p-values are given in parentheses.

4.3.2 Busyness vs. Reputation Hypothesis

In this part, I investigate multiple board appointments under aspects of the Busyness Hypothesis and the Reputation Hypothesis. Under the Busyness Hypothesis, directors with multiple board appointments are expected to have a negative impact on firm performance (Ferris, Jagannathan and Pritchard, 2003). Individuals might be overcommitted and thus not able to fulfill their responsibilities due to time constraints. Jiraporn et al. (2009) find that multiple directorships negatively affect the probability of attending board meetings. The consequent reduction in the monitoring function could for example lead to agency costs in form of increased litigation exposure. Jiraporn, Singh and Lee (2009) find that directors holding more board appointments serve on fewer board committees. Board committees are associated with increasing board effectiveness (Klein, 1998). Under the Reputation Hypothesis, directors with multiple board appointments are expected to enhance firm performance. The director increases his skills and his experience by sitting on different boards and learns about different management styles and strategies (Carpenter and Westphal, 2001). Holding multiple board appointments is perceived as a credible signal of the director's skills (Fama and Jensen, 1983). Consequently, skilled directors hold more board appointments because they are actively sought by firms for their firm performance improving abilities (Jiraporn, Singh and Lee, 2009).

Drawing on prior literature, I assess director busyness by counting a director's board appointments. In order to assess the Reputation Hypothesis, I draw on the presence of chairmen of supervisory boards of other firms and on the number of appointments held by the chair of the supervisory board. The chair of the supervisory board has a more distinguished function on the board. Consequently, this position should be given to skilled and experienced individuals. Evidence that chairmen of supervisory boards are different from their fellow colleagues can be found in Table 9. Accordingly, COS (1) are significantly more often male, (2) hold significantly more often a doctoral and/or professorial degree and (3) have significantly more directorships. I investigate whether the presence of several of these individuals enhances firm performance.

Table 9: Subdivision of the director sample (4,408 director years)

Variable	Mean	Median	Mean	Median	p-value (Chi-square/ t-Test)	p-Value (Wilcoxon Test)
	Non-COS (n=3,651)		COS (n=757)			
FEMALE	0.078		0.015		(0.000)	
ACADEMIC	0.262		0.482		(0.000)	
SEAT	1.719	1.000	4.020	4.000	(0.000)	(0.000)
SPVSEAT	1.276	1.000	3.798	3.000	(0.000)	(0.000)
MGTSEAT	0.443	0.000	0.222	0.000	(0.000)	(0.000)
NATSEAT	1.553	1.000	3.501	3.000	(0.000)	(0.000)
INTSEAT	0.165	0.000	0.519	0.000	(0.000)	(0.000)

Variable definitions (data has been hand-collected from annual consolidated financial statements):
FEMALE is an indicator variable taking the value 1 if an individual is female, ACADEMIC is an indicator variable taking the value 1 if an individual has a doctoral and/or professorial degree, SEAT is the total number of an individual's seats in supervisory and management boards, SPVSEAT is the number of an individual's seats in supervisory boards, MGTSEAT is the number of an individual's seats in management boards, NATSEAT is the number of an individual's seats in German supervisory and management boards, INTSEAT is the number of an individual's seats in non-domestic supervisory and management boards.

In order to contrast the Busyness Hypothesis and the Reputation Hypothesis, I estimate model (1) with the variables percentage of busy directors (%BUSYD), the indicator variable BUSYBOARD, percentage of directors being chairman of supervisory boards (%COSD) and the indicator variable COSBOARD. Results are displayed in Table 10.

Table 10: Busyness vs. Reputation Hypothesis (n=453)

	(1)	(2)	(3)	(4)	(5)	(6)
Independent variable	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**
%BUSYD	-0.347				-0.362	
	(0.208)				(0.191)	
BUSYBOARD		-0.111				-0.111
		(0.249)				(0.248)
%COS			0.258		0.299	
			(0.541)		(0.480)	
COSBOARD				0.039		0.039
				(0.634)		(0.627)
SALES	0.034	0.028	0.032	0.034	0.035	0.031
	(0.758)	(0.801)	(0.775)	(0.761)	(0.752)	(0.782)
SALESGROWTH	**0.390**	**0.396**	**0.391**	**0.388**	**0.388**	**0.391**
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
CAPEX	1.322	1.266	1.302	1.285	1.340	1.263
	(0.133)	(0.150)	(0.140)	(0.145)	(0.128)	(0.152)
R&D	**2.280**	**2.217**	**2.337**	**2.338**	**2.267**	**2.209**
	(0.015)	(0.019)	(0.013)	(0.013)	(0.016)	(0.019)
LEV	**-0.819**	**-0.792**	**-0.800**	**-0.802**	**-0.829**	**-0.801**
	(0.016)	(0.020)	(0.019)	(0.019)	(0.015)	(0.019)
CLSHELD	**0.395**	**0.426**	**0.398**	**0.405**	**0.382**	**0.423**
	(0.079)	(0.059)	(0.078)	(0.073)	(0.091)	(0.061)
SEGMENT	-0.018	-0.020	-0.015	-0.016	-0.015	-0.019
	(0.597)	(0.545)	(0.658)	(0.629)	(0.651)	(0.562)
Fixed effects	Firm, Year	Firm, Year	Firm, Year	Firm, Year	Firm, Year	Firm, Year
F-statistic	**11.030**	**11.020**	**10.980**	**10.970**	**10.950**	**10.930**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R^2	0.858	0.858	0.857	0.857	0.858	0.858

Dependent Variable: Tobin’s q (Worldscope)

Variable definitions (data source):

%BUSYD is busy board members to board members, BUSYBOARD is an indicator variable taking the value 1 if more than 50% or more of the board members are busy, %COSD is board members holding the position of a chair of supervisory board to board members, COSBOARD is an indicator variable taking the value 1 if at least one director holds a chair of a supervisory board in another firm, SALES is the natural logarithm of a firm’s sales (Worldscope), SALESGROWTH is a firm’s sales in t minus sales in t-1 to sales in t-1 (Worldscope), CAPEX is a firm’s capital expenditures (additions to fixed assets) to total assets (Worldscope), R&D is a firm’s research and development expense to total assets (Worldscope), LEV is a firm’s total debt to total assets (Worldscope), CLSHELD is a firm’s closely held shares to common shares outstanding (Worldscope), SEGMENT is a firm’s number of product segments (Worldscope).

Notes:

Bold typeset denotes significant difference from zero (two-sided t-test) at significance levels of 0.01, 0.05 and 0.10, respectively; p-values are given in parentheses.

In line with the Busyness Hypothesis, I find a negative relationship between Tobin's q and busy directors. The relationship is non-significant at common significance levels. The sign of %COS and COSBOARD, which are both supposed to capture director skills, are both positive and insignificant. Estimating a full model, the signs are again as expected and non-significant on common levels. These results give weak evidence for both the Busyness and the Reputation Hypothesis. Multiple board appointments have a negative impact on firm performance. This effect does not hold for directors that are chairman on other supervisory board. This might stem from the circumstance that these individuals are particularly skilled in fulfilling their tasks on a supervisory board. However, these results are statistically insignificant.

I further substantiate the previous findings by conducting additional tests. In the previous test, no distinction is made with respect to which individual is busy. This is a simplification of reality in so far that both the CEO and the COS have a particular important role in and for a firm. Consequently, in line with the Busyness Hypothesis, it should be more harmful for a firm if these two individuals are busy. I address this consideration by estimating model (1) including the additional number of directorships held by the COS and the CEO. Results are displayed in Table 11.

