

**Three Essays on
Audit Regulation, Audit Market Structure,
and the Quality of Financial Statements**

Dissertation

zur Erlangung des akademischen Grades
Doktor der Wirtschaftswissenschaften (Dr. rer. pol)
am Fachbereich Wirtschaftswissenschaften
der Universität Konstanz

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Tag der mündlichen Prüfung: 09. Juli 2014

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Summary

This dissertation is a collection of three research papers written during my doctoral studies at the University of Konstanz between May 2009 and April 2014. All three studies cover the main topic auditing and are empirical analysis. The main focus of the first two studies is on audit regulation, whereas the third study deals with former audit firm employees. The thesis is organized as follows: The study in Chapter 1 analyses the connection between audit regulations and the structure of the national audit markets. Chapter 2 contains the investigation of the effect of audit regulations on the financial reporting quality. The study in Chapter 3 analyses changes of the audit fees and the discretionary accruals following the appointment of a former audit firm employee to the board of directors.

Chapter 1, *Audit Market Regulation and Supplier Concentration around the World: Empirical Evidence*, is a joint work with Ulrike Stefani. We empirically analyze the connection between audit regulations and the structure of the national audit markets. Our analysis is based on a unique hand-collected dataset on audit regulations effective in various countries during the period 2001–2010 (i.e., mandatory audit firm rotation, joint audits, a limitation of the fees paid to the audit firm, restrictions on the joint supply of audit and non-audit services, mandatory audit partner rotation, the disclosure of the fees paid to the audit firm, and restrictions on auditors' liability). In addition, we take the information about the audit clients and their statutory auditors contained in the *Reuters Fundamentals* database to derive different measures of supplier concentration and competition at the country-level (i.e., the concentration ratio CR_4 , and the *Hirschmann-Herfindahl*-index HHI as measures for the concentration, as well as the ratio between the number of audit firms active in the segment of statutory audits for listed clients divided by the average number of listed audit clients, and the mobility of audit firms' market shares as measures for the competition). Additional country variables were taken from the *World Bank*. The final sample consists of 141,190 firm-year observations from listed companies and of 2,439 audit firms from 29 countries (Australia, Austria, Belgium, Brazil, Canada, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, the Korean Republic, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, Turkey,

the United Kingdom, and the United States). We use a country-fixed effects model to investigate the connections between national audit regulations and our measures of supplier concentration and competition. The results indicate that the regulating authorities should take the connections between potentially conflicting goals into account. A proportionate auditor liability system decreases the concentration ratio and the asymmetry of the market share distribution, but also increases the competition on the audit market. The prohibition of the joint supply of audit and non-audit services lowers the level of absolute supplier concentration and increases the auditor-client-ratio, but decreases the mobility of market shares. For the mandatory audit firm rotation and for mandatory joint audits, in contrast, we observe an increase of the concentration ratio, whereat joint audits also increase the relative concentration. However, joint audits decrease the market share mobility, but the mandatory audit firm rotation increases competition. Thus, this study points to the need to take into account clients' and audit firms' adaptive strategies to new regulations. The paper was presented on the *75th Annual Conference of the German Academic Association for Business Research*, the *36th Annual Congress of the European Accounting Association*, the *23th Audit & Assurance Conference of the British Accounting & Finance Association*, and the *7th Symposium of the European Auditing Research Network*. It was also accepted for presentation on the *2013 Annual Meeting of the American Accounting Association*.

Chapter 2, *Audit Market Regulation and Earnings Characteristics: Cross-Country Evidence on the Role of the Audit Market Structure*, is a joint work with Ulrike Stefani and Ulf Mohrmann. Based on a sample of 88,180 firm-year observations from 29 countries for the period between 2002 and 2011, we explore the link between various audit regulations, the structure of the national audit markets (as measured by the concentration ratio and the mobility of audit firms' market shares), and the reporting quality (as measured by the discretionary accruals, the likelihood of reporting a small profit, and asymmetric recognition of economic profits and losses in accounting income "asymmetric timeliness"). For our analysis we take into account the audit regulations that most frequently appeared in the public debate during the last decade (i.e., mandatory audit firm rotation, joint audits, a limitation of the fees paid to the audit firm, restrictions on the joint supply of audit and non-audit services, mandatory audit partner rotation, the disclosure of the fees paid to the audit firm, and restrictions on auditors' liability). Using panel regressions we analyze *whether* and *how* these regulations affect the different

measures for the reporting quality within a single analysis. Our research design thus allows for investigating the marginal effect of a regulatory measure on the reporting quality, taking into account the existence of other regulations. In addition, we analyze whether the structure of the audit market affects the influence of different regulations on reporting quality. Since the structure of an audit market is likely to influence the initial value of an earnings characteristic, the effectiveness of regulatory measure might also depend on the market structure. Our results indicate that there is an effect of several regulations on the reporting quality. Specifically, we find a quality increasing effect of fee disclosures, fee caps, and restrictions of non-audit services. In contrast, the mandatory audit firm rotation is associated with a lower audit quality. Moreover, these effects depend on the structure of the audit market. Regulations that increase the amount of discretionary accruals are more likely to have an effect on highly concentrated audit markets, whereas regulations that decrease the level of discretionary accruals are more likely to be effective in markets with a low concentration. For the likelihood of reporting a small profit and the asymmetric timeliness we observe only a weak influence of concentration. In contrast to the concentration, the effectiveness of audit market regulations on reporting quality does not depend on the audit market's competition. Our results help to explain the contradictory findings of prior research. In addition, our results might be helpful for the regulating authorities to determine the possible consequences of introducing new regulations on the quality of financial statements. The paper was accepted for presentation on the 76th Annual Conference of the German Academic Association for Business Research, the 37th Annual Congress of the European Accounting Association, and the 26th Annual Conference of the Society for the Advancement of Socio-Economics.

Chapter 3, *The Effect of the Appointment of Former Audit Firm Employees to the Board of Directors on the Quality of the Financial Reporting*, is a joint work with Achim Mattes. Based on data from publicly listed companies in the United Kingdom between 2002 and 2009 we analyze how accounting expertise from former audit firm employees on company boards influences the audit effort and the reporting quality. More specifically, we analyze the changes in audit fees and discretionary accruals, as measures for audit effort and reporting quality, following the appointment of an audit expert to the board. We measure the variation in audit fees and discretionary accruals *within* firms over time in a panel regression framework that controls for general differ-

ences between individual firms and for common determinants. This setup ensures the clean statistical identification of changes in audit fees and discretionary accruals that result from the audit experts' appointments. For our analysis we use a self-constructed panel dataset which connects publicly available data on employment histories to information on board compositions, financial statement data, information on the incumbent audit firm, and capital market information. Our results show an increase in the audit fees in the first years after the appointment of an audit expert to the board. We relate this fee increase to improvements in the financial reporting that must be audited, i.e. higher audit fees proxy for higher audit effort and come along with a higher reporting quality. Since an increase in audit fees can also result from factors other than improvements in the accounting system that must be approved by the auditor (e.g. serious internal control problems that had gone undetected in previous audits), we additionally analyze the discretionary accruals as a measure for the reporting quality. Our results show that the observed fee increase is indeed associated with a permanently lowered level of discretionary accruals after the appointment. More detailed results reveal that these two effects are predominantly observable for audit experts who serve as executive directors, for companies with weak corporate governance structures, and for companies with small boards. The findings correspond to a stronger accounting expertise effect when the influence of the expert in the board is high. Overall, our findings show that firms' stakeholders and other addressees of financial reports can expect greater audit effort and improved financial reporting quality after the appointment of a former audit firm employee to the board. Our comprehensive empirical evidence is consistent with a rational ongoing appointment practice, but raise questions about the perception of audit expert appointments by financial markets, because earlier research found no significant reaction to appointments of audit experts.

Zusammenfassung

Die vorliegende Dissertation ist eine Sammlung von drei Forschungsarbeiten, die während meines Promotionsstudiums an der Universität Konstanz von Mai 2009 bis April 2014 entstanden sind. Alle drei Arbeiten befassen sich mit dem Hauptthema Wirtschaftsprüfung und sind empirische Untersuchungen. Der Schwerpunkt der beiden ersten Studien bildet die Regulierung der Wirtschaftsprüfung, die dritte Studie hingegen beschäftigt sich mit ehemaligen Angestellten von Wirtschaftsprüfungsgesellschaften. Die Arbeit ist wie folgt gegliedert: Die Studie in Kapitel 1 analysiert den Zusammenhang zwischen der Regulierung von Wirtschaftsprüfung und der Struktur nationaler Wirtschaftsprüfungsmärkte. Kapitel 2 beinhaltet die Untersuchung der Auswirkungen der Regulierung von Wirtschaftsprüfung auf die Qualität der Finanzberichterstattung. Die Arbeit in Kapitel 3 analysiert die Entwicklung der Honorare für Prüfungsleistungen und der diskretionären Periodenabgrenzungen nach der Berufung eines ehemaligen Angestellten von Wirtschaftsprüfungsgesellschaften in den Vorstand.

Kapitel 1, *Audit Market Regulation and Supplier Concentration around the World: Empirical Evidence*, ist eine gemeinsame Arbeit mit Ulrike Stefani. Die Studie untersucht empirisch den Zusammenhang zwischen der Regulierung von Wirtschaftsprüfung und der Struktur nationaler Wirtschaftsprüfungsmärkte. Sie basiert auf einzigartigen von Hand erfassten Daten bezüglich der Wirtschaftsprüfungsregulierung in verschiedenen Ländern zwischen 2001 bis 2010 (d.h., die Pflicht zum Wechsel des Prüfers, „Joint Audits“, eine Begrenzung der Honorare für den Abschlussprüfer, Beschränkungen für das Angebot von Prüfung und Beratung aus einer Hand, die Pflicht zum Wechsel des verantwortlichen Prüfungspartners, die Veröffentlichung der Honorare für den Abschlussprüfer und Beschränkungen der Prüferhaftung). Zur Berechnung verschiedener Konzentrations- und Wettbewerbsmaße auf Länderebene (d.h., die Konzentrationsrate CR_4 und der *Hirschmann-Herfindahl-Index* HHI als Konzentrationsmaße, sowie das Verhältnis von im Markt aktiven Prüfungsgesellschaften zu Mandaten und der Änderungen der Marktanteile von Prüfungsgesellschaften als Wettbewerbsmaße) werden weitere Informationen über die Mandanten sowie ihre gesetzlich vorgeschriebenen Abschlussprüfer aus der *Reuters Fundamentals* Datenbank hinzugenommen. Zusätzliche Ländervariablen stammen von der *World Bank*. Der verwendete Datensatz beinhaltet

141,190 beobachtete Unternehmensjahre von gelisteten Unternehmen und 2,439 Wirtschaftsprüfungsgesellschaften aus 29 Ländern (Australien, Belgien, Brasilien, Dänemark, Deutschland, Estland, Finnland, Frankreich, Griechenland, Irland, Italien, Japan, Kanada, Luxemburg, die Niederlande, Norwegen, Österreich, Polen, Portugal, Schweden, die Schweiz, Slowenien, Spanien, Südkorea, Tschechien, die Türkei, das Vereinigte Königreich, Ungarn und den Vereinigten Staaten). Für die Untersuchung des Zusammenhangs zwischen nationaler Wirtschaftsprüfungsregulierung und den Konzentrations- und Wettbewerbsmaßen wird ein Länder-Fixed Effects Modell verwendet. Die Ergebnisse legen nahe, dass Regulierungsbehörden die Verbindungen zwischen sich eventuell widersprechenden Zielen in Betracht ziehen sollten. Ein Rechtssystem mit verhältnismäßiger Prüferhaftung führt zu niedrigeren Konzentrationsraten, einer weniger asymmetrischen Verteilung der Marktanteile und steigert den Wettbewerb auf dem Prüfungsmarkt. Das Verbot von Prüfung und Beratung aus einer Hand senkt die Konzentration und führt zu einer höheren Anbieterzahl, allerdings nimmt auch die Veränderung der Marktanteile der Prüfungsgesellschaften ab. Die Pflicht zum Wechsel der Prüfungsgesellschaft nach einer vorgegebenen Zeit, ebenso wie „Joint Audits“, erhöht hingegen die Konzentrationsrate. Allerdings führen „Joint Audits“ zu einer geringeren Veränderung der Marktanteile der Prüfungsgesellschaften, wohingegen die Pflicht zum Wechsel der Prüfungsgesellschaft den Wettbewerb steigert. Die Studie zeigt daher, dass die Anpassungsstrategien der Prüfungsgesellschaften sowie die der Unternehmen auf veränderte regulatorische Rahmenbedingungen berücksichtigt werden müssen. Die Studie wurde auf der 75. *Wissenschaftlichen Jahrestagung des Verbandes der Hochschullehrer für Betriebswirtschaft*, dem 36. *Jahreskongress der European Accounting Association*, der 23. *Audit & Assurance Konferenz der British Accounting & Finance Association*, und dem 7. *Symposium des European Auditing Research Network* präsentiert. Sie wurde auch zur Präsentation auf dem *Jahrestreffen der American Accounting Association 2013* angenommen.