Table 11: Appointments held by COS and CEO and Tobin's q (n=453)

	(1)	(2)	(3)	(4)	(5)
Independent variable	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**
COSSEATS	**-0.036**		**-0.036**	-0.024	
	(0.096)		(0.096)	(0.629)	
COSSEATS^2				-0.002	
				(0.796)	
NONCOSSEATS	0.006			0.005	
	(0.943)			(0.949)	
CEOSEATS		-0.007	-0.005		0.016
		(0.889)	(0.920)		(0.865)
CEOSEATS^2					-0.006
					(0.761)
NONCEOSEATS		-0.039			-0.040
		(0.595)			(0.582)
NONCOSCEOSEATS			0.001		
			(0.992)		
SALES	0.059	0.034	0.060	0.059	0.029
	(0.597)	(0.763)	(0.592)	(0.600)	(0.799)
SALESGROWTH	**0.381**	**0.389**	**0.380**	**0.382**	**0.391**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
CAPEX	1.276	1.299	1.281	1.276	1.313
	(0.146)	(0.141)	(0.146)	(0.147)	(0.138)
R&D	**2.340**	**2.294**	**2.334**	**2.339**	**2.294**
	(0.013)	(0.015)	(0.014)	(0.013)	(0.015)
LEV	**-0.847**	**-0.799**	**-0.844**	**-0.842**	**-0.804**
	(0.013)	(0.019)	(0.014)	(0.014)	(0.019)
CLSHELD	**0.398**	**0.406**	**0.400**	**0.402**	**0.408**
	(0.077)	(0.073)	(0.077)	(0.075)	(0.072)
SEGMENT	-0.021	-0.018	-0.021	-0.021	-0.018
	(0.529)	(0.586)	(0.533)	(0.525)	(0.598)
Fixed effects	Firm, Year	Firm, Year	Firm, Year	Firm, Year	Firm, Year
F-statistic	**10.980**	**10.870**	**10.880**	**10.880**	**10.770**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R^2	0.859	0.857	0.859	0.859	0.857

Dependent Variable: Tobin's q (Worldscope)

Variable definitions (data source):

COSSEATS is the number of additional seats held by the chair of the supervisory board, COSSEATS^2 is the squared number of additional seats held by the chair of the supervisory board, NONCOSSEATS is the number of additional seats held by non-COS members of the board to board size minus one, CEOSEATS is the number of additional seats held by the CEO, CEOSEATS^2 is the squared number of additional seats held by the CEO, NONCEOSEATS is the number of additional seats held by non-CEO members of the board to board size minus one, NONCOSCEOSEATS is the number of additional seats held by board members who are not the COS or the CEO to board size minus two, SALES is the natural logarithm of a firm's sales (Worldscope), SALESGROWTH is a firm's sales in t minus sales in t-1 to sales in t-1 (Worldscope), CAPEX is a firm's capital expenditures (additions to fixed assets) to total assets (Worldscope), R&D is a firm's research and development expense to total assets (Worldscope), LEV is a firm's total debt to total assets (Worldscope), CLSHELD is a firm's closely held shares to common shares outstanding (Worldscope), SEGMENT is a firm's number of product segments (Worldscope).

Notes:

Bold typeset denotes significant difference from zero (two-sided t-test) at significance levels of 0.01, 0.05 and 0.10, respectively; p-values are given in parentheses.

In model specification (1), COSSEATS is the number of the COS's additional directorships and NONCOSSEATS is the number of additional seats held by the remaining board members deflated by board size minus one. In specification (2), CEOSEATS is the number of the CEO's additional directorships and NONCEOSEATS is the number of additional seats held by the remaining board members deflated by board size minus one. Finally, in specification (3), I include COSSEATS and CEOSEATS; NONCOSCEOSEATS is the number of additional seats held by the remaining board members deflated by board size minus two. Consistent with the Busyness Hypothesis, I find a negative sign on my variables of interest. The coefficient of COSSEATS is significant. While these results also suggest a negative relationship between multiple board appointments and firm performance, they need a more distinguished interpretation. Accordingly, the results suggest that it is more harmful for firm performance when the COS holds multiple board appointments while the negative relationship is not significant for additional board seats held by the CEO.

Balsmeier, Buchwald and Peters (2009) argue that the relationship between the number of board appointments of CEO or COS and firm performance might be non-linear. Particularly, they conjecture that although additional appointments are given to skilled directors, imposed time consumption will prevail after a certain number of multiple board appointments. In order to address this concern, they include the additional number of board appointments and its squared value. Their results suggest a positive concave relationship between additional seats held by the CEO and firm performance. In order to assess a possible non-linear relationship, I follow the aforementioned authors and also include the squared value of COSSEATS (specification (4)) and CEOSEATS (specification (5)). Notably, neither the variables of interest nor their squared values are significantly associated with firm performance. In this respect, my results do not indicate that the non-linear model specification is more suitable in modeling the relationship between additional board appointments held by COS or CEO and firm performance. Investigating the signs of the coefficients, the results suggest a negative convex relationship for additional board appointments held by the COS since both coefficients of COSSEATS and COSSEATS^2 are negative. As for additional seats held by the CEO, the signs indicate a positive concave relationship, suggesting that there are benefits for firm performance if the CEO takes multiple board appointments but these are limited and the effect can turn negative if the number of additional board appointments is too high.

I further assess the previous findings in a final test. I address whether it matters which of the directors are busy by calculating a busyness score and a reputation score. The busyness score is calculated as follows:

$$BUSYSCORE_j = \frac{3 * \sum_{CEO=1}^{1} \sum_{k=1}^{l} WL_{CEO,k} + 2 * \sum_{MGT=1}^{n} \sum_{k=1}^{l} WL_{MGT,k} + 2 * \sum_{COS=1}^{1} \sum_{k=1}^{l} WL_{COS,k} + 1 * \sum_{SB=1}^{m} \sum_{k=1}^{l} WL_{SB,k}}{BOARDSIZE_j}$$

BUSYSCORE is calculated for every board of the firm j in the sample for each year. Each board is subdivided into four elements: CEO, management board (MGT) comprising n board members (excluding CEO), COS and supervisory board (SB) comprising m board members (excluding COS). The workload (WL) for each of these four elements is calculated. The workload captures for every individual whether that individual is a CEO, a member of a management board, a COS or a member of a supervisory board in another firm. Individuals can have k- up to l-additional appointments where l is only bounded for members of the supervisory board by ten. The underlying assumption of the score is that different tasks in a firm exhibit different time restrictions. It is assumed that being a CEO is most time consuming. The workload associated with this task is 3. Next, it is assumed that time requirements of being in the management board and being a COS is somewhat comparable. In order to denote the difference to the CEO, the workload associated with these tasks is 2. Finally, the workload associated with being a member of the supervisory board is 1. After these four sub scores are calculated, they are weighted. Since the management board is responsible for the operating activities of the firm, it is assumed that it is more harmful for a firm when the management board is busier than the supervisory board. Also, more weight is given to the circumstance that the CEO or the COS is busy. The weights are given according to the workloads. The score is deflated by board size.

The reputation score is calculated as follows:

$$REPUTATIONSCORE_j = \frac{\sum_{b=1}^{m} MGTSB_b + COS_b + INTERNATIONAL_b + EXPERIENCE_b + ACADEMIC_b}{BOARDSIZE_j}$$

The reputation score is calculated for every board of the firm j in the sample. This score aims at capturing the skills and experience that an individual brings to the board. Each board consists of m members. For each member, five indicator variables are calculated. MGTSB takes the value one, if an individual has a position in a management board and a supervisory board. The idea behind this variable is that an individual benefits from knowing how management and supervisory boards work. COS takes the value one if an individual is the chair of a supervisory board within a firm. As discussed above, being the chairman of a firm is a distinguished task and COS feature different characteristics than their fellow colleagues. In this respect, I interpret being entrusted with the position to be the chairman of a supervisory board as a signal to be an individual with distinguished skills and experience. EXPERIENCE takes the value one if an individual has more than three directorships. This reflects the known argument of the Reputation Hypothesis that directors benefit from sitting on several boards and are able to improve their skills. INTERNATIONAL takes the value one if an individual is a member of a non-German board. Related to the experience argument, I assume that an individual benefits from being exposed to other cultural influences. Also, this might indicate that the individual has a broader network that he can rely on. ACADEMIC takes the value one if an individual has a doctoral and/or professorial degree. This variable is supposed to capture that an individual might be chosen to a board due to expertise on particular topics. Likewise, an academic degree might signal a good skill set. However, it needs to be kept in mind that this is a very crude proxy since neither the absence nor the existence of a doctoral or professorial degree necessarily shed light on the skill set of an individual. The reputation score is deflated by board size.

It is important to note that both scores feature highly debatable characteristics. In this respect, I propose the scores as additional measures to those that I already used in the two tests before. The difficulty in constructing the two scores clearly reflects the problems within this line of research. While it seems reasonable to assume that the CEO and COS are distinguished individuals that are important to the firm, the actual weights given to the workload are comparably erratic. In this respect, I do not propose that a CEO works three times more than a member of the supervisory board. Rather, the weights are meant to symbolize that different tasks exhibit different work loads and that different board positions can have a stronger impact on a firm’s performance than others. Correlations show that both scores are negatively and non-significantly associated with Tobin’s q. Correlations also show that both scores are highly correlated among each other and that the scores are significantly positively correlated with all the other board variables, especially with %BUSYD. Estimating model (1) with the two board scores is displayed in Table 12. All specifications exhibit a negative and non-significant relationship with firm performance. However, the p-value of BUSYSCORE is 0.237 and the p-value of REPUTATIONSCORE is 0.107, indicating a rather strong negative relationship. The negative association pertains when including both proxy variables into the model specification. The weaker p-values should be seen in the light of high correlations between the two variables. Overall, these results further substantiate that multiple board appointments have a negative impact on firm performance and are not counteracted by skills or experience.

Table 12: Busyness score vs. Reputation score (n=453)

	(1)	(2)	(3)
Independent variable	**Coefficient**	**Coefficient**	**Coefficient**
BUSYSCORE	-0.059		-0.017
	(0.237)		(0.781)
REPUTATIONSCORE		-0.227	-0.198
		(0.107)	(0.260)
SALES	0.052	0.048	0.052
	(0.642)	(0.666)	(0.643)
SALESGROWTH	**0.382**	**0.374**	**0.374**
	(0.001)	(0.001)	(0.001)
CAPEX	1.317	1.272	1.283
	(0.134)	(0.147)	(0.145)
R&D	**2.238**	**2.147**	**2.141**
	(0.017)	(0.022)	(0.023)
LEV	**-0.812**	**-0.822**	**-0.824**
	(0.017)	(0.016)	(0.016)
CLSHELD	**0.401**	**0.408**	**0.406**
	(0.075)	(0.069)	(0.071)
SEGMENT	-0.019	-0.019	-0.019
	(0.575)	(0.576)	(0.571)
Fixed effects	Firm, Year	Firm, Year	Firm, Year
F-statistic	**11.030**	**11.080**	**10.970**
	(0.000)	(0.000)	(0.000)
R^2	0.858	0.859	0.859

Dependent Variable: Tobin's q (Worldscope)

Variable definitions (data source):

BUSYSCORE is a score that captures the busyness of a board (calculation as described), REPUTATIONSCORE is a score that captures the reputation/skill of a board (calculation as described), SALES is the natural logarithm of a firm's sales (Worldscope), SALESGROWTH is a firm's sales in t minus sales in t-1 to sales in t-1 (Worldscope), CAPEX is a firm's capital expenditures (additions to fixed assets) to total assets (Worldscope), R&D is a firm's research and development expense to total assets (Worldscope), LEV is a firm's total debt to total assets (Worldscope), CLSHELD is a firm's closely held shares to common shares outstanding (Worldscope), SEGMENT is a firm's number of product segments (Worldscope).

Notes:

Bold typeset denotes significant difference from zero (two-sided t-test) at significance levels of 0.01, 0.05 and 0.10, respectively; p-values are given in parentheses.

4.3.3 Bank boards

Prior literature offers several non-exclusive hypotheses for the occurrence of bank representation on boards of non-financial firms (Dittmann, Maug and Schneider (2010) provide a comprehensive literature review). First, bank representation could be actively sought by non-financial firms for their financial expertise. In this respect, bank representation might be beneficial for a firm by counteracting adverse selection in the process of taking debt. Second, bank representatives can serve as equity or debt monitors. In the first case, they represent shareholder interests. In the latter case, they safeguard their own loans. Third, banks might be interested to place representatives on non-financial firms for their own interest. In doing so, they could profit from increasing their industry expertise. The knowledge gained could be used in contracting decisions with other members of that industry. Alternatively, banks might use the established relationships to sell other bank related services like M & A advisory services. Against this background, predictions of bank representation on firm performance are unequivocal and depend on the potential of conflicts of interest. This leads to the question on how far directors with bank affiliations are different from their fellow colleagues without bank affiliations. When safeguarding their loans, bank directors might urge management to be extra cautious, hindering decisions to undertake risky but profitable investments. On the other hand, they might not necessarily be better monitors but more knowledgeable in reorganizing the management preemptively before problems arise (Fauver and Fuerst, 2006). Their power might arise from threatening to cut off financing. Gorton and Schmid (2000) find evidence that suggests an improving effect of bank involvement on firm performance. Contrary, evidence of Dittmann, Maug and Schneider (2010) is mixed. In so far, these non-exclusive explanations do not allow a one-directional proposition on firm performance.

In order to assess the impact of having bank representatives on the board on Tobin's q, I estimate model (1) including the variables %BANKD and the indicator variable BANKBOARD, respectively. Results are displayed in Table 13. Both specifications show a positive and non-significant relationship. Since I do not further assess the channels of how bank representatives affect firm performance or other corporate aspects, I cannot infer on how the positive effect of bank representation positively influences firm performance for my sample firms. However, this finding at least puts the results from the previous section into perspective indicating that multiple board appointments are not harmful per se. It also features the notion that bank representatives do not solely pursue bank interests. In this respect, my results are contrary to Dittmann, Maug and Schneider (2010). However, the aforementioned authors also find a positive and non-significant relationship between their board representation proxy and firm performance in their fixed firm and year specification.

Table 13: Bank boards and Tobin's q (n=453)

	(1)	(2)
Independent variable	**Coefficient**	**Coefficient**
%BANKD	0.549	
	(0.434)	
BANKBOARD		0.117
		(0.287)
SALES	0.038	0.035
	(0.731)	(0.753)
SALESGROWTH	**0.397**	**0.401**
	(0.000)	(0.000)
CAPEX	1.287	1.248
	(0.144)	(0.156)
R&D	**2.321**	**2.307**
	(0.013)	(0.014)
LEV	**-0.816**	**-0.808**
	(0.017)	(0.018)
CLSHELD	**0.407**	**0.407**
	(0.071)	(0.070)
SEGMENT	-0.018	-0.017
	(0.585)	(0.613)
Fixed effects	Firm, Year	Firm, Year
F-statistic	**10.990**	**11.010**
	(0.000)	(0.000)
R^2	0.858	0.858

Dependent Variable: Tobin's q (Worldscope)

Variable definitions (data source):

%BANKD is directors serving on a bank's supervisory or management board to board members, BANKBOARD is an indicator variable taking the value 1 if at least one director also serves on a bank's supervisory or management board, SALES is the natural logarithm of a firm's sales (Worldscope), SALESGROWTH is a firm's sales in t minus sales in t-1 to sales in t-1 (Worldscope), CAPEX is a firm's capital expenditures (additions to fixed assets) to total assets (Worldscope), R&D is a firm's research and development expense to total assets (Worldscope), LEV is a firm's total debt to total assets (Worldscope), CLSHELD is a firm's closely held shares to common shares outstanding (Worldscope), SEGMENT is a firm's number of product segments (Worldscope).

Notes:

Bold typeset denotes significant difference from zero (two-sided t-test) at significance levels of 0.01, 0.05 and 0.10, respectively; p-values are given in parentheses.