Kapitel 2, *Audit Market Regulation and Earnings Characteristics: Cross-Country Evidence on the Role of the Audit Market Structure*, ist eine gemeinsame Arbeit mit Ulrike Stefani und Ulf Mohrmann. Basierend auf einem Datensatz bestehend aus 88,180 beobachteten Unternehmensjahren aus 29 Ländern für die Periode von 2002 bis 2011 wird die Beziehung zwischen verschiedenen Regulierungsmaßnahmen für Wirtschaftsprüfung, die Struktur von nationalen Prüfungsmärkten (gemessen mit der Konzentration

onsrate CR_4 und den Änderungen der Marktanteile von Prüfungsgesellschaften) und die Qualität der Finanzberichterstattung (gemessen mit den diskretionären Periodenabgrenzungen, der Wahrscheinlichkeit einen kleinen Gewinn zu berichten und die asymmetrische Erfassung von Gewinnen und Verlusten „Asymmetric Timeliness“) untersucht. Die Analyse berücksichtigt dabei die in der öffentlichen Debatte der letzten Dekade am häufigsten genannten Vorschläge zur Regulierung von Wirtschaftsprüfung (d.h., die Pflicht zum Wechsel des Prüfers, „Joint Audits“, eine Begrenzung der Honorare für den Abschlussprüfer, Einschränkungen für das Angebot von Prüfung und Beratung aus einer Hand, die Pflicht zum Wechsel des verantwortlichen Prüfungspartners, die Veröffentlichung der Honorare für den Abschlussprüfer und Beschränkungen der Prüferhaftung). Die Untersuchung, *ob* und *wie* diese Regulierungsmaßnahmen die verschiedenen Maße der Finanzberichtsqualität beeinflussen, erfolgt in einer Analyse mittels Panel Regressionen. Dieses Forschungsdesign ermöglicht, unter Beachtung weiterer existenter Regulierungen, den marginalen Effekt einer Regulierung auf die Qualität der Finanzberichterstattung zu bestimmen. Darüber hinaus wird untersucht, ob die Struktur eines Wirtschaftsprüfungsmarktes die Auswirkungen der Regulierungsmaßnahmen auf die Finanzberichtsqualität beeinflussen. Da die Struktur eines Prüfungsmarktes wahrscheinlich einen Einfluss auf den Ausgangswert der Gewinnmerkmale hat, ist ein Einfluss der Struktur auf die Wirkungsweise von Regulierungsmaßnahmen für Wirtschaftsprüfung ebenso möglich. Die Ergebnisse der Untersuchung zeigen, dass mehrere Regulierungsmaßnahmen einen Einfluss auf die Qualität der Finanzberichterstattung aufweisen. Insbesondere wirkt die Pflicht zur Veröffentlichung der Honorare für den Abschlussprüfer sowie eine Begrenzung der Honorare für den Abschlussprüfer und Einschränkungen für das Angebot von Prüfung und Beratung aus einer Hand qualitätssteigernd. Im Gegensatz hierzu senkt die Pflicht zum Wechsel des Prüfers die Qualität. Zudem hängen diese Effekte von der Struktur des Prüfungsmarktes ab. Regulierungsmaßnahmen, welche die diskretionären Periodenabgrenzungen erhöhen, wirken scheinbar auf hoch konzentrierten Prüfungsmärkten. Hingegen wirken Regulierungsmaßnahmen, welche die diskretionären Periodenabgrenzungen senken, scheinbar in Prüfungsmärkten mit einer geringen Konzentration. Für die Wahrscheinlichkeit einen kleinen Gewinn zu berichten und die „Asymmetric Timeliness“ kann nur eine schwache Abhängigkeit von der Konzentration festgestellt werden. Im Gegensatz hierzu hängt die Wirkungsweise von Regulierungsmaßnahmen auf die Qualität der Finanzberichterstattung nicht von dem Wettbewerb auf dem Prüfungsmarkt ab. Die Resultate leisten einen Beitrag zur Klärung,

weshalb frühere Arbeiten widersprüchliche Ergebnisse berichten. Zur Abschätzung möglicher Konsequenzen aus der Einführung von Regulierungsmaßnahmen auf die Qualität der Finanzberichterstattung, sind die Ergebnisse ebenfalls für Regulierungsbehörden von Interesse. Die Studie wurde zur Präsentation auf der 76. *Wissenschaftliche Jahrestagung des Verbandes der Hochschullehrer für Betriebswirtschaft*, dem 37. *Jahreskongress der European Accounting Association*, und der 26. *Jahreskonferenz der Society for the Advancement of Socio-Economics* angenommen.

Kapitel 3, *The Effect of the Appointment of Former Audit Firm Employees to the Board of Directors on the Quality of the Financial Reporting*, ist eine gemeinsame Arbeit mit Achim Mattes. Basierend auf Unternehmensdaten aus dem Vereinigten Königreich von 2002 bis 2009 wird untersucht, welchen Effekt die Prüfungsexpertise ehemaliger Angestellter von Wirtschaftsprüfungsgesellschaften im Vorstand von Unternehmen auf den Prüfungsaufwand und die Qualität der Finanzberichterstattung hat. Insbesondere wird die Änderung der Prüfungshonorare sowie der diskretionären Periodenabgrenzungen, als Surrogaten für Prüfungsaufwand und Qualität der Finanzberichterstattung, nach der Berufung eines Prüfungsexperten in den Vorstand eines Unternehmens untersucht. Dabei wird für beide Surrogate die Variation innerhalb eines Unternehmens über die Zeit mit Hilfe von Paneldatenregressionen gemessen. Das Forschungsdesign berücksichtigt dabei allgemeine Unterschiede zwischen den Unternehmen sowie übliche Determinanten. Dies gewährleistet eine klare statistische Identifikation der Auswirkungen, die aus der Berufung von Prüfungsexperten resultieren. Die Analyse basiert auf einem eigens erstellten Paneldatensatz, der öffentlich verfügbare Informationen über Anstellungsverhältnisse mit Informationen zur Vorstandszusammensetzung, Bilanzdaten, Informationen zur Prüfungsgesellschaft, sowie Kapitalmarktinformationen verknüpft. Die Ergebnisse zeigen einen Anstieg der Prüfungshonorare in den ersten Jahren nach der Berufung eines Prüfungsexperten in den Vorstand. Dieser Anstieg kann Verbesserungen in der Finanzberichterstattung zugeordnet werden, die vom Prüfer kontrolliert werden müssen, d.h. höhere Prüfungshonorare dienen als Indikator für mehr Prüfungsaufwand, der mit einer höheren Qualität der Finanzberichterstattung einhergeht. Da jedoch ein Anstieg der Prüfungshonorare ebenso das Ergebnis von anderen Ereignissen sein kann (bspw. bisher unentdeckte interne Kontrollprobleme), werden zusätzlich die diskretionären Periodenabgrenzungen als ein Maß für die Qualität der Finanzberichterstattung untersucht. Die Ergebnisse zeigen, dass der beobachtete

Honoraranstieg in der Tat mit einer permanenten Reduktion der diskretionäre Periodenabgrenzungen einhergeht. Weitere detaillierte Auswertungen zeigen ferner, dass beide Resultate hauptsächlich auf Experten mit Exekutivfunktion im Vorstand, sowie auf Unternehmen mit schwacher Corporate Governance und kleinen Vorständen zurück zu führen sind. Dies entspricht einem stärkeren Effekt der Expertise auf die Finanzberichterstattung, wenn der Einfluss des Experten im Vorstand groß ist. Insgesamt zeigen die Ergebnisse, dass die Stakeholder der Unternehmen sowie andere Adressaten des Finanzberichts einen höheren Prüfungsaufwand und eine Verbesserung der Qualität der Finanzberichterstattung von der Berufung ehemaliger Wirtschaftsprüfungsangestellter erwarten können. Die umfassenden empirischen Belege dieser Studie sprechen für die Rationalität dieser fortwährenden Berufungspraxis, ziehen allerdings Fragen im Zusammenhang mit der Wahrnehmung der Finanzmärkte nach sich, da diese in früheren Studien keine signifikanten Reaktionen auf Expertenberufungen gezeigt haben.

Chapter 1:
Audit Market Regulation and Supplier
Concentration around the World:
Empirical Evidence

1.1 Motivation

As a consequence of the recent financial crisis, important financial institutions faced severe economic problems or even went into bankruptcy. National governments thus were forced to spend inconceivable sums of money to support the economically relevant financial institutions, to manage the consequences of the crisis, and to prevent the European Currency Union from collapsing. The fact that statutory auditors had issued unqualified opinions on the financial statements even of those banks that shortly after had to publicly admit severe financial difficulties is particularly precarious. Some of the audit firms had not only earned large amounts of fees for providing audit services, but had also had received considerable sums for supplying non-audit services to these clients (Sikka 2009). In the aftermath of the financial crises, there was thus an outpouring of public criticism again questioning auditor independence. Within the European Union, an intense debate on audit market regulation has been resumed.¹ In the United States (U.S.), in the United Kingdom (U.K.), and in Australia, there also are ongoing discussions on how to further improve audit quality.²

In addition to concerns regarding auditor independence, the high level of supplier concentration and the lack of competition in national audit markets have crystallized as the most challenging problems addressed in these discussions. In most countries, the Big 4 (*Deloitte & Touche, Ernst & Young, PricewaterhouseCoopers, and KPMG*) dominate the national market for providing audit services to listed companies. Smaller suppliers of audit services, in contrast, face severe barriers to market entry, because the acquisition of new clients in the oligopolistic market segment of statutory audits of listed companies has proven to be difficult for them. As a consequence, the Commission

¹ After the public consultation on the Green Paper “Audit Policy: Lessons from the Crisis” (Commission of the European Communities 2010a) in November 2011, the EU Commission had issued a proposal regarding regulatory reforms intended to improve the quality of audits of public-interest entities (Commission of the European Communities 2011b) as well as a proposal for a directive that attempts to expand the internal market for statutory audits by improving the conditions for small and medium-sized audit firms (Commission of the European Communities 2011a). In 2013, the Committee on Legal Affairs of the European Parliament finished its deliberations of the proposal referring to audits of public-interest entities and issued a report (Committee on Legal Affairs of the European Parliament 2013), which was the draft for the ballot of the European Parliament. On April 3rd, 2014 the European Parliament adopted the draft with only minor changes (European Parliament 2014).

² United States General Accounting Office (2003b), United States Government Accountability Office (2008), United States Treasury (2006), and United States Treasury (2008) for the U.S.; Oxera Consulting Ltd. (2006, 2007), House of Lords (2010), and Office of Fair Trading (2011a, 2011b) for the U.K.; Australian Financial Reporting Council - The Treasury (2010) and Department of Finance and Deregulation (2011) for Australia.

of the European Communities (2010a) has regarded the dominant position of the Big 4 as a “systemic risk”, because the collapse of one of these suppliers is expected to have severe consequences on the availability of audits and negative effects on the stability of the financial system. Moreover, clients lack sufficient options when appointing an audit firm, and there is also the concern that audit quality might be low if the audit market is characterized by a low degree of dynamism and competition.³ The high level of audit market concentration and the lack of competition for audits in the financial sector are seen as potential reasons for the apparently poor performance of the Big 4 during the financial crisis (House of Lords 2010).