4.3.4 International boards

This part of the analysis focuses on directors that feature appointments on non-domestic boards. According to the inter-organizational perspective, firms featuring more affiliations to firms in foreign countries would use these networks to enhance their business activities in these countries. The underlying assumption is that interlocking serves as an instrument to regulate relationships between firms that are dependent on each other (Allen, 1974). This view stresses that interlocks can help to reduce environmental uncertainty in several ways. Schoorman, Bazerman and Atkin (1981) suggest that the organizational benefits arising from interlocking are related to (1) horizontal coordination, (2) vertical coordination, (3) personal skills and (4) diversity in board composition. This view emphasizes that board members are able to provide good advice and help to establish business contacts for the management (e.g. Koenig, Gogel and Sonquist, 1979; Hermalin and Weisbach, 1988). Accordingly, I expect a positive impact on firm performance. In order to propose a more specific measure of firm performance, I also investigate the relationship between the existence of additional board appointments in a foreign country and a firm's foreign sales, where I accordingly expect a positive relationship.

In order to assess the impact on firm performance of directors holding international directorships, I estimate model (1) with the percentage of international directors (%INTD) and the indicator variable INTBOARD. Results are displayed in Table 14. The coefficient of %INTD is negative. Although insignificant, the p-value of 0.104 indicates a strong negative relationship. The coefficient of INTBOARD is negative and non-significant.

Table 14: International boards and Tobin's q (n=453)

	(1)	(2)
Independent variable	**Coefficient**	**Coefficient**
%INTD	-0.621	
	(0.104)	
INTBOARD		-0.061
		(0.760)
SALES	0.030	0.030
	(0.783)	(0.787)
SALESGROWTH	**0.384**	**0.394**
	(0.001)	(0.000)
CAPEX	1.273	1.278
	(0.147)	(0.147)
R&D	**2.357**	**2.337**
	(0.012)	(0.013)
LEV	**-0.823**	**-0.795**
	(0.015)	(0.020)
CLSHELD	**0.414**	**0.410**
	(0.065)	(0.069)
SEGMENT	-0.014	-0.017
	(0.666)	(0.620)
Fixed effects	Firm, Year	Firm, Year
F-statistic	**11.080**	**10.970**
	(0.000)	(0.000)
R^2	0.859	0.857

Dependent Variable: Tobin's q (Worldscope)

Variable definitions (data source):

%INTD is directors with international board appointments to board members, INTBOARD is an indicator variable taking the value 1 if more than 50% or more of the directors have international board appointments, SALES is the natural logarithm of a firm's sales (Worldscope), SALESGROWTH is a firm's sales in t minus sales in t-1 to sales in t-1 (Worldscope), CAPEX is a firm's capital expenditures (additions to fixed assets) to total assets (Worldscope), R&D is a firm's research and development expense to total assets (Worldscope), LEV is a firm's total debt to total assets (Worldscope), CLSHELD is a firm's closely held shares to common shares outstanding (Worldscope), SEGMENT is a firm's number of product segments (Worldscope).

Notes:

Bold typeset denotes significant difference from zero (two-sided t-test) at significance levels of 0.01, 0.05 and 0.10, respectively; p-values are given in parentheses.

Results of regressing Tobin's q on %INTD do not confirm the idea that the presence of directors featuring ties to non-domestic boards enhances firm performance but on the contrary, it leads to a negative firm valuation. Yet, international directors might be beneficial to a firm by practical channels that originate from specific knowledge about foreign countries or advantages in initiating business relationships.

In order to propose a more specific measure to assess the impact of international directors on firm performance, I investigate the relationship between directors having international board appointments and foreign sales. I first assess the relationship in univariate tests. Correlations displayed in Table 7 show a significant positive correlation between the percentage of foreign sales and the percentage of international directors. Next, I subdivide the sample into firms with national and international orientation. I classify firms as nationally oriented if foreign sales are less than 20% of total sales and as internationally oriented if foreign sales equal or exceed 20% of total sales. The chosen separation value follows that used by Loderer and Peyer (2002). Dividing the sample into firms having and not having foreign sales does not materially change the results displayed in Table 15.

Table 15: Subdivision of the sample by foreign sales (n=453)

Variable	**Mean**	**Median**	**Mean**	**Median**	**p-value (t-Test)**	**p-Value (Wilcoxon Test)**
	National orientation (n=144)		*International orientation (n=309)*			
	%Foreign sales < 20%		*%Foreign sales >= 20%*			
MKTCAP	458.611	93.115	1,954.080	116.787	(0.000)	(0.021)
BOARDSIZE	9.493	8.000	10.560	8.000	(0.068)	(0.035)
BOARDTIES	9.903	5.500	14.078	9.000	(0.002)	(0.000)
%BUSY	0.235	0.200	0.276	0.250	(0.032)	(0.017)
NATBOARDTIES	8.215	5.000	11.320	7.000	(0.005)	(0.002)
INTBOARDTIES	1.688	0.000	2.757	1.000	(0.007)	(0.000)
%INTD	0.080	0.000	0.132	0.111	(0.000)	(0.000)

Variable definitions (data source):
MKTCAP is a firm's market capitalization in M€ (Worldscope), BOARDSIZE is the size of a firm's supervisory board and management board as of December 31 of the respective year (hand-collected), BOARDTIES is the number of ties established by board members to other boards, %BUSY is busy board members to board members, NATBOARDTIES is the number of ties established by board members to German supervisory or management boards, INTBOARDTIES is the number of ties established by board members to non-domestic supervisory or management boards, %INTD is international directors to board members.

Accordingly, internationally oriented firms have a higher percentage of directors holding international board appointments. However, the univariate results also illustrate that international sales are more prevalent for bigger firms that usually also have bigger boards. Hence, I test whether this relationship holds in a multivariate setting. In order to investigate whether ties to international boards drive foreign sales, I estimate the following model specification:

Model (2)

$$\begin{aligned}\%FORSALES = {} & \beta_1 \%VariableOfInterest + \beta_2 MKTCAP + \beta_3 SALESGROWTH \\ & + \beta_4 CAPEX + \beta_5 R\&D + \beta_6 LEV + \beta_7 CLSHELD + \beta_8 SEGMENT + \varepsilon\end{aligned}$$

I use the percentage of foreign sales, measured as foreign sales to total sales, as the dependent variable. This is a widely used proxy to capture a firm's international activities (e.g. Zou and Stan, 1998; Katsikeas, Leonidou and Morgan, 2000). My variable of interest is either the percentage of international directors on the board (%INTD) or the indicator variable INTBOARD. The control variables that are conventionally used within this line of literature are comparably close to the variables used before. In order to ensure comparability with my other firm performance measures, I use the same control variables as in model (1). Accordingly, studies in this field include firm size into their consideration. A relationship is expected because small firms are expected to grow in their domestic market before taking risky operations abroad, while larger firms need to expand their business in order to increase sales. Also, larger firms realize more economies of scale and are associated with less risk in operations abroad (Bonaccorsi, 1992). However, prior findings on the relationship between foreign activities and size are mixed (Aaby and Slater, 1989). Size is measured as the natural logarithm of a firm's market capitalization (MKTCAP). The literature on international activities expects a positive relationship with research and development intensity (e.g. Benvignati, 1990; Braunerhjelm, 1996; Ito and Pucik, 1993). Research and development intensity is measured as research and development expense to total assets (R&D). I also include controls for capital expenditure (CAPEX), leverage (LEV), ownership structure (CLSHELD) and the number of product segments (SEGMENT). All variables are provided by Worldscope.