In the present study, the focus is rather on the role of national audit regulations in determining the *status quo* of audit market concentration at the country-level than on its consequences. Thus, we will not discuss whether a high level of concentration leads to a low degree of competition and a low quality of audited financial statements, but investigate whether certain measures of audit regulation bring forward the evolution of an oligopolistic audit market. Our research question is of particular importance because measures intended to improve auditor independence might cause negative side-effects on the level of audit market concentration. Amongst other things, the Commission of the European Communities (2011b), for example, has discussed the adoption of more severe restrictions on the joint supply of audit and non-audit services and a mandatory audit firm rotation. Also in the United States, the Public Company Accounting Oversight Board (2011) has discussed the introduction of the mandatory audit firm rotation in order to improve auditor independence. These measures directly affect the profits of the audit firms active in the market as well as the barriers to market entry for smaller suppliers. As a consequence, the proposed regulations could affect the market share distribution. In the present paper, we investigate whether the goals of improving audit quality, mitigating audit market concentration, and increasing competition are interdependent.

³ Investigating concentration levels for audit markets of U.S. cities, Kallapur et al. (2010), however, find that the absolute audit market concentration has a positive effect on audit quality; nevertheless, there is a negative impact of the relative audit market concentration on audit quality. In a cross-country-study, Francis et al. (2013) confirm that there is a positive relation between the earnings quality and the CR_4 within a country, but that Big 4 clients have larger accruals, are less likely to report losses, and exhibit less timely loss recognition if the market shares are asymmetrically distributed between the Big 4. In a country-specific analysis, Boone et al. (2012), in contrast, document a negative association between the absolute concentration and audit quality.

We report the results of a cross-country study designed to examine whether a country's audit regulations have an effect on the levels of concentration and competition observed for the national audit market. Our analysis is based on a unique hand-collected dataset on audit regulations effective in various countries during the period 2001–2010. In addition, we take the information about the audit clients and their statutory auditors contained in the *Reuters Fundamentals* database to derive different measures of supplier concentration and competition at the country-level (i.e., the concentration ratio CR_4 as the combined market share of the four market leaders, the asymmetry of the market share distribution as measured by the *Hirschmann-Herfindahl*-index HHI , the ratio between the number of audit firms active in the segment of statutory audits for listed clients divided by the average number of listed audit clients (AC_R), and the mobility of audit firms' market shares (MOB)). Our final sample consists of 141,190 firm-year observations from listed companies and of 2,439 audit firms from 29 countries (Australia, Austria, Belgium, Brazil, Canada, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, the Korean Republic, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States). We use a country-fixed effects model to investigate the connections between national audit regulations and our measures of supplier concentration and competition.

Our study makes four primary contributions: First, we give a detailed overview about the *status quo* of audit regulations across various countries and its development in the past decade. Our dataset contains both EU Member States and countries that are not directly affected by the EU regulations. We use the institutional setting within the EU as a starting point and refer to other regulations where necessary. Second, we describe the differences between the countries within our sample with respect to the audit regulation, the level of supplier concentration, and audit market competition. Third, the results of our regressions confirm the assertion that regulations intended to improve audit quality have a significant effect on audit market concentration and competition at the country-level. In particular, our findings indicate that a proportionate auditor liability system would have the positive effects of a decrease in the combined market share of the four largest audit firms, a decrease in the asymmetry of the market share distribution, and an intensification of competition as measured by the mobility of the market shares. The prohibition of the joint supply of audit and non-audit services also has positive effects

(i.e., it lowers the level of absolute supplier concentration and increases the auditor-client-ratio), but it has the drawback of decreasing the mobility of market shares. Provided that a ban on non-audit services indeed strengthens auditor independence, the goals of improving audit quality and of mitigating the dominance of the market leaders are thus aligned, but at the cost of a lower degree of competition. For the mandatory audit firm rotation and for mandatory joint audits, in contrast, we observe a significant increase of the market share of the four market leaders. In countries where joint audits are mandatory, we also find an increase in the relative concentration. Whereas mandatory joint audits decrease the market share mobility, the mandatory audit firm rotation increases competition. Thus, mandatory joint audits are an example that the objectives of improving auditor independence, decreasing supplier concentration, and strengthening competition are conflicting. Our findings thus indicate that regulators should take the connections between potentially conflicting goals into account. Forth, this study highlights the need to further investigate clients' and audit firms' adaptive strategies to new regulations, and to gain a better understanding of the interrelation between independence, market structure, and the quality of audited financial statements.

The remainder of the paper is organized as follows: In Section 1.2, we give a brief overview about the recent discussion on audit regulation and describe the current situation at the country-level. In addition, we formulate research questions addressing the possible effects of audit regulations on market concentration and competition. In Section 1.3, we define the variables of interest and provide descriptive statistics in addition to an overview of audit market concentration and competition for the countries in our sample. Section 1.4 contains our regression analysis, our key findings, and the results of our robustness checks. Section 1.5 concludes and states the limitations of our study.

1.2 The Regulatory Environment of Statutory Audits and its possible Effects on the Market Structure

The EU Directive on Statutory Audits (2006/43/EC)

For the EU Member States, the Directive 2006/43/EC (European Parliament and European Council 2006a), amended by the Directive 2008/30/EC (European Parliament and European Council 2008) contain the rules regarding statutory audits of annual and consolidated accounts. All the EU Member States were expected to comply with the so-called Statutory Audit Directive before June 29th, 2008. Whereas some EU Member

States completely transposed this Directive within the given time frame, others implemented the necessary rules and institutions step by step. Spain and Ireland, for example, fully transposed the Statutory Audit Directive only in 2010.

The main attempt of the Statutory Audit Directive was to harmonize the audit processes across the EU Member States and to establish a single market for audit services within the EU. Thus, the Statutory Audit Directive possibly eased the acquisition of clients across national boundaries for smaller audit firms. If this was the case, we should observe a lower level of supplier concentration and a higher number of audit firms active in the market for countries that have adopted the Statutory Audit Directive as compared to countries that do not have to comply with these rules. However, Directive 2006/43/EC also contains elements with the potential to create new barriers to market entry for smaller audit firms. Among other measures, the EU Member States were expected to organize an effective system of public oversight for statutory auditors and to make sure that audit firms implement an internal quality control system. Moreover, the Statutory Audit Directive contains provisions for the internal auditor rotation. If, due to capacity constraints, smaller audit firms are not capable of implementing these rules, we should observe a higher level of supplier concentration and a lower number of active audit firms for those countries that have adopted the Statutory Audit Directive. As the Statutory Audit Directive leaves the Member States some discretion regarding the implementation of certain elements, auditing is not yet fully harmonized across the EU. Therefore, the adoption of more specific rules might more directly affect the structure of the audit market and competition at the country-level than the implementation of the Statutory Audit Directive.

Restrictions on auditor liability

In its recommendation concerning the limitation of the civil liability of statutory auditors and audit firms, the Commission of the European Communities (2008a) notes that statutory auditors face increasing liability risks. To minimize these risks, the audit firms thus have implemented internal risk management processes to monitor their audit processes and the riskiness of their clients (Ewert and London Economics 2006, 91). Yet the access to insurance coverage against litigation risks has become increasingly difficult,⁴ and middle-tier audit firms name this fact as a serious issue (Ewert and London

⁴ In line with this argument, Choi et al. (2008) show that audit fees increase in the strength of a country's legal liability regime.

Economics 2006, 46). As a consequence, unlimited joint and several liability can restrain audit firms from entering the international audit market for listed companies. In order to ensure sufficient audit capacities and a competitive market for audit services, the EU Commission therefore recommended limiting the liability of statutory auditors of listed companies arising from a breach of their professional duties. The Member States can choose the specific method of limiting auditor liability they consider most suitable: The Member States can determine a liability cap under their national law that can take on the form of a maximum financial amount or of a formula allowing for the calculation of such an amount. Alternatively, the Member States can establish a system of proportionate liability, i.e., a system according to which statutory auditors are not liable beyond their actual contribution to the claimant's loss, and the auditor is not jointly and severally liable with other parties. The Member States can also allow for provisions in which statutory auditors and their clients individually agree on a limitation of the auditor's liability.

According to the explanatory statement of the EU Commission, a system of limited auditor liability should decrease supplier concentration (Commission of the European Communities 2008b, 41; Ewert and London Economics 2006, 46). For countries with limited auditor liability, we thus expect to observe lower market shares of the market leaders, more symmetrically distributed market shares, a larger number of audit firms active in the market, and more competition.

The joint supply of audit and non-audit services

In 2002, the Commission of the European Communities (2002) published a recommendation regarding auditor independence, pointing to the fact that national rules defining the scope of non-audit services the auditor is allowed to provide to audit clients differ largely across the Member States. The EU Commission worried that it might be difficult to provide external addressees with an EU-wide uniform level of assurance that statutory auditors perform their work independently. In an attempt to harmonize the independence rules, the EU Commission required that *“a statutory auditor should not carry out a statutory audit if there are any financial, business, employment or other relationships between the statutory auditor and his client (including certain non-audit services provided to the audit client) that a reasonable and informed third party would conclude compromise the statutory auditor's independence”* (Commission of the European Communities 2002, 24). Following a principles-based approach, the EU

Commission required that auditors should neither take any decision nor take part in any decision-making on behalf of the audit client while providing non-audit services. In addition, the Commission of the European Communities (2005) recommended that the audit committee should keep the nature and extent of non-audit services under review and apply a formal policy specifying the types of non-audit services that are (a) excluded, (b) permissible after review by the audit committee, and (c) permissible without referral to the committee.

The Directive 2006/43/EC continued to apply the principles-based approach, stating that “*Member States shall ensure that a statutory auditor or an audit firm shall not carry out a statutory audit if there is any direct or indirect financial, business, employment or other relationship—including the provision of additional non-audit services—between the statutory auditor, audit firm or network and the audited entity from which an objective, reasonable and informed third party would conclude that the statutory auditor’s or audit firm’s independence is compromised*” (Art. 22). But the provision of particular types of non-audit services is still allowed. However, the Directive 2006/43/EC requires the disclosure of audit and non-audit fees.

To date, there is no direct EU-wide ban strictly preventing auditors from offering non-audit services to their audit clients, and Art. 22 of the Directive 2006/43/EC has been implemented in a very divergent manner across the EU. Although all Member States have adopted limitations regarding the scope of services statutory auditors are allowed to provide to their audit clients, the legislation still differs widely between the Member States. Whereas Belgium, France, and Hungary imposed a tight restriction on the provision of non-audit services, other Member States were far less restrictive.

In its published proposal from 2011, the Commission of the European Communities (2011b) thus suggested to restrict the joint provision of audit and non-audit services, even to the extent of creating pure audit firms. More precisely, the EU Commission proposed that statutory auditors should be strictly prevented from providing their audit clients with non-audit services that are assessed as incompatible with the independent public-interest function of auditing.⁵ For non-audit services that are not regarded as in-

⁵ These services include expert services unrelated to the audit; tax consultancy; general management and other advisory services; bookkeeping and the preparation of accounting records and financial statements; designing and implementing internal control or risk management; procedures related to the preparation and/or the control of financial information included in the financial statements and advice on risk; valuation services; providing fairness opinions or contribution-in-kind reports; actuarial and

compatible with the audit function, the EU Commission suggested that the audit committee be empowered to assess whether or not the auditor should provide these services to the audited entity.⁶ Audit-related financial services, however, could still be provided.⁷ Although the Committee on Legal Affairs of the European Parliament (2013) largely followed the Commission's suggestions with respect to the type of prohibited non-audit services,⁸ it did not support the prohibition for large audit firms to supply any non-audit services to any public-interest entity.⁹ Furthermore, the fee restriction proposed in Art. 9(2), e.g., the limitation of the fees earned from the provision of the non-audit services mentioned in Art. 10(2) to 10 percent of the fees paid for the statutory audit, was not contained in the amendment of the Committee on Legal Affairs of the European Parliament (2013). The current draft of the directive, approved by the European Parliament on 3rd April 2014, contains the proposed limitations for the non-audit services by the Committee on Legal Affairs in Article 5. Paragraph 1 further specifies that these restrictions are limited to (1) the period between the beginning of the period audited and the issuing of the audit report and (2) the financial year immediately preceding this period (European Parliament 2014). Apart from this period, the fees for non-audit services are limited to 70% of the average of the fees paid in the last three consecutive financial years for the audit (Article 4, paragraph 2). The EU Commission's original recommendations would have gone far beyond the regulations effective in the U.S., where the

legal services; designing and implementing financial information technology systems for public-interest entities; participating in the client's internal audit and the provision of services related to the internal audit function; broker or dealer, investment adviser, or investment banking services (Commission of the European Communities 2011b, Art. 10(3a)).