Table 16 displays the results of estimating model (2). Specification (1) reports results of the base model without board variables. The model exhibits a reasonable fit with sales growth, capital expenditures, research and development intensity and ownership structure significantly contributing to the model fit. Specifications including the percentage of international directors (%INTD) and the indicator variable INTBOARD show a positive and non-significant relationship between the variables of interest and the percentage of foreign sales. Results might be biased due to a lack of control for a firm's foreign orientation. I address this concern by including foreign assets to total assets (Worldscope). I do not include the percentage of foreign assets throughout the investigation because the number of observations drops to 297 due to missing values for foreign assets. The coefficient of foreign asset intensity is highly significant while the other results are not materially different. Due to low correlations and VIFs, multicollinearity does not seem to be a problem when including the percentage of foreign assets.

Table 16: International board appointments and foreign sales (n=453)

Independent variable	(1) Coefficient	(2) Coefficient	(3) Coefficient
%INTD		0.019	
		(0.825)	
INTBOARD			0.008
			(0.849)
MKTCAP	0.002	0.002	0.002
	(0.893)	(0.884)	(0.884)
SALESGROWTH	**-0.038**	**-0.038**	**-0.038**
	(0.077)	(0.080)	(0.077)
CAPEX	**-0.436**	**-0.435**	**-0.434**
	(0.025)	(0.026)	(0.026)
R&D	**0.924**	**0.924**	**0.925**
	(0.000)	(0.000)	(0.000)
LEV	**0.149**	**0.150**	**0.149**
	(0.052)	(0.051)	(0.052)
CLSHELD	**-0.116**	**-0.116**	**-0.116**
	(0.020)	(0.020)	(0.020)
SEGMENT	0.010	0.010	0.010
	(0.170)	(0.174)	(0.173)
Fixed effects	Firm, Year	Firm, Year	Firm, Year
F-statistic	**27.890**	**27.620**	**27.620**
	(0.000)	(0.000)	(0.000)
R^2	0.938	0.938	0.938

Dependent Variable: Foreign sales to sales (Worldscope)

Variable definitions (data source):

%INTD is directors with international board appointments to board members, INTBOARD is an indicator variable taking the value 1 if more than 50% or more of the directors have international board appointments, MKTCAP is the natural logarithm of a firm's market capitalization (Worldscope), SALESGROWTH is a firm's sales in t minus sales in t-1 to sales in t-1 (Worldscope), CAPEX is a firm's capital expenditures (additions to fixed assets) to total assets (Worldscope), R&D is a firm's research and development expense to total assets (Worldscope), LEV is a firm's total debt to total assets (Worldscope), CLSHELD is a firm's closely held shares to common shares outstanding (Worldscope), SEGMENT is a firm's number of product segments (Worldscope).

Notes:

Bold typeset denotes significant difference from zero (two-sided t-test) at significance levels of 0.01, 0.05 and 0.10, respectively; p-values are given in parentheses.

Results of regressing international activities on %INTD puts the prior results concerning firm performance measured by Tobin's q only partly into perspective. Although positive, the association is non-significant and does not suggest that directors having board appointments on non-domestic boards enhance firm performance by facilitating foreign activities.

4.3.5 Additional tests

Alternative profitability measures

I further scrutinize the relationship between multiple board appointments and firm performance by using other firm profitability measures as dependent variable. Following prior literature, I use return on assets (ROA) and return on sales (ROS) (Fich and Shivdasani, 2006; Dittmann, Maug and Schneider, 2010). Results are shown in Table 17.

I find a negative relationship between %BUSYD, %COSD and %BANKD and the dependent variables. The coefficients of %COSD (when regressing ROA on %COSD) and %BANKD are significant. The coefficients of %INTD are positive and significant. Overall, these results further substantiate the notion that multiple board appointments are harmful for firm performance. However, the results concerning directors featuring international board appointments suggest a positive impact on accounting based performance measures.

Table 17: Multiple board appointments and firm profitability (n=453)

	Busy		COS		Bank		International	
Independent variable	**ROA Coefficient**	**ROS Coefficient**	**ROA Coefficient**	**ROS Coefficient**	**ROA Coefficient**	**ROS Coefficient**	**ROA Coefficient**	**ROS Coefficient**
%BUSYD	-0.003	-0.066						
	(0.958)	(0.671)						
%COSD			**-0.146**	-0.348				
			(0.061)	(0.144)				
%BANKD					**-0.268**	**-0.947**		
					(0.038)	(0.017)		
%INTD							**0.185**	**0.909**
							(0.009)	(0.000)
SALES	0.030	**0.171**	0.029	**0.170**	0.026	**0.158**	0.030	**0.172**
	(0.146)	(0.006)	(0.149)	(0.007)	(0.198)	(0.011)	(0.139)	(0.005)
SALESGROWTH	**0.044**	0.033	**0.045**	0.035	**0.042**	0.025	**0.046**	0.044
	(0.033)	(0.600)	(0.029)	(0.576)	(0.042)	(0.686)	(0.024)	(0.465)
CAPEX	0.091	-0.127	0.083	-0.152	0.091	-0.133	0.095	**-0.112**
	(0.575)	(0.799)	(0.608)	(0.758)	(0.573)	(0.788)	(0.553)	(0.816)
R&D	-0.142	-0.620	-0.136	-0.596	-0.129	-0.564	-0.145	-0.625
	(0.413)	(0.240)	(0.428)	(0.257)	(0.452)	(0.280)	(0.397)	(0.222)
LEV	**-0.224**	**-0.518**	**-0.220**	**-0.503**	**-0.213**	**-0.475**	**-0.215**	**-0.469**
	(0.000)	(0.007)	(0.001)	(0.009)	(0.001)	(0.013)	(0.001)	(0.012)
CLSHELD	-0.017	0.039	-0.011	0.055	-0.016	0.043	-0.019	0.032
	(0.683)	(0.762)	(0.792)	(0.664)	(0.691)	(0.735)	(0.650)	(0.793)
SEGMENT	0.008	0.016	0.007	0.014	0.008	0.019	0.007	0.013
	(0.206)	(0.387)	(0.282)	(0.472)	(0.170)	(0.321)	(0.249)	(0.492)
Fixed effects	Firm, Year	Firm, Year	Firm, Year	Firm, Year	Firm, Year	Firm, Year	Firm, Year	Firm, Year
F-statistic	**8.740**	**9.430**	**8.860**	**9.500**	**8.890**	**9.640**	**8.990**	**10.140**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R^2	0.827	0.838	0.829	0.839	0.830	0.841	0.831	0.848

Dependent Variables: ROA is EBIT to total assets (Worldscope), ROS is Sales to total assets (Worldscope).

Variable definitions (data source):

%BUSYD is busy board members to board members, %COSD is board members holding the position of a chair of supervisory board to board members, %BANKD is directors serving on a bank's supervisory or management board to board members, %INTD is directors with international board appointments to board members, SALES is the natural logarithm of a firm's sales (Worldscope), SALESGROWTH is a firm's sales in t minus sales in t-1 to sales in t-1 (Worldscope), CAPEX is a firm's capital expenditures (additions to fixed assets) to total assets (Worldscope), R&D is a firm's research and development expense to total assets (Worldscope), LEV is a firm's total debt to total assets (Worldscope), CLSHELD is a firm's closely held shares to common shares outstanding (Worldscope), SEGMENT is a firm's number of product segments (Worldscope).

Notes:

Bold typeset denotes significant difference from zero (two-sided t-test) at significance levels of 0.01, 0.05 and 0.10, respectively; p-values are given in parentheses.

Endogeneity

As pointed out earlier, endogeneity constitutes a problem throughout the study. One way to address endogeneity is to use instrumental regressions. In doing so, adequate instruments need to be found. Roughly, adequate means that the instrument is correlated with the endogenous regressor but is uncorrelated with the error term of the structural equation. Utilizing unsuitable instruments will not solve the endogeneity problem. On the contrary, estimates might be even more biased (Larcker and Rusticus, 2010). Consequently, identifying appropriate instruments is essential. I thought about drawing on director compensation but results of the first stage were unsatisfactory.