⁶ Art. 10(3b) addresses the provision of human resources services (including recruiting senior management) and providing comfort letters for investors in the context of the issuance of an undertaking's securities (Commission of the European Communities 2011b).

⁷ These services include auditing or reviewing of interim financial statements, providing assurance on corporate governance statements or on corporate social responsibility matters, providing assurance on or attestation of regulatory reporting to regulators of financial institutions beyond the scope of the statutory audit, providing the certification of compliance with the tax requirements where such attestation is required by the national law, and any other statutory duty related to the audit work imposed by the legislation of the European Union on the statutory auditor or audit firm (Commission of the European Communities 2011b, Art. 10(2)).

⁸ The Committee on Legal Affairs of the European Parliament (2013) did not distinguish between non-audit services that are incompatible with the audit function and services that are not incompatible. Instead, it prohibited the services described in Art 10(3a) and 10(3b), but excluded from a prohibition expert services unrelated to the audit, general tax consultancy, and other advisory services. Yet the Committee on Legal Affairs required that the audit committee must approve the provision of all allowed services.

⁹ A large audit firm is one that generates more than one-third of its annual audit revenues from large public-interest entities *and* belongs to a network with combined annual audit revenues within the EU of more than € 1,500,000,000 (Commission of the European Communities 2011b, Art. 10(5)).

scope of non-audit services that auditors are allowed to provide to their audit clients is also restricted.¹⁰

The empirical evidence regarding the relation between the supply of non-audit services and auditor independence is mixed (Francis 2006; Quick 2012). Using qualified or going concern audit opinions, the degree of earnings management, restatements, and litigation as surrogates for “*auditor independence in fact*”, empirical studies did not find clear-cut evidence on the question whether non-audit services indeed threaten independence.¹¹ The majority of studies investigating the interrelation between non-audit services and “*independence in appearance*”, however, found a negative effect (Raghunandan (2003), Francis and Ke (2006), and Quick and Warming-Rasmussen (2009); Ghosh et al. (2009) provide contrary evidence).

The effects of a prohibition of the joint supply of audit and non-audit services on audit market concentration are even more undetermined. There are reasons that a prohibition would increase concentration: If, for example, audit firms lose profits due to the implementation of restrictions on their scope of services, some suppliers would exit the market because of the zero-profit constraint resulting from a given amount of fixed costs and *Bertrand*-equilibrium behavior (Bleibtreu and Stefani 2012b). In addition, a restriction or even a ban on non-audit services could increase audit fees (Cosgrove and Niederjohn 2008; Asthana et al. 2009; Ghosh and Pawlewicz 2009), either because audit services cannot serve as a “loss leader”, or because knowledge-spillovers between non-audit and audit services would be eliminated (Knechel and Sharma 2008).¹² The increase in audit fees would increase the market shares—if measured using audit fees—

¹⁰ Title II, Sec. 201 (g) of the Sarbanes-Oxley Act of 2002 prohibits registered audit firms from providing to public companies bookkeeping, financial information system design or implementation, appraisal and valuation services, actuarial services, internal audit outsourcing, management and human resources functions, investment advising services, legal services, and expert services. Sec. 202 allows statutory auditors to supply some kinds of non-audit services if the audit committee has approved this course of action.

¹¹ Frankel et al. (2002), Ferguson et al. (2004), Srinidhi and Gul (2007), Basioudis et al. (2008), and Hoitash et al. (2007) find a negative association between non-audit fees and measures for audit quality, whereas DeFond et al. (2002), Ashbaugh et al. (2003), Chung and Kallapur (2003), Larcker and Richardson (2004), Reynolds et al. (2004), and Ruddock et al. (2006) do not find evidence supporting the notion that non-audit services severely harm audit quality.

¹² Most of the studies using a single-equation model with audit fees as a dependent and non-audit fees as an independent variable document a significantly positive effect of non-audit fees on audit fees (Simunic 1984; Simon 1985; Bell and Tabor 1991; DeBerg et al. 1991; Butterworth and Houghton 1995; Craswell and Francis 1999; Ezzamel et al. 1996) but Palmrose (1986) finds evidence contradicting the argument for knowledge spillovers. Using audit effort instead of audit fees (O’Keefe et al. 1994; Davis et al. 1993) and applying simultaneous-equations specifications for audit and non-audit fees (Whisenant et al. 2003) also does not yield evidence in favor of knowledge spillovers.

of the remaining, predominantly large audit firms.¹³ There are, however, also arguments that the prohibition of non-audit services would reduce supplier concentration: If audit clients value non-audit services more than audit services, but are not allowed to buy non-audit services from their statutory auditor, clients will hire another, possibly smaller audit firm and keep their consultant. Moreover, if the joint supply of both services is regarded as a barrier to market entry—because nationally active audit firms are not able to provide consulting services to larger listed companies due to capacity constraints—the prohibition would facilitate market entry. Furthermore, if the prohibition would remove existing knowledge-spillovers, large audit firms that had formerly supplied both services would lose their comparative cost advantage for a specific client and the possibility of cross-subsidizing the audits of other clients. Thus, a ban on non-audit services would enable smaller audit firms to acquire (more) clients in the segment of listed companies and thus foster competition between larger and smaller suppliers. However, if the audit is used as a door opener for the acquisition of consulting projects, there might be a lower degree of competition between the market leaders.

Audit fee caps

If the fees received from one client exceed some critical threshold, there is the concern that auditor independence might be threatened,¹⁴ because the auditor has a strong economic interest not to lose a client whose fees represent a large proportion of the audit firm's total fees (*economic bonding*). Thus, the Commission of the European Communities (2011b) proposed to establish a specific procedure to secure audit quality in cases where the audit fees from a single public-interest entity are significant. More precisely, the auditor should inform the audit committee about the fact that the total fees received from this client, for two consecutive years, represent more than 15 percent of the total annual fees the auditor receives (Art. 9(3)). The audit committee should then consider whether the audit engagement should be subject to a quality control review by another auditor prior to the issuance of the audit report. Moreover, the auditor should

¹³ For example, Ghosh and Pawlewicz (2009) shows that in the U.S. in the pre-SOX era, the fees for non-audit services represented 79 percent of the total fees paid to the Big 4, but only 42 percent of the total fees paid to the non-Big 4 audit firms. Also in the post-SOX era, the non-audit services are with 37 percent more important for the Big 4 than with 25 percent for the non-Big 4. Moreover, the Professional Oversight Board of the UK (2010) reported that in 2009, the mean share of non-audit fees was 39 percent for the Big 4 and 30 percent for the other audit firms.

¹⁴ Previous findings on the correlation between audit fees and *independence in mind* are mixed, but there is evidence of a negative association between a client's economic importance and *independence in appearance* (Quick 2012).

inform the competent authority referred to in Art. 35(1) when the total fees received from a public-interest entity subject to the statutory audit represent, for two consecutive years, 15 percent or more of the auditor's total annual fees (Art. 9(3)). The competent authority then should decide about the continuation of the audit engagement, which should not exceed two additional years. The Committee on Legal Affairs of the European Parliament (2013) followed these suggestions and supported the general restriction that the fees paid to the audit firm should not exceed the 15 percent threshold. The current draft of the directive, approved by the European Parliament on 3rd April 2014, also contains the general 15% restriction in Article 4 (European Parliament 2014).

The implementation of fee caps might affect supplier concentration for several reasons: Fee caps could exclude smaller audit firms from providing audit services to listed clients because the fees received from a larger client easily exceed the critical threshold. Thus, for countries in which fee caps are effective, the market leaders' combined market share should be higher and the number of audit firms active in the market should be lower if some smaller audit firms are effectively crowded out. However, to prevent market exit, fee caps also give smaller audit firms a strong incentive to expand their business in the segment of listed companies; fee caps would thus decrease both absolute and relative supplier concentration. The effect on competition is ambiguous.

Mandatory joint audits

Joint audits are defined as audits in which two or more auditors simultaneously carry out the audit, i.e., issue a single audit report and share the responsibility for the audit. At the EU-level, there are currently no specific regulations regarding joint audits or audit consortia. Because in Denmark joint audits have been disestablished in 2005, today, France is the only Member State that by law requires joint audits for statutory audits of listed companies that publish consolidated accounts.¹⁵ Because in France there are no regulations regarding the size of the audit firms taking part in the audit consortium, the most frequent case is that two larger audit firms—but not necessarily the Big 4—jointly perform the audit.¹⁶ In Germany, joint audits are not mandatory, but allowed (IDW Institut der Wirtschaftsprüfer in Deutschland e. V. 1999), and there are also no require-

¹⁵ For an overview of countries with joint audits around the world see Ratzinger-Sackel et al. (2012) and Ratzinger-Sakel et al. (2013).

¹⁶ André et al. (2011) show that in France, 18.1 percent of their sample companies had two Big 4 audit firms, whereas 58.6 percent had hired one Big 4. Francis et al. (2009) confirm that the majority of French companies are audited by at least one Big 4.

ments regarding the size of the joint auditors. However, the fees an auditor earns from a specific public-interest entity are restricted to 15 percent of the audit firms' total fees (§ 319 Abs. 3 Nr. 5 and § 319a Abs. 1 Nr. 1 HGB).

There are several reasons to assume that two rather large audit firms are hired as joint auditors. First, within an audit consortium, each auditor has to accept the overall responsibility for the entire audit, and both auditors are jointly liable. Thus, both audit firms must possess sufficient capacities to plan and conduct the audit to be able to come to an informed overall assessment. Second, the presence of two auditors increases the coordination costs (e.g., for defining the terms of engagement, for discussing professional issues, and for summarizing the results of the audit procedures) (Bédard et al. 2012). The coordination costs might be particularly high in a consortium of a larger and a smaller audit firm.¹⁷ Third, audit fees are expected to be higher for a joint audit than for a single audit.¹⁸ Clients, however, will expect additional value from the extra fees paid,¹⁹ and therefore will tend to hire two large audit firms.²⁰ Fourth, it could be argued that audit quality should be larger if two international audit firms are hired.²¹ In addition, the supposition that a joint audit performed by two Big 4 auditors increases audit quality as perceived by external addressees might stand to reason.²²

¹⁷ Gonthier-Besacier and Schatt (2007) and Thinggaard and Kiertzner (2008) observed significantly lower fees paid for a joint audit performed by two Big 4 auditors than for joint audits done by a combination of a Big 4 and a non-Big 4 or by two non-Big 4 audit firms.

¹⁸ André et al. (2011) report that audit fees of major French companies audited by two Big 4 audit firms are significantly higher than Big 4 fees in the U.K. In line with this result, Lesage et al. (2012) also report higher audit fees for French firms compared to German firms. For Denmark, Holm and Thinggaard (2010) observed audit fee discounts in companies changing from joint audits to single audits, but Lesage et al. (2012) found difference in the audit fees for in Denmark. For Sweden, Haapamäki et al. (2011) found that firms opting to engage joint auditors pay significantly higher audit fees than other firms, and Zerni et al. (2012) report the same for Sweden. Francis et al. (2009), in contrast, did not find evidence that French audit fees are higher under a joint audit approach than audit fees observed in other European countries.

¹⁹ For Sweden, Haapamäki et al. (2011) report that companies voluntarily hiring joint auditors have a higher degree of earnings conservatism and are less likely to have income-increasing discretionary accruals than other firms. Holm and Thinggaard (2010) and Lesage et al. (2012), in contrast, do not support the notion that joint audits increase audit quality. Recent empirical research highlights higher earnings management in France than in the U.K. and in countries with better investor protection (Leuz et al. 2003; Burgstahler et al. 2006).

²⁰ For empirical evidence on the connection between client characteristics and auditor choice, see Francis et al. (2009).

²¹ For a sample of companies listed in France, Francis et al. (2009) found that the amount of income-increasing discretionary accruals decreases in the number of Big 4 auditors taking part in the joint audit. Bédard et al. (2012) also argue that earnings quality as measured by accruals is lower for a combination of one Big 4 and a local audit firm. Marmousez (2006), in contrast, found that reporting quality is lower for a combination of two Big 4 audit firms than for a joint audit by one Big 4 and one non-Big 4 audit firm.

²² For Finland, Karjalainen (2009) finds supporting evidence that perceived audit quality is higher for companies hiring more than one responsible auditor.

In its Green Paper, however, the Commission of the European Communities (2010a) had proposed joint audits *with a non-systemic audit firm* as the second auditor. In addition to increasing audit quality, the idea behind the introduction of joint audits was to enhance the market entry of smaller audit firms, i.e., to decrease audit market concentration, to foster the growth of non-Big 4 audit firms, and to intensify competition.²³ The current draft of the directive (European Parliament 2014), approved by the European Parliament, does not require joint audits anymore, but allows a longer maximum duration of the audit engagement for joint audits than for single audits (24 years vs. 10 years, see Art. 17).

The effects of the implementation of joint audits on concentration and competition depend on the specific requirements regarding the joint auditors. Note that for the country-year observations within our sample, there was no requirement to hire a smaller audit firm. Because there are economic incentives to choose two larger audit firms, in countries with mandatory joint audits, both the absolute and the relative concentration should be higher and the number of audit firms active in the market should be lower. The overall effect on competition is ambiguous, because it should increase between the candidates for joint auditors, but decrease between smaller and larger audit firms.

Mandatory audit partner rotation

For audits of public-interest entities, Art. 42 of the Statutory Audit Directive (European Parliament and European Council 2006a) prescribes the rotation of the key audit partners after seven years. In addition, Art. 42 of the 8th EU Directive requires a cooling-off period of two years. These regulations are binding for public-interest companies. In the recently published proposal, the Commission of the European Communities (2011b) suggested to extend the cooling-off period of the key audit partners to three years (Art. 33(4)), and the Committee on Legal Affairs of the European Parliament (2013) also supported this suggestion. Article 17, paragraph 7 of the current directive draft recalls a maximum engagement period for key audit partners of seven years and now extends the cooling-off period to three years (European Parliament 2014). Table 1.14 shows that all the EU Member States have implemented the internal auditor rotation, although at a different point in time. There are also differences regarding the maximum audit partner tenure.

²³ The results of Piot (2007) indicate that joint audits can preserve competition by reducing the domination of the large audit firms.

As audit firms capable of auditing listed clients should have enough audit partners available to fulfill the requirements of the internal auditor rotation, we do not expect to observe any effects of this rule on audit market concentration and competition. However, the internal auditor rotation could be a barrier to market entry for rather small audit firms.

Mandatory audit firm rotation

Although Art. 42(2) of the 8th Directive prescribes the internal rotation of key audit partners, audit firm rotation is optional within the EU. Today, Italy is the only EU Member State that requires the audit firm rotation for all companies. Since 2003, Poland prescribes the external rotation for insurance companies, and Turkey—as a candidate for the full EU membership—introduced the audit firm rotation for all companies also in 2003, but abandoned it again in 2011 (Ewelt-Knauer et al. 2012). Some countries outside the EU also have the external rotation.²⁴ Spain, in contrast, had a mandatory audit firm rotation until 1995, and Austria introduced a six-year rotation before 2004, but both countries repealed this rule before its effective date in favor of the upcoming Company Law Directive (Cameran et al. 2005; Harris and Whisenant 2012).

Because audit firm tenure is, in general, not restricted, the EU Commission proposed the external rotation as a measure to increase auditor independence²⁵ and to improve audit quality.²⁶ Moreover, the EU Commission expects that the external rotation also increases the dynamism of the audit market, fosters competition, and decreases supplier concentration.²⁷ In its 2011 published proposal, the Commission of the European Communities (2011b) thus suggested a mandatory audit firm rotation for statutory auditors of public-interest entities after six years (Art. 33(1)). If two statutory auditors or

²⁴ See Ewelt-Knauer et al. (2012) for a detailed overview.

²⁵ The results of Mansi et al. (2004) and Ghosh and Moon (2005), however, indicate that *perceived* audit quality increases with auditor tenure.

²⁶ Empirical evidence on the interrelation between auditor tenure and audit quality—as measured by the frequency of qualified audit opinions or going concern opinions, litigation and results of SEC surveillance, results of external quality controls, or earnings management—indicates a lower audit quality at the beginning of the auditor-client relationship (Geiger and Raghunandan 2002; Johnson et al. 2002; Carcello and Nagy 2004; Davis et al. 2009) (pre-SOX). However, studies conducted in a regulatory environment without mandatory rotation cannot be transferred to evaluate the efficiency of audit firm rotation. For a period in which the external rotation was mandatory in Spain, Gómez-Aguilar and Ruiz-Barbadillo (2003) did not find a significant relationship between going concern decisions and auditor tenure. For Italy, where audit firm rotation is mandatory, Cameran et al. (2010) document that the external rotation does not improve audit quality. Kwon et al. (2010) find similar results for Korea. Harris and Whisenant (2012) show that audit quality is lower in the first years after an auditor change, but that audit quality was higher after the audit firm rotation rule had been implemented.

²⁷ Cameran et al. (2005) provide contrary evidence, i.e., supplier concentration in Italy has increased due to the implementation of the audit firm rotation rule.

audit firms have been appointed throughout a continuous engagement of six years, the maximum duration can be extended to nine years. In addition, the Commission required mandate duration of at least two years (Art 33(1)) and a cooling-off period of four years (Art. 33(2)). The Committee on Legal Affairs of the European Parliament (2013), however, proposed only a one-year minimum engagement period and suggested to extend the maximum period to 14 years. Article 17, paragraph 3 of the current draft of the EU-Directive, approved by the European Parliament, contains a maximum period of 10 years with a four year cooling-off period. However, in Article 17, paragraph 4 there are several exceptions that allows for an increase up to 20 years or in case of a joint audit up to 24 years (European Parliament 2014).

In the United States, the Sarbanes-Oxley Act of 2002 did not introduce a mandatory audit firm rotation, but required the United States General Accounting Office to conduct a study on the effects of the external rotation (Sec. 207 of the Sarbanes-Oxley Act of 2002). In 2003, the United States General Accounting Office (2003b) stated that audit firm rotation causes additional costs and may thus not be the most efficient way to improve auditor independence. Therefore, it did not recommend implementing the external rotation. After eight years of experience with the Sarbanes-Oxley Act and the assessment of its effects, however, the Public Company Accounting Oversight Board (2011) issued a concept release on auditor independence, directing the discussion on audit firm rotation again, which was, however, refused by the House of Representatives in 2013.

Because clients frequently tend to choose one of the larger audit firms in the case of a voluntary auditor change,²⁸ a mandatory audit firm rotation could increase the frequency of auditor changes from smaller to larger audit firms, thereby increasing supplier concentration.²⁹ In the long run, some smaller audit firms could exit the market, i.e., the number of audit firms active in the market should be lower for countries where the audit firm rotation is mandatory. Due to the increase in forced auditor changes, our competition measure should also increase.

²⁸ The argument that clients use audit firms' market shares as a proxy for quality Ferguson et al. (2006) could explain this choice pattern.

²⁹ Comunale and Sexton (2005) show that audit firm rotation can have substantial effects on the long-term market share distribution.

The disclosure of auditor fees

Within the European Union, recital 33 of the Directive 2006/43/EC requires the disclosure of the audit fees and the fees paid for non-audit services in the notes to the annual accounts and the consolidated accounts. The disclosure of auditor fees is intended to enhance the transparency regarding the auditor-client relationship and to strengthen auditor independence. Turkey being the only exception, the disclosure of auditor fees is mandatory in all of the countries we analyze, but it became effective in different points in time. In its proposal from 2011, the Commission of the European Communities (2011b) suggested that audit firms disclose in their transparency reports their country-wide incomes (Art. 26 and 27), which was supported by the European Parliament and is now part of the current draft of the directive (Article 13), approved by the European Parliament on 3rd April 2014 (European Parliament 2014). This requirement already exists, for example, in Germany.³⁰

To predict the effects of auditor fee disclosure on market concentration, we would have to make assumptions regarding the signaling function of the fee level. More precisely, the effect depends on whether a high level of audit fees is regarded as an indicator for a high effort level (i.e., high audit fees are “good news” (Blankley et al. 2012)) or as a signal for disagreements between the audit firm and its client (i.e., high audit fees are “bad news” (Carcello et al. 1995; Geiger and Rama 2003)). In addition, an effect on audit market concentration only occurs if the interpretation of the fee level depends on audit firm size. Because there are also substantial switching costs that would have to outweigh the potential benefits derived from the signal, and the demand for non-audit services has also to be taken into account, we refrain from making any predictions regarding the effect of fee disclosures on supplier concentration or competition.

Overview of country-specific audit regulations

We collected the information about various audit regulations (and about all changes in the past decade) for a huge set of countries by sending questionnaires to the respective national audit oversight board. For the non-responding countries, we retrieved the information directly from the national laws and from the related amendments. In addition, we took information provided in Ewelt-Knauer et al. (2012), Ewert and London

³⁰ In Germany, audit firms have to publish the fees earned from providing statutory audits and other services to public-interest entities and to other clients in their annual transparency reports (§ 55c WPO).

Economics (2006), Le Vourc'h and Morand (2011), Quick et al. (2008), and Ratzinger-Sackel et al. (2012) which we double-checked with the specific legal requirements. Table 1.14 in the Appendix gives an overview of audit regulations effective in different countries, together with the relevant articles or the source of the information. We observe that the national audit markets are quite different with regard to their regulatory and legislative environment of financial reporting and auditing. There are also huge differences in the timing of the introduction of the regulations discussed during the last decade.

1.3 Supplier Concentration and Competition in the National Audit Markets

1.3.1 Sampling

To examine the effect of a country's audit regulation on its market concentration and competition, we focus on the segment of statutory audits of all companies listed in the respective country.³¹ One reason for restricting our analysis to a subset of the whole national audit market is the data availability. Moreover, in the majority of cases, the regulations we consider apply in particular to listed companies. The regulations contained in the EU Directive 2006/43/EC and in the recent proposal made by the Commission of the European Communities (2011b), for example, apply to auditors that carry out statutory audits of "public-interest entities", i.e., "*entities governed by the law of a Member State whose transferable securities are admitted to trading on a regulated market of any Member State within the meaning of point 14 of Art. 4(1) of Directive 2004/39/EC*" (European Parliament and European Council 2006a). The regulations introduced with the Sarbanes-Oxley Act of 2002 apply to "issuers" as defined in section 3 of the Securities Exchange Act of 1934.

We started sampling with data from 34 countries (all the 28 European countries available in the *Reuters Fundamentals* database as well as Australia, Brazil, Canada, Japan, the Korean Republic, and the United States) over the period 2001–2010. For each country and each year, we collected data from all publicly traded companies that were

³¹ Although there are large differences across the EU Member States regarding the size of companies that are subject to statutory audits (Directive 2006/46/EC of the European Parliament and European Council (2006b) and 4th Directive of the Council of the European Communities (1978)), for listed companies, auditing is mandatory in every EU Member State (Le Vourc'h and Morand 2011). The remaining countries included in our sample also prescribe statutory audits for listed companies.

listed on August 2nd, 2010. From the resulting 24,797 firms and the corresponding 247,970 firm-year observations, we excluded all 7,670 firm-years for which either a *ThomsonReuters* identification code or information on the company's home country was missing. For the remaining firm-years, we collected information about the company's industry, the accounting standard applied, the statutory auditor, and total assets. Because financial companies have specific characteristics with regard to financial reporting, and, in some countries, are subject to special audit regulations, we excluded 58,830 firm-years from this industry class (ICB Industry 8000). We lost additional 40,164 firm-years due to missing information on the audit firm or on total assets. Finally, we excluded observations from Bulgaria, Iceland, Liechtenstein, Lithuania, and Slovakia, because these countries had, on average, information on less than 10 firm-years and on less than 75 percent of the original firm-years from that country. For Iceland and Liechtenstein, we were also not able to gather all the information on audit regulation. Our final sample consists of 141,190 firm-year observations taken from 29 countries with a total of 2,439 audit firms. Based on this data, we constructed a sample with one observation per country and year, ending up with 290 country-year observations.