Another way of addressing endogeneity is to include lagged variables. The rationale behind this idea is that if the lagged variable is able to explain the dependent variable, the causality runs from the lagged variable to the dependent variable. Using this approach is comparably common in this line of literature (e.g. Fich and Shivdasani, 2006; akin Jiraporn et al., 2009). I re-run all regressions and exchange the board variables by their one year lagged value. Since I do not have board variables for the year 2003, I re-run the regressions with 302 observations for two cross-sectional years. Since I only investigate two years, I only include fixed year effects but not fixed firm effects. Alternatively, I might have used the t+1 values of all other explanatory variables. Both approaches come with limitations. When using the t+1 values, I contrast the time period 2005-2007 with my original setting of 2004-2006. In order to maintain comparability, I favor the alternative. However, this results in loosing observations, which reduces statistical power. All regressions are provided in the Appendix.

Although the endogeneity tests confirm many of the preceding findings, the tests also reveal some differences. Particularly, when assessing the Reputation Hypothesis (Table A.1) with the presence of chairmen form other supervisory boards (%COS), I find a negative and significant relationship (before positive and non-significant). Also, results from Table A.3 show a negative and significant relationship between Tobin's q and BUSYSCORE (before negative and non-significant) and REPUTATIONSCORE (before negative and marginally non-significant). These results further substantiate a negative relationship between multiple board appointments and firm performance and that this relationship is not counteracted by director skills that are expected to have a positive influence on firm performance.

Notably, the endogeneity tests show differing results in the following cases: The tests reveal a positive and non-significant relationship between the number of additional board appointments held by the COS (before negative and significant) and CEO (before negative and insignificant). The coefficient of %BANKD is now negative and marginally non-significant (before positive and non-significant). The coefficient of %INTD is now positive and non-significant (before negative and marginally non-significant).

Taken all together, the endogeneity tests further substantiate the notion that multiple board appointments harm firm performance. Since I include the lagged board variables, the results suggest that the causality runs from the board variables to firm performance and not that firms with bad performance attract directors with multiple board appointments. However, the endogeneity tests also produce some mixed results which indicate that the results need to be interpreted with caution. Whether the mixed results originate from lagging the variables or the decreased power of statistical inferences due to the exclusion of one cross-section cannot be assessed conclusively.

Employee representation

A particularity of the German board system is the legally coded employee representation on the supervisory board. Theoretical implications of codetermination rights on firm value are unclear. Since codetermination is imposed on firms, a firm's resulting governance might deviate from its efficient structure that would materialize naturally. However, legally coded employee representation might mitigate frictions that for example arise from coordination problems stemming from unilaterally introduced employee representation (Fauver and Fuerst, 2006). Gorton and Schmid (2004) find that an increase in employee representation from one-third of the supervisory board size to one-half destroys firm value. Results of Fauver and Fuerst (2006) suggest the existence of an inverse U-shaped relationship between employee representation and firm value.

One possibility to test whether employee representation influences my results would be by introducing a control variable that measures the percentage of employee representation on the board. However, employee representation is regulatory driven and depends on a firm's total employees. Depending on the number of employees, it will be around zero, one-third and half of the supervisory board's size. Hence, I follow Dittmann, Maug and Schneider (2010). In their study that deals with bank representation on the board, they exclude employee representatives from their analysis. Doing so imposes restrictions on my sample because unfortunately, not all firms report which of their supervisory directors are employee representatives. This gives rise to the danger to confound firms that are not required to have employee representation on their board with firms that do not disclose it. In order to avoid this problem, I delete all observation that have more than 500 employees but provide no information on employee representation. This leads to a sample of 315 firm year observations (before: 453 firm year observations).

Of course, this substantially limits comparability with results of my base sample. Consequently, I do not re-run all of my regressions but focus on specifications where I try to disentangle the Busyness and the Reputation Hypotheses using the busyness and reputations score. My results are not materially different from the previous results and are consistent with the notion that multiple board appointments are harmful for firm performance. The coefficients are negative but non-significant at common significance levels (Table A.8). However, I refrain from over interpreting these results due to the mentioned shortcomings.

5 Summary and conclusions

I investigate the effect of multiple board appointments on firm performance using a sample of publicly listed German firms. The incidence of multiple board appointments is interesting in the light of competing explanations for their existence and differing implications for firm performance. At the same time, a sound understanding of their existence and their implications is of relevance in the endeavor to develop appropriate corporate governance guidelines. The topic has already received a great deal of attention from the academic side. I deploy measures used in prior literature to classify directors holding multiple board appointments and contribute to the literature by investigating a new aspect: board appointments held in non-domestic firms.

I first contrast the Busyness Hypothesis and the Reputation Hypothesis. Explicitly pointing towards the circumstance that many of my variables of interest are non-significant at common significance levels, the results of the first part of the analysis support the Busyness Hypothesis and the notion that multiple board appointments are harmful for firm performance. This finding is not counteracted by director skills that are expected to enhance firm performance. These findings can be interpreted in three ways.

First, it might reflect the inappropriateness of my chosen proxy to reflect director skills. Second, the result can be seen to be in line with Biehler and Ortmann (1985) who argue that the (supervisory) board is also perceived as an instrument of representation. Consequently, being the chair of a supervisory board on another firm might be used as a signal to reassure stakeholders but does not necessarily mean that the individual is particularly suitable to fulfill its task. Third, it might reflect the circumstance that the individual is too busy fulfilling its task since being the chairman of a supervisory board is particularly time consuming. The latter argument is partly fuelled by the circumstance that I find a negative and significant relationship between additional seats held by the sample firms' chairman of the supervisory board and firm performance. I find no such association between additional seats held by the CEO.

In the second part of the analysis, I investigate the effect of having bank representatives on the board on firm performance. I find a positive and non-significant relationship, and a negative and significant relationship between return on assets and return on sales. Since I do not investigate possible channels of this effect, I refrain from speculating of how bank representation affects firm performance. Yet, two things should be noted. First, the finding suggests that multiple board appointment are not harmful for firm performance per se and puts the finding from the first part into perspective. Second, it should be mentioned that accounting-based measures are less suitable in capturing director expertise and networks (Hillman, 2005). In this respect, my findings suggest a positive market valuation but a negative relationship with historical performance. Hence, a more cautious and a more conservative investing style naturally come into mind and might be worth to be investigated.

In the third part of the analysis, I investigate the effect of international directors on firm performance. I call these individuals “international directors”, although I do not draw on their nationality but the circumstance that they work on international, i.e. non-domestic boards. I find a negative and marginally non-significant impact on Tobin’s q. However, I find a positive and significant relationship with return on assets and return on sales. I also find a positive but weak relationship with foreign activities. Of course, these mixed results are puzzling. Yet, they are consistent with my prior findings whereby busy directors negatively affect firm performance. Directors with international board appointments might be negatively valued by the market since they are associated with over-commitment for example due to an increased work load that might stem from preparing documents that are in a foreign language or from considerable more traveling time. Yet, the positive relationship with the backward looking profitability measures might be explained in the light of facilitating operative transactions and contracting by the help of a broader network. This explanation is also in line with the positive relationship between international directors and foreign activities. Still, results are too mixed to be over interpreted.

Overall, the results of the study are not unequivocal but the majority of the found evidence points towards the notion that multiple board appointments have a negative impact on firm performance as measured by Tobin’s q. Yet, the results also illustrate the ambiguity of the relationship between multiple board appointments and firm performance. Although multiple board appointments are negatively connotated, their influence on firm performance is not negative per se. In this respect, the results support the idea that board effectiveness cannot be ensured by putting restrictions on multiple board appointments. Rather, active board members need to assess in which form board effectiveness might benefit from appointing a certain director to the board. At the same time, appointed directors need to assess whether they are able to fulfill all their responsibilities when taking any additional board appointments. This might seem like a somewhat naïve statement in the light of self-interests and selfish behavior and directly leads to the question whether other control mechanisms could be helpful in ensuring that board directors do not take too many board appointments. On the one hand, this might be achieved by self-imposed corporate guidelines. The advantage of self-imposed corporate guidelines lies in higher flexibility. For example, smaller firms might allow more multiple board appointments than bigger firms, or the guidelines might be more specific with regard to activities on other boards. On the other hand, directors need to question board effectiveness constantly and directors need to assess whether board effectiveness suffers from directors that burden too many responsibilities on themselves.