Table 1.1: Descriptive statistics - client firms

<i>country</i>	number of companies		percentage of companies taken into account		number of audit firms		total assets (TA) in Mio. U.S. \$		ln(TA) in Mio. U.S. \$		75%-quartile of audited mandates	
	<i>n</i>	<i>(sd)</i>	%	<i>(sd)</i>	<i>n</i>	<i>(sd)</i>	<i>mean</i>	<i>(sd)</i>	<i>mean</i>	<i>(sd)</i>	<i>p75</i>	<i>(sd)</i>
Australia	1,154	(341)	74%	(0.22)	79	(7.17)	433,297	(238,509)	18,441	(5,661)	7.7	(2.98)
Austria	55	(10)	80%	(0.14)	14	(2.27)	95,033	(41,696)	1,056	(179)	5.2	(1.76)
Belgium	85	(13)	76%	(0.12)	25	(3.39)	102,379	(28,284)	1,579	(218)	2.7	(1.64)
Brazil	220	(38)	81%	(0.14)	39	(10.88)	499,065	(356,670)	4,234	(742)	4.0	(3.73)
Canada	960	(180)	78%	(0.15)	85	(12.76)	768,516	(343,158)	16,370	(3,481)	4.1	(1.54)
Czech Rep.	14	(3)	86%	(0.21)	10	(1.79)	21,673	(14,964)	264	(69)	1.5	(0.44)
Denmark	103	(11)	88%	(0.10)	12	(2.88)	123,890	(52,628)	1,904	(216)	11.5	(5.89)
Estonia	7	(2)	79%	(0.20)	4	(0.85)	2,185	(1,820)	132	(38)	3.1	(1.76)
Finland	103	(5)	95%	(0.05)	12	(2.18)	187,250	(43,701)	1,983	(128)	18.2	(12.99)
France	520	(66)	79%	(0.10)	138	(31.37)	2,124,998	(642,062)	9,770	(1,222)	1.0	(0.00)
Germany	562	(72)	77%	(0.10)	129	(21.35)	2,119,535	(559,649)	10,386	(1,376)	1.9	(0.34)
Greece	230	(21)	92%	(0.09)	15	(1.42)	117,443	(41,119)	4,251	(455)	18.0	(3.6)
Hungary	18	(4)	71%	(0.17)	9	(3.47)	22,622	(8,729)	348	(78)	2.9	(1.10)
Ireland	41	(7)	72%	(0.13)	7	(0.97)	82,496	(25,604)	777	(142)	10.4	(1.76)
Italy	198	(29)	88%	(0.13)	13	(1.66)	795,263	(239,091)	3,940	(610)	28.9	(8.21)
Japan	3,060	(325)	90%	(0.10)	180	(8.20)	5,205,402	(995,837)	59,271	(6,312)	4.0	(1.07)
Korean Rep.	997	(59)	93%	(0.05)	63	(14.94)	1,149,817	(411,660)	18,706	(1,348)	10.5	(4.30)
Luxembourg	19	(3)	77%	(0.11)	9	(0.79)	114,719	(73,653)	382	(57)	3.1	(0.74)
Netherlands	112	(12)	87%	(0.09)	10	(1.91)	444,956	(171,316)	2,189	(241)	22.5	(3.15)
Norway	119	(25)	78%	(0.16)	10	(1.91)	196,390	(78,671)	2,263	(508)	19.9	(5.81)
Poland	226	(74)	76%	(0.25)	61	(16.96)	62,706	(31,588)	3,964	(1,330)	2.7	(0.88)
Portugal	44	(3)	87%	(0.05)	19	(2.67)	120,674	(45,667)	863	(69)	2.2	(0.34)
Slovenia	11	(1)	96%	(0.08)	4	(0.57)	11,194	(5,090)	215	(21)	4.0	(1.58)
Spain	93	(8)	92%	(0.08)	11	(0.94)	637,026	(299,373)	1,919	(202)	12.4	(2.48)
Sweden	270	(61)	74%	(0.17)	23	(5.62)	281,450	(82,057)	4,763	(1,064)	13.1	(13.30)
Switzerland	160	(13)	90%	(0.07)	13	(1.55)	480,116	(130,928)	3,164	(261)	14.5	(10.30)
Turkey	172	(16)	91%	(0.09)	28	(4.50)	96,155	(48,673)	3,238	(380)	5.4	(1.38)
U.K.	1,004	(220)	77%	(0.17)	70	(14.62)	1,915,295	(552,299)	17,964	(3,960)	6.1	(1.86)
U.S.	3,878	(500)	71%	(0.09)	261	(27.40)	10,013,496	(2,007,559)	68,472	(8,694)	3.8	(1.23)
EU[#]	3,726	(592)	80%	(0.13)	440	(77.63)	9,386,032	(2,871,411)	68,823	(11,168)	1.2	(0.42)

Note: This table shows the mean number of listed companies, listed companies taken into account as a percentage of all the listed companies within a country, number of audit firms active in the market of statutory audits for listed companies, total assets audited (in Mio. U.S. \$), natural logarithm of total assets audited (in Mio. U.S. \$), and 75%-quartile of audit firm size with respect to audit mandates (averages per country across 2001–2010); (EU[#]: EU-countries only).

For each country in our sample, Table 1.1 shows the average (2001–2010) of the number of listed companies included in the analysis, the percentage of listed companies from that country taken into account after excluding all companies with missing information, the number of audit firms, the total assets audited (in Mio. U.S. \$), the natural logarithm of the total assets audited, and the 75%-quartile of audit firm size when clients are used as a basis. The last row shows the values resulting if all EU Member States in our sample are regarded as one economic area. Table 1.1 also illustrates that there are some countries with only few observations, which is partially due to the size or the development of these countries' capital markets. In 2012, for example, in total still only 26 companies were listed on the Slovenian stock exchange. In addition, both the publication of accounting information in general and the availability of this information in *Reuters Fundamentals* are less restricted for countries with a well-developed capital market. Interestingly, the U.S. and the EU are rather similar regarding the mean number of companies and the mean total assets audited. However, the mean number of audit firms in the EU is 69 percent higher than in the U.S. Moreover, there are huge differences across the countries with respect to the size of the listed companies. In Australia, for example, on average 1,154 companies were listed, but the mean of total assets audited is 433,297 Mio. U.S. \$. Germany and France, in contrast, both have less than 600 listed companies, on average, but the mean of total assets audited exceeds 2,000,000 Mio. U.S. \$.

We calculated various measures for audit market concentration and competition for each of the 29 national audit markets in our sample and each year between 2001 and 2010. The fact that some large countries (e.g., Australia, Canada, Japan, the Korean Republic, the U.K., and the U.S.) are overrepresented in the sense of firm-year-observations naturally leads to a more precise value for these countries. However, all countries have the same weight in the regression analysis we provide in Section 4.

1.3.2 Measures for Audit Market Concentration and Competition

In a market with N suppliers i ($i = 1, \dots, n, \dots, N$), the concentration ratio CR_n as a measure for the *absolute* supplier concentration is defined as the sum of the n largest suppliers' market shares x_i , i.e., $CR_n = \sum_{i=1}^n x_i$. Whereas the concentration ratio only gives the punctual information about the combined market share of the n largest suppliers, the *Hirschmann-Herfindahl-index* (HHI) takes into account the inequality of the

distribution of market shares among *all* suppliers (*relative* concentration). The *HHI* is calculated by summing up the squared market share of each supplier active in the market (i.e., $HHI = \sum_{i=1}^N x_i^2$). Both the CR_n and the *HHI* are frequently used in the literature on audit market concentration, and the Organisation for Economic Co-Operation and Development (1993) also uses both measures to evaluate mergers and acquisitions.³² Moreover, the industrial organizations literature suggests that the asymmetry of the market share distribution among the dominating firms, in addition to the absolute concentration, can affect competition (Schmalensee 1989; Willis and Rogers 1998). For the audit market, there is also empirical evidence suggesting that large differences between the combined market shares of the dominating firms and the next largest firm lead to a price premium (Mayhew and Wilkins 2003), and that a high degree of relative concentration might be more problematic for audit quality than a high market share of the Big 4 (Kallapur et al. 2010; Francis et al. 2013).

Because the information on audit fees is not available for all countries over the entire time period we investigate, we use the number of audit clients M to determine the market share of audit firm i , i.e., $x_i^M = M_i / \sum_{i=1}^N M_i$. However, concentration measures based on the number of audit clients are likely to underestimate a country's audit market concentration, because the market leaders frequently audit large companies. Thus, we also use the natural logarithm of the total assets (TA) of an audit firms' clients as a basis for determining our market share measures, i.e., $x_i^{TA} = \ln(TA)_i / \sum_{i=1}^N \ln(TA)_i$. The literature on audit pricing has documented that TA explains about 70 percent of the variation in audit fees across clients (Hay et al. 2006b), and therefore concentration measures based on $\ln(TA)$ can serve as a proxy for concentration measures based on audit fees.

New regulations often cause an increase in audit firms' direct and indirect audit costs and/or in audit firms' profits per client, and thus can lead to a crowding out of (in particular small) audit firms. Therefore, we also investigate the number of audit firms active in the segment we consider, and use the auditor-client-ratio (AC_R) as a measure

³² The German Federal Cartel Office (§§ 19 (3) and 36 (1) of the German Act Against Restraints of Competition (Gesetz gegen Wettbewerbsbeschränkungen) relies more on the concentration ratio, whereas in the U.S., the *HHI* is usually taken as a basis (U.S. Department of Justice and the Federal Trade Commission 2010, 5.3).

for the competition within a national audit market. To control for random fluctuations in the number of audit clients due to data availability, we calculate AC_R by dividing the number of audit firms N_t that in year t ($t = 2001, \dots, 2010$) provide audit services in the respective country by the average number of listed audit clients M in the country

over the years 2001–2010, i.e., $AC_R_t = N_t / \left(0.1 \cdot \sum_{t=2001}^{t=2010} M_t \right)$. As an additional measure

for the competition within a country's audit market, for every year from 2001–2010, we use the mobility of the market shares (MOB) between the audit firms i that are active in the market segment we consider. Buijink et al. (1998) were the first to apply this measure to audit market data. MOB_t is calculated by summing up, for every audit firm i and every year t ($t = 2002, \dots, 2010$), the absolute difference between the market share in

year t and the market share in the base year 2001, i.e., $MOB_t = \left(\sum_{i=1}^N |x_{it} - x_{i2001}| \right) / 2$ with

$MOB_t \in [0;1]$, where N is the total number of audit firms continually active in the market and x_{it} is the market share of audit firm i in year t , based on either the number of audit clients or on the natural logarithm of the total assets audited. Higher values for MOB indicate a higher mobility of the market shares and thus a higher degree of competition. Because data on audit fees is not available over the entire time period we investigate, we cannot use the level or the development of audit fees as a competition measure.³³

Because the HHI decreases as the number of suppliers N increases, the values for the HHI and the AC_R should be negatively correlated. Moreover, changes in the market shares (of the four largest suppliers) affect both the HHI and the MOB (and the CR_4), i.e., these metrics should be positively correlated. Table 1.2 shows the *Spearman* and *Pearson* correlation coefficients between our concentration and competition metrics. The values indicate that there are substantial positive correlations between $CR_4(M)$, $CR_4(\ln(TA))$, $HHI(M)$, and $HHI(\ln(TA))$, respectively, but that AC_R and MOB are rather weakly (although partly significantly) correlated to these metrics. Thus, a low number of audit firms does not necessarily indicate that the four largest

³³ From the 141,490 observations our regressions are based on, we would lose 80,739 observations due to missing fee data. Fee data is missing in particular for the years prior to 2006. However, the exclusion of the years 2001–2006 would have the effect that we would have to exclude those regulations from our analysis that remained constant during the remaining period.

suppliers have a significantly higher market share or that the market shares are highly asymmetrically distributed (and *vice versa*). Furthermore, it seems that a high absolute concentration and a highly asymmetric market share distribution do not affect the market share mobility to a large extent. Thus, our metrics measure different aspects of a national audit market's concentration and competition.

Table 1.2: Correlation coefficients - concentration and competition measures

		Spearman correlation						
		$CR_4(M)$	$CR_4(\ln(TA))$	$HHI(M)$	$HHI(\ln(TA))$	AC_R	$MOB(M)$	$MOB(\ln(TA))$
Pearson correlation	$CR_4(M)$	1	0.9956 *	0.9582 *	0.9586 *	-0.0831	0.0378	0.0024
	$CR_4(\ln(TA))$	0.9962 *	1	0.9479 *	0.954 *	-0.082	0.0311	0.0014
	$HHI(M)$	0.9049 *	0.8917 *	1	0.9963 *	-0.0094	0.0679	0.0281
	$HHI(\ln(TA))$	0.909 *	0.9005 *	0.9978 *	1	-0.0049	0.0688	0.0365
	AC_R	-0.149 *	-0.144 *	-0.0203	-0.0241	1	0.0292	0.179 *
	$MOB(M)$	0.0468	0.0351	0.1655 *	0.1585 *	-0.0134	1	0.8621 *
	$MOB(\ln(TA))$	0.0124	0.0091	0.1337 *	0.1348 *	0.1563 *	0.8586 *	1

Note: This table shows *Spearman* and *Pearson* correlation coefficients between our yearly concentration metrics $CR_4(M)$, $CR_4(\ln(TA))$, $HHI(M)$, $HHI(\ln(TA))$, AC_R , $MOB(M)$, and $MOB(\ln(TA))$. * indicates significance at the 5% level.

Table 1.3 gives an overview of our competition and concentration metrics at the country-level. In order to correctly interpret whether the values obtained for $CR_{4,t}$ are indeed an indicator for a high level of absolute supplier concentration, i.e., whether the four largest suppliers together have an over-proportionately high market share, the number of suppliers actually active in the respective market segment has to be taken into account. Thus, we applied the test proposed by Parker (1991) to the country-specific values obtained for $CR_{4,t}$. Columns *, **, and *** of Table 1.3 denote the number of years for which $CR_{4,t}$ is significant at the 10, 5, and 1 percent level, respectively. The columns + and ++ show the number of years for which, according to the benchmarks provided for in the EU legislation (see Table 1.4, last column), the country-specific values obtained for HHI_t are regarded as an indicator for a moderately concentrated market (i.e., $0.10 \leq HHI_t \leq 0.20$) and a highly concentrated market (i.e., $HHI_t > 0.20$), respectively. The last three columns of Table 1.3 show the results for the auditor-client ratios and the market share mobility measures.

Table 1.3: Concentration and competition measures for each country

country	$CR_4(M)$			$CR_4(In(TA))$			HHI(M)			HHI(In(TA))			AC_R		MOB(M)		MOB(In(TA))					
	value	(sd)		***	**	*	value	(sd)		***	**	*	value	(sd)	++	+	value	(sd)	value	(sd)		
Australia	0.47	(0.05)	0	0	0	0	0.50	(0.05)	0	0	10	0.077	(0.01)	0	0	0	0.07	(0.01)	0.15	(0.05)	0.15	(0.05)
Austria	0.73	(0.05)	3	4	1	0	0.73	(0.05)	2	5	0	0.188	(0.02)	8	2	0	0.26	(0.04)	0.12	(0.03)	0.12	(0.03)
Belgium	0.61	(0.05)	1	0	9	0	0.63	(0.04)	0	2	8	0.119	(0.02)	10	0	0	0.30	(0.04)	0.12	(0.03)	0.13	(0.04)
Brazil	0.66	(0.05)	0	0	10	0	0.68	(0.05)	0	0	10	0.134	(0.02)	10	0	0	0.18	(0.05)	0.15	(0.04)	0.15	(0.04)
Canada	0.68	(0.03)	0	0	10	0	0.72	(0.03)	0	0	10	0.128	(0.01)	10	0	0	0.09	(0.01)	0.05	(0.02)	0.06	(0.02)
Czech Republic	0.56	(0.04)	0	0	0	0	0.59	(0.04)	0	0	0	0.130	(0.02)	10	0	0	0.74	(0.13)	0.09	(0.04)	0.08	(0.03)
Denmark	0.83	(0.05)	0	3	5	0	0.85	(0.05)	0	2	6	0.216	(0.03)	4	6	0	0.12	(0.03)	0.13	(0.08)	0.14	(0.08)
Estonia	1.00	(0.00)	-	-	-	-	1.00	(0.00)	-	-	-	0.373	(0.11)	0	10	0	0.49	(0.12)	0.17	(0.07)	0.17	(0.07)
Finland	0.91	(0.03)	0	0	10	0	0.91	(0.03)	0	0	10	0.278	(0.01)	0	10	0	0.12	(0.02)	0.10	(0.05)	0.10	(0.05)
France	0.58	(0.05)	0	0	10	0	0.61	(0.05)	0	0	10	0.097	(0.02)	3	0	0	0.27	(0.06)	0.07	(0.03)	0.07	(0.03)
Germany	0.53	(0.03)	0	0	10	0	0.55	(0.03)	0	0	10	0.084	(0.01)	1	0	0	0.23	(0.04)	0.07	(0.03)	0.10	(0.02)
Greece	0.72	(0.05)	1	3	2	0	0.72	(0.05)	1	2	2	0.219	(0.05)	6	4	0	0.06	(0.01)	0.10	(0.02)	0.16	(0.05)
Hungary	0.73	(0.12)	0	0	0	0	0.76	(0.11)	0	0	0	0.174	(0.05)	6	4	0	0.51	(0.19)	0.17	(0.05)	0.12	(0.03)
Ireland	0.91	(0.03)	0	0	0	0	0.91	(0.03)	0	0	0	0.257	(0.03)	0	10	0	0.16	(0.02)	0.11	(0.02)	0.10	(0.03)
Italy	0.86	(0.03)	0	1	9	0	0.87	(0.03)	0	1	9	0.209	(0.02)	3	7	0	0.07	(0.01)	0.10	(0.03)	0.11	(0.01)
Japan	0.79	(0.04)	0	0	10	0	0.79	(0.04)	0	0	10	0.171	(0.01)	10	0	0	0.06	(0.00)	0.11	(0.01)	0.14	(0.08)
Korean Republic	0.59	(0.05)	0	0	10	0	0.60	(0.05)	0	0	10	0.107	(0.01)	9	0	0	0.06	(0.01)	0.14	(0.07)	0.14	(0.07)
Luxembourg	0.72	(0.07)	0	0	0	0	0.75	(0.07)	0	0	0	0.168	(0.02)	9	1	0	0.46	(0.04)	0.15	(0.08)	0.07	(0.03)
Netherlands	0.87	(0.03)	1	2	3	0	0.89	(0.03)	1	0	5	0.205	(0.01)	4	6	0	0.09	(0.02)	0.07	(0.03)	0.11	(0.02)
Norway	0.91	(0.03)	1	1	7	0	0.92	(0.03)	1	1	7	0.264	(0.03)	1	9	0	0.08	(0.02)	0.11	(0.02)	0.16	(0.02)
Poland	0.42	(0.06)	0	0	10	0	0.42	(0.06)	0	0	10	0.064	(0.01)	0	0	0	0.27	(0.07)	0.14	(0.03)	0.14	(0.03)
Portugal	0.62	(0.12)	0	7	0	0	0.64	(0.11)	0	5	2	0.161	(0.06)	7	1	0	0.43	(0.06)	0.18	(0.04)	0.18	(0.04)
Slovenia	0.99	(0.03)	0	0	0	0	0.99	(0.03)	0	0	0	0.330	(0.07)	0	10	0	0.37	(0.05)	0.13	(0.07)	0.13	(0.07)
Spain	0.89	(0.02)	0	0	10	0	0.90	(0.02)	0	1	9	0.257	(0.01)	0	10	0	0.12	(0.01)	0.24	(0.01)	0.23	(0.01)
Sweden	0.82	(0.04)	0	0	10	0	0.83	(0.04)	0	0	10	0.204	(0.02)	7	3	0	0.09	(0.02)	0.07	(0.02)	0.06	(0.02)
Switzerland	0.90	(0.01)	0	1	9	0	0.91	(0.01)	0	0	10	0.262	(0.01)	0	10	0	0.08	(0.01)	0.05	(0.02)	0.05	(0.02)
Turkey	0.59	(0.03)	0	1	8	0	0.59	(0.03)	0	1	8	0.115	(0.01)	10	0	0	0.16	(0.03)	0.10	(0.04)	0.10	(0.04)
United Kingdom	0.58	(0.04)	0	0	10	0	0.61	(0.04)	0	0	10	0.105	(0.01)	5	0	0	0.07	(0.01)	0.14	(0.04)	0.15	(0.04)
United States	0.62	(0.06)	0	0	10	0	0.68	(0.05)	0	0	10	0.106	(0.02)	6	0	0	0.07	(0.01)	0.10	(0.01)	0.09	(0.02)
EU [#]	0.59	(0.02)	0	0	10	0	0.62	(0.02)	0	0	10	0.097	(0.01)	3	0	0	0.12	(0.02)	0.10	(0.03)	0.10	(0.02)

Note: Mean concentration ratios CR_4 , *Hirschmann-Herfindahl*-indices HHI , auditor-client ratios AC_R , and market share mobility measures (MOB). The columns *, **, and *** indicate the number of years for which CR_4 is significant at the 10, 5, and 1 percent level according to the test proposed by Parker (1991). For -, the number of auditors was insufficient to calculate significance levels. Columns + and ++ denote the number of years for which the HHI , due to EU-legislation, indicates a moderately concentrated market and a highly concentrated market, respectively. (EU[#]: only EU-countries).

Table 1.4: Critical values for the *Hirschmann-Herfindahl-index HHI*

	U.S.	U.S. since 2010 ³⁴	European Legislation ³⁵
no concentrated market	$HHI < 0.15$	$HHI < 0.10$	$HHI < 0.10$
moderately concentrated market	$0.15 \leq HHI \leq 0.25$	$0.10 \leq HHI \leq 0.18$	$0.10 \leq HHI \leq 0.20$
highly concentrated market	$HHI > 0.25$	$HHI > 0.18$	$HHI > 0.20$

Note: Critical values for the *Hirschmann-Herfindahl-index HHI* according to the legislation in the European Union and in the United States

Table 1.3 confirms that nearly half of the countries in our sample are characterized by a dominating position of the four biggest audit firms or networks.³⁶ For Australia, Brazil, Canada, Finland, France, Germany, Japan, the Korean Republic, Poland, Sweden, the U.K., and the U.S., all 10 year-observations for $CR_{n,t}(ln(TA))$ and even for $CR_{n,t}(M)$ are highly significant. For the Czech Republic, Hungary, Ireland, Luxembourg, and Slovenia, in contrast, the test of Parker (1991) does not point to a significant level of absolute supplier concentration in even one of the 10 years. Moreover, countries like Ireland, Slovenia, Spain, and Switzerland are characterized by highly asymmetrical distributions of audit firms' market shares. For these countries, all 10 values derived for $HHI_t(M)$ and for $HHI_t(ln(TA))$ are above the critical threshold defining a highly concentrated market. In Australia, France, Germany, and Poland, in contrast, the relative supplier concentration seems comparably low. 100 clients hire, on average, fewer than 10 audit firms in Australia, Canada, Greece, Italy, Japan, the Korean Republic, the Netherlands, Norway, Sweden, Switzerland, the United Kingdom, and in the United States, whereas in the Czech Republic, Estonia, Hungary, Luxembourg, and Portugal, 100 clients hire more than 40 audit firms, on average. Taken together, the overall assessment of supplier concentration within a country depends on the concentration measure applied as well as on the basis used to determine audit firms' market shares. Based on our results, the national audit markets of Finland, Italy, Spain, Sweden, and Switzerland seem to be particularly concentrated, whereas the markets of the Czech Republic,

³⁴ See U.S. Department of Justice and the Federal Trade Commission (2010).

³⁵ See Commission of the European Communities (2004), recitals 19-21.

³⁶ Note that the Big 4 audit networks are not necessarily the market leaders within in each country. In some countries, *BDO* is the number four (Australia and Belgium) or even the number one (Poland). *Grand Thornton* is on rank four in some countries (Denmark, U.K.). Furthermore, there are countries in which national audit networks have large market shares (Greece, Portugal). Nevertheless, except from Greece and Poland, one of the Big 4 audit networks is the market leader, and the remaining Big 4 still play a major role.

Hungary, Luxembourg, and Slovenia show a rather low degree of supplier concentration. Although the four largest audit firms have a considerable market share in France, there is a comparatively low level of relative concentration, and the mean auditor-client-ratio is rather high. This result is in line with Oxera Consulting Ltd. (2007), showing that concentration in France is comparably low, but in contrast to Piot (2007) and Bédard et al. (2012), documenting that concentration in France is lower than in the U.K.