My findings are prone to several limitations. An essential step within the investigation is the classification of the directors and the boards. Several problems arise in this endeavor. The Busyness Hypothesis draws on time restrictions of overcommitted directors. In this respect, classifying directors as busy measured by the number of directorships is objectively comprehensible. At the same time, necessary data is available in the financial statements. The Reputation Hypothesis draws on benefits that materialize from skills, experience and networks. Finding an objectively comprehensible proxy that reflects the aforementioned director characteristics is much more complicated. Consequently, the used proxy variables are prone to noise. Also, work and decision-finding processes within a board are not observable for outsiders. Hence, it is difficult to assess whether it is more severe when certain individuals are busy, and also, what additional work load causes their busyness. To some extent, I address these concerns by building scores that aim at alleviating the aforementioned shortcomings. Still, these scores can only cover a limited range of an individual's characteristics and thus, are prone to incompleteness. Also, for the busyness score I use weights that are not chosen with regard to a clear theoretical basis but feature a certain erratic component in order to symbolize that different tasks exhibit different time requirements.

Data availability exacerbates test designs. For example, it seems crucial to develop extensive but thorough measures to classify directors. This does not only comprise educational background and work experience but more complex measures as inclusion in networks. This is no easy endeavor. Hwang and Kim (2009) demonstrate that ties also arise from similar regional or educational origins. Other possible dimensions are prior membership to the management (Bresser and Thiele, 2008) or union affiliations (Fauver and Fuerst, 2006). Also, the observation period is of great importance for example in order to conclude on causality. It is also difficult to assess how long a tie must exist in order to affect e.g. foreign sales. This points towards the necessity for longitudinal studies over a reasonably long period. An issue related to this concern is that of broken ties. It is unclear how long a tie needs to be maintained. After the initial contact has been established, other means of communication could be used.

Econometric issues exacerbates the validity of inferences. A common difficulty in this line of research arises from endogeneity. The causality between firm performance and multiple board appointments can work in both ways. On the one hand, board appointments can lead to overcommitted directors which can be harmful for the firm. On the other hand, firms exhibiting poor performance might actively search for skilled directors and offer them an additional appointment. I try to address the problem of endogeneity by re-running my regressions including the lag of my variables of interest. Results are not entirely robust to the alternative model specification, indicating that endogeneity might confound my results.

The stream of literature dealing with multiple board appointments is growing. The incidence of multiple board appointments, especially in Germany, still offers ample research questions. With regard to subsequent research, it seems reasonable to take a step back and get a more sophisticated understanding of what determines the number of seats held on an individual level. Then, a more sophisticated understanding on what determines the board composition is needed. As shown in prior literature, it is difficult to predict the impact of directors holding multiple board appointments on firm characteristics. To some extent, this is due to the manifold possible impacts that are conceivable. In this respect, it seems vital to propose a specific measure that is able to clearly capture effects of holding multiple board appointments.

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Appendix

Table A.1: Busyness vs. Reputation Hypothesis (n=302)

	(1)	(2)	(3)	(4)	(5)	(6)
Independent variable	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**
%BUSYD	-0.388				-0.069	
	(0.157)				(0.823)	
BUSYBOARD		-0.090				-0.012
		(0.528)				(0.936)
%COS			**-1.289**		**-1.231**	
			(0.009)		(0.027)	
COSBOARD				**-0.213**		**-0.211**
				(0.033)		(0.042)
SALES	0.010	-0.001	0.014	0.018	0.015	0.018
	(0.706)	(0.960)	(0.580)	(0.486)	(0.556)	(0.489)
SALESGROWTH	**0.791**	**0.817**	**0.776**	**0.773**	**0.774**	**0.774**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CAPEX	0.271	0.296	0.374	0.534	0.362	0.529
	(0.786)	(0.767)	(0.705)	(0.592)	(0.714)	(0.597)
R&D	**2.973**	**2.798**	**2.957**	**2.837**	**2.992**	**2.847**
	(0.002)	(0.004)	(0.002)	(0.003)	(0.002)	(0.003)
LEV	**-1.120**	**-1.116**	**-1.139**	**-1.161**	**-1.138**	**-1.160**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CLSHELD	-0.010	0.009	-0.045	-0.025	-0.046	-0.025
	(0.954)	(0.962)	(0.804)	(0.889)	(0.802)	(0.893)
SEGMENT	0.042	0.041	0.045	0.039	0.045	0.040
	(0.184)	(0.191)	(0.152)	(0.207)	(0.151)	(0.207)
Fixed effects	Year	Year	Year	Year	Year	Year
F-statistic	**129.460**	**128.590**	**132.140**	**130.850**	**119.740**	**118.550**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R^2	0.195	0.191	0.208	0.202	0.209	0.202

Dependent Variable: Tobin’s q (Worldscope)

Notes:

Board variables are lagged by one year.

Bold typeset denotes significant difference from zero (two-sided t-test) at significance levels of 0.01, 0.05 and 0.10, respectively; p-values are given in parentheses.

Table A.2: Appointments held by COS and CEO and Tobin’s q (n=302)

	(1)	(2)	(3)
Independent variable	**Coefficient**	**Coefficient**	**Coefficient**
COSSEATS	0.003		0.003
	(0.895)		(0.908)
NONCOSSEATS	**-0.126**		
	(0.087)		
CEOSEATS		-0.024	-0.022
		(0.608)	(0.645)
NONCEOSEATS		-0.082	
		(0.162)	
NONCOSCEOSEATS			-0.101
			(0.107)
SALES	0.017	0.016	0.017
	(0.533)	(0.595)	(0.567)
SALESGROWTH	**0.784**	**0.779**	**0.783**
	(0.000)	(0.000)	(0.000)
CAPEX	0.258	0.218	0.214
	(0.795)	(0.827)	(0.831)
R&D	**3.174**	**3.088**	**3.155**
	(0.001)	(0.002)	(0.001)
LEV	**-1.107**	**-1.120**	**-1.100**
	(0.000)	(0.000)	(0.000)
CLSHELD	-0.020	-0.016	-0.014
	(0.913)	(0.929)	(0.940)
SEGMENT	0.042	0.043	0.043
	(0.182)	(0.174)	(0.178)
Fixed effects	Year	Year	Year
F-statistic	**117.870**	**117.560**	**107.760**
	(0.000)	(0.000)	(0.000)
R^2	0.198	0.197	0.199

Dependent Variable: Tobin’s q (Worldscope)

Notes:

Board variables are lagged by one year.

Bold typeset denotes significant difference from zero (two-sided t-test) at significance levels of 0.01, 0.05 and 0.10, respectively; p-values are given in parentheses.

Table A.3: Busyness score vs. Reputation score (n=302)

	(1)	**(2)**	**(3)**
Independent variable	**Coefficient**	**Coefficient**	**Coefficient**
BUSYSCORE	**-0.073**		-0.020
	(0.068)		(0.745)
REPUTATIONSCORE		**-0.230**	-0.187
		(0.035)	(0.274)
SALES	0.012	0.016	0.016
	(0.630)	(0.547)	(0.530)
SALESGROWTH	**0.774**	**0.789**	**0.783**
	(0.000)	(0.000)	(0.000)
CAPEX	0.234	0.165	0.170
	(0.814)	(0.868)	(0.865)
R&D	**3.087**	**3.605**	**3.543**
	(0.001)	(0.001)	(0.001)
LEV	**-1.131**	**-1.109**	**-1.114**
	(0.000)	(0.000)	(0.000)
CLSHELD	-0.025	-0.025	-0.028
	(0.890)	(0.890)	(0.878)
SEGMENT	0.047	0.043	0.045
	(0.135)	(0.167)	(0.158)
Fixed effects	Year	Year	Year
F-statistic	**130.180**	**130.780**	**118.540**
	(0.000)	(0.000)	(0.000)
R^2	0.199	0.202	0.202

Dependent Variable: Tobin's q (Worldscope)

Notes:

Board variables are lagged by one year.

Bold typeset denotes significant difference from zero (two-sided t-test) at significance levels of 0.01, 0.05 and 0.10, respectively; p-values are given in parentheses.

Table A.4: Bank boards and Tobin's q (n=302)

Independent variable	**(1)** **Coefficient**	**(2)** **Coefficient**
%BANKD	-1.036	
	(0.112)	
BANKBOARD		**-0.200**
		(0.089)
SALES	0.018	0.023
	(0.518)	(0.421)
SALESGROWTH	**0.796**	**0.801**
	(0.000)	(0.000)
CAPEX	0.287	0.238
	(0.773)	(0.811)
R&D	**2.754**	**2.765**
	(0.004)	(0.004)
LEV	**-1.130**	**-1.145**
	(0.000)	(0.000)
CLSHELD	-0.013	0.008
	(0.945)	(0.966)
SEGMENT	0.046	0.044
	(0.147)	(0.158)
Fixed effects	Year	Year
F-statistic	**129.740**	**129.940**
	(0.000)	(0.000)
R^2	0.196	0.197

Dependent Variable: Tobin's q (Worldscope)

Notes:

Board variables are lagged by one year.

Bold typeset denotes significant difference from zero (two-sided t-test) at significance levels of 0.01, 0.05 and 0.10, respectively; p-values are given in parentheses.

Table A.5: International boards and Tobin’s q (n=302)

	(1)	**(2)**
Independent variable	**Coefficient**	**Coefficient**
%INTD	0.102	
	(0.775)	
INTBOARD		**0.790**
		(0.005)
SALES	-0.004	-0.003
	(0.887)	(0.914)
SALESGROWTH	**0.809**	**0.765**
	(0.000)	(0.000)
CAPEX	0.316	0.180
	(0.752)	(0.855)
R&D	**2.604**	**1.721**
	(0.011)	(0.084)
LEV	**-1.122**	**-1.119**
	(0.000)	(0.000)
CLSHELD	0.009	0.050
	(0.960)	(0.782)
SEGMENT	0.040	0.051
	(0.208)	(0.104)
Fixed effects	Year	Year
F-statistic	**128.420**	**132.710**
	(0.000)	(0.000)
R^2	0.190	0.211

Dependent Variable: Tobin’s q (Worldscope)

Notes:

Board variables are lagged by one year.

Bold typeset denotes significant difference from zero (two-sided t-test) at significance levels of 0.01, 0.05 and 0.10, respectively; p-values are given in parentheses.

Table A.6: International board appointments and foreign sales (n=302)

	(1)	(2)
Independent variable	**Coefficient**	**Coefficient**
%INTD	**0.398**	
	(0.001)	
INTBOARD		0.108
		(0.273)
MKTCAP	**0.030**	**0.035**
	(0.001)	(0.000)
SALESGROWTH	**-0.168**	**-0.171**
	(0.008)	(0.008)
CAPEX	-0.348	-0.346
	(0.310)	(0.322)
R&D	0.032	0.292
	(0.925)	(0.392)
LEV	0.089	0.105
	(0.353)	(0.282)
CLSHELD	0.020	0.013
	(0.747)	(0.844)
SEGMENT	0.012	0.014
	(0.268)	(0.211)
Fixed effects	Firm, Year	Firm, Year
F-statistic	**70.230**	**67.150**
	(0.000)	(0.000)
R^2	0.121	0.093

Dependent Variable: Foreign sales to sales (Worldscope)

Notes:

Board variables are lagged by one year.

Bold typeset denotes significant difference from zero (two-sided t-test) at significance levels of 0.01, 0.05 and 0.10, respectively; p-values are given in parentheses.

Table A.7: Multiple board appointments and firm profitability (n=302)

	Busy		**COS**		**Bank**		**International**	
	ROA	**ROS**	**ROA**	**ROS**	**ROA**	**ROS**	**ROA**	**ROS**
Independent variable	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**
%BUSYD	**-0.147**	**-0.325**						
	(0.000)	(0.000)						
%COSD			**-0.268**	**-0.440**				
			(0.000)	(0.007)				
%BANKD					-0.113	-0.094		
					(0.232)	(0.660)		
%INTD							**-0.136**	**-0.385**
							(0.008)	(0.001)
SALES	**0.019**	**0.035**	**0.018**	**0.031**	**0.017**	**0.027**	**0.017**	**0.031**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)
SALESGROWTH	**0.080**	0.051	**0.080**	0.055	**0.085**	0.065	**0.088**	0.071
	(0.002)	(0.383)	(0.002)	(0.355)	(0.001)	(0.277)	(0.001)	(0.231)
CAPEX	0.161	0.298	0.191	0.359	0.177	0.339	0.190	0.368
	(0.254)	(0.355)	(0.175)	(0.269)	(0.220)	(0.303)	(0.183)	(0.255)
R&D	**-0.695**	**-2.267**	**-0.742**	**-2.400**	**-0.789**	**-2.480**	**-0.644**	**-2.063**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LEV	**-0.145**	**-0.250**	**-0.149**	**-0.257**	**-0.146**	**-0.252**	**-0.144**	**-0.247**
	(0.000)	(0.006)	(0.000)	(0.005)	(0.000)	(0.006)	(0.000)	(0.006)
CLSHELD	0.020	0.051	0.016	0.047	0.024	0.063	0.021	0.050
	(0.437)	(0.385)	(0.549)	(0.429)	(0.362)	(0.298)	(0.426)	(0.401)
SEGMENT	0.007	0.011	**0.007**	0.011	0.007	0.010	0.007	0.010
	(0.106)	(0.270)	(0.093)	(0.273)	(0.120)	(0.334)	(0.145)	(0.333)
Fixed effects	Year	Year	Year	Year	Year	Year	Year	Year
F-statistic	**23.020**	**13.400**	**23.120**	**12.560**	**20.820**	**11.540**	**21.800**	**13.080**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R^2	0.294	0.311	0.295	0.297	0.263	0.280	0.277	0.306

Dependent Variables: ROA is EBIT to total assets (Worldscope), ROS is Sales to total assets (Worldscope).

Notes:

Board variables are lagged by one year.

Bold typeset denotes significant difference from zero (two-sided t-test) at significance levels of 0.01, 0.05 and 0.10, respectively; p-values are given in parentheses.

Table A.8: Busyness score vs. Reputation score without employee representatives (n=315)

	(1)	(2)
Independent variable	**Coefficient**	**Coefficient**
BUSYSCORE	-0.038	
	(0.476)	
REPUTATIONSCORE		-0.211
		(0.168)
SALES	-0.102	-0.105
	(0.479)	(0.461)
SALESGROWTH	**0.577**	**0.564**
	(0.000)	(0.000)
CAPEX	0.235	0.275
	(0.830)	(0.801)
R&D	**2.281**	**2.177**
	(0.034)	(0.043)
LEV	-0.507	-0.474
	(0.242)	(0.272)
CLSHELD	**0.632**	**0.664**
	(0.029)	(0.021)
SEGMENT	-0.033	-0.031
	(0.434)	(0.455)
Fixed effects	Firm, Year	Firm, Year
F-statistic	**8.020**	**8.090**
	(0.000)	(0.000)
R^2	0.832	0.833

Dependent Variable: Tobin's q (Worldscope)

Notes:

BUSYSCORE and REPUTATIONSCORE are calculated excluding employee representatives.

Bold typeset denotes significant difference from zero (two-sided t-test) at significance levels of 0.01, 0.05 and 0.10, respectively; p-values are given in parentheses.