The values for *MOB* indicate that the audit markets of Canada and Switzerland are rather static. Estonia, Hungary, Portugal, and Spain, in contrast, show a high transfer of market shares between the audit firms. Based on our results contained in Table 1.2, however, there is not necessarily a correlation between a high market concentration and low level of competition. For example, Denmark, Norway, and Spain have rather highly concentrated audit markets, but also a comparably high market share mobility, whereas the opposite is true for the Czech Republic, France, and Germany.

The sample period and the definition of the relevant market aggravate the comparison of our results with those provided in the literature.³⁷ Nevertheless, Le Vourc'h and Morand (2011) found similar values of $CR_{4,2009}(M)$ and $HHI_{2009}(M)$ for Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain. The values of $CR_{4,2009}(M)$ and $HHI_{2009}(M)$ for the Czech Republic, Hungary, Poland, Slovenia, Sweden, and the U.K. reported in Le Vourc'h and Morand (2011) are slightly different from ours, and their $HHI_{2009}(M)$ for Greece is lower. The measure *MOB* has only been used in a few studies so far. Buijink et al. (1998) compared the Dutch and German audit markets for the periods between 1970 and 1994 based on *MOB*. In line with their results, our data show an increase of *MOB* for the Dutch market over time, but in contrast to their study, we found rather stable

³⁷ Huber (2011) also gives an overview about country-specific levels of concentration, but focuses on audits of listed companies with FTSE 350 equivalent market cap and of listed companies with a market cap exceeding 100 Mio. £. Thus, the numbers of companies taken into account (the values for the concentration ratio) are lower (considerably higher) than in our study. Moreover, there is no indication which basis is used to determine the market shares. The sample of Francis et al. (2013) drawn from *Global Vantage* contains 55,408 firm-year observations from larger listed companies of 42 countries for the time period 1999-2007, and thus the results are not comparable to ours. Because Ewert and London Economics (2006) use either only companies from the main index of a country's main national stock exchange, and in another overview for some countries a different sample composition (only FTSE 350 for the U.K.), their results are only partially comparable to ours. For the country samples matching ours, their results are qualitatively similar.

values for Germany. However, our values are higher for both countries than those reported in Buijink et al. (1998).

The existence of substantial country-differences regarding the level of audit market concentration could be partially due to the economic development of a country. In the Czech Republic, for example, consolidation activity over 1998-2011 was low, which could explain the comparatively low concentration level. In Slovenia, statutory audits have been introduced only in 1994/1995, and there are still only few certified public accountants. Thus, the absolute concentration is not significant if the number of audit firms is taken into account, but nevertheless all the values for the *HHI*_{*t*} indicate a highly concentrated market. Another reason for the country-differences we observe could be seen in traditional aspects. In Switzerland, for example, audit firms developed primarily from the banking sector, so concentration is rather high. For France, the lower level of relative supplier concentration could be explained by the strong performance of the *Mazars Group*. In the present paper, the focus is on differences in legislation and audit regulation as an explanation for country-differences in concentration. For example, joint audits in France and limited auditors' liability in Belgium and in Germany have been regarded as factors decreasing the concentration levels in these countries (Le Vourc'h and Morand 2011). However, Greece and Slovenia also have a limited auditor liability, but a considerably higher concentration than Belgium and Germany. Therefore, a detailed analysis of each rule and of possibly existing interdependencies between the audit regulations is needed to shed more light on the effects of various regulations.

1.3.3 Variables for Audit Regulation and Country-Specific Characteristics

To address the question whether there is a connection between audit market regulations and our measures of supplier concentration and competition, we use the information about the regulations contained in Table 1.14. More precisely, we use country-specific dummy variables for each year between 2001 and 2010 that indicate whether a certain regulation has been effective:

EU_Dir_06 takes on the value of 1 if a country had fully adopted the Directive on Statutory Audits (2006/43/EC) at the beginning of year *t*. We took the information needed to construct *EU_Dir_06* from the reports provided by the Commission of the European Communities (2010b). For those 12 EU Member States that had already fully completed the implementation process before the first Scoreboard Letter had been pub-

lished on July 31st, 2008, we assumed that the Directive had been fully adopted in 2008. *Liab_Cap* and *Liab_Reg* both refer to statutory auditors' legal liability. *Liab_Cap* is coded 1 if a law providing for an upper limit of the auditor's liability was effective within a country in year t . Examples for such a "liability cap" are that liability is restricted to a multiple of the audit fees earned from a client or to a fixed amount of money. *Liab_Reg* takes on the value of 1 if the proportionate liability rule was effective in the country in year t . Information about the liability regime was mainly taken from Ewert and London Economics (2006) and updated if changes in a country's law were made before 2006 or by the end of 2010. The variables *NAS_const* and *NAS_forb* both describe a country's regulation regarding the joint provision of audit and non-audit services. *NAS_const* is coded 1 if the scope of non-audit services statutory auditors are allowed to provide to their audit clients was restricted in year t . Non-audit-services were assumed to be constraint when a regulation was effective that exceeded the provisions contained in the Statutory Audit Directive (Art. 22 and Art. 24) or in the *International Standards on Auditing (ISA)* (*ISA* 220 Para. 11, *ISA* 260 Para. 17, *ISA* 260 Para. A. 21 and A. 22). We define services such as bookkeeping as being subject to a self-review-threat, and consequently do not classify their prohibition as an explicit constraint.³⁸ *NAS_forb* is 1 if the joint supply of audit and non-audit services was entirely forbidden in year t , i.e., if according to the independence requirements laid down in the specific national law, statutory auditors were not allowed to provide services other than the audit to their audit clients. In addition, we use the dummy variable *Fee_Cap* to take into account whether the country's law contains an explicit constraint regarding the total fees the statutory auditor is allowed to earn from a single client.³⁹ Rules stating that a client's fees should not exceed an (unspecified) critical threshold in order to avoid independence concerns were not treated as a fee cap. *Joint_man* takes on the value of 1 if joint audits were mandatory in the country in year t . The variables *Part_Rot* and *Firm_Rot* both refer to the rules regarding auditor rotation effective in a country in year t . *Part_Rot* (*Firm_Rot*) is coded 1 if a rotation of the key audit partner (a rotation of the audit firm) after a certain time span was mandatory in year t . We coded these dummy variables as 1

³⁸ For example, we did not define Finland's restrictions on the provision of non-audit services as a constraint. Section 25 (1), 2 "Disqualification of an auditor" of the Auditing Act from 2007 defines "the auditor is responsible for the preparation of the accounting records or for the management of assets or for the supervision of either activity in the corporation or foundation" as a reason for exclusion.

³⁹ As an example, the German Commercial Code (Handelsgesetzbuch) (§ 319 Abs. 3 Nr. 5 HGB) states that auditors are not allowed to perform the statutory audit for a company from which they have earned more than 30 percent of their total revenues during the last five years, and if this is expected to be the case also for the current fiscal year.

at the point in time when the respective law became effective, not only when the first mandatory changes occurred. *Fee_Disc* is coded 1 if in year t companies had to publicly disclose their fees for audit and non-audit services in their annual reports (due to the law, the corporate governance codex, or the stock exchange rules effective in a country).

We include additional metrics as controls. First, we consider two measures of financial market development because there seems to be an association with earnings quality (Leuz et al. 2003), and therefore also a possible connection to a client's propensity to choose a large audit firm. We measure a country's yearly level of financial market development with *Market_Cap* taken from the *World Bank*, i.e., the country's market capitalization in percent of its *GDP*, where the market capitalization is the share price of the domestically incorporated companies listed on the country's stock exchanges at the end of the year, times the number of shares outstanding.⁴⁰ *FDI*, a yearly metric also taken from the *World Bank*, measures the foreign direct investment of a country, i.e., the net inflows of investment (new investment inflows less disinvestment) to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments, divided by the *GDP*.⁴¹ We assume that higher values of *FDI* are positively associated with the share of international investors that might have an influence on the choice of the audit firm (Choi and Wong 2007). Because of the global structure of the international audit networks and the resulting economies of scale, the complexity of the accounting rules applied within a country and the audit firms' capability to react to a change of the accounting standards might also affect the market share of the largest audit firms. We therefore include the variable *IFRS_Share*, which measures the percentage of firms within a country that prepared financial statements on the basis of the *International Financial Reporting Standards (IAS/IFRS)* in year t .⁴² *Gov_Eff* is the measure "Government Effectiveness" taken from Kaufmann et al. (2012) and is updated for every year of our sample. It "captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the govern-

⁴⁰ See <http://data.worldbank.org/indicator/CM.MKT.LCAP.GD.ZS>.

⁴¹ See <http://data.worldbank.org/indicator/BX.KLT.DINV.WD.GD.ZS>.

⁴² Although Australia kept its local accounting standards, there was a major change in the accounting system towards the International Financial Reporting Standards IFRS for all annual reports prepared on or after June 2006.

ment's commitment to such policies". *Gov_Eff* ranges from -2.5 to 2.5, with higher values corresponding to better governance.⁴³ We include this variable because the role of accounting and the choice of the audit firm might be connected to the strength of the legal environment. In weak legal environments, the audit firm can serve as a partial substitute for the legal protection of outside shareholders and increase the demand for high quality audits (Choi and Wong 2007). On the other hand, a weak legal system may fail to credibly impose sanctions in the case of failures, and thus decrease the demand for high quality audits (Francis et al. 2003). Table 1.5 gives an overview of the definitions of our variables.

For 15.52 percent of our 290 country-year observations, the Directive on Statutory Audits was implemented. 16.55 percent of our observations had a liability cap, and 12.76 percent had the proportionate liability system. Thus, for 70.69 percent of our country-year observations, there was no restriction regarding auditors' liability. In 58.28 percent of the cases, there was no constraint regarding the scope of services statutory auditors were allowed to provide to their audit clients. For 28.62 percent of the observations, the supply of certain non-audit services was forbidden, and for 13.10 percent, the joint provision of audit and non-audit services was entirely forbidden. 17.24 percent of the observations are characterized by a restriction regarding the total fees audit firms are allowed to earn from one single client. Joint audits were mandatory for only 4.83 percent of our observations. Audit partner rotation was mandatory for 44.14 percent of our country-years, and for 11.38 percent of our observations, the audit firm rotation was effective. For 59.66 percent of our observations, the disclosure of audit fees was mandatory. Table 1.6 summarizes the number of countries where a specific regulation was effective and the number of changes in the regulations for each year. For all countries in our sample, Table 1.7 shows the mean and the standard deviation (over the years 2001–2010) for our yearly country-specific control variables.

⁴³ Note that the values for *Gov_Eff* were missing for the year 2001. We approximated the country-values for 2001 by taking the average of the years 2000 and 2002.

Table 1.5: Variable description**Dependent variables**

- AC_R = number of audit firms active on the audit market of a country in year t , divided by the mean number of listed companies within a country (average across years 2001–2010);
- $CR_4(M)$ = combined market share (based on the number of audit clients) of the four largest audit firms in year t within a country;
- $CR_4(\ln(TA))$ = combined market share (based on the natural logarithm of total assets audited) of the four largest audit firms in year t within a country;
- $HHI(M)$ = *Hirschmann-Herfindahl*-index for a country in year t , based on the number of audit clients;
- $HHI(\ln(TA))$ = *Hirschmann-Herfindahl*-index for a country in year t , based on the natural logarithm of the total assets audited;
- $MOB(M)$ = absolute sum of the differences for all audit firms between the market share in each year $t = 2002, \dots, 2010$ and the market share in the base year 2001, divided by two. Market shares are based on the number of audit clients;
- $MOB(\ln(TA))$ = absolute sum of the differences for all audit firms between the market share in each year $t = 2002, \dots, 2010$ and the market share in the base year 2001, divided by two. Market shares are based on the natural logarithm of the total assets audited;

Explanatory variables

- EU_Dir_06 = dummy variable coded 1 when the EU Directive (2006/43/EC) was fully adopted at the beginning of year t , 0 otherwise;
- Fee_Cap = dummy variable coded 1 when in year t there was an upper limit for the total fees earned from a single client, 0 otherwise;
- Fee_Disc = dummy variable coded 1 when in year t companies had to disclose their auditor fees in their annual report, 0 otherwise;
- $Firm_Rot$ = dummy variable coded 1 when audit firm rotation was mandatory in year t , 0 otherwise;
- $Joint_man$ = dummy variable coded 1 when joint audits were mandatory in year t , 0 otherwise;
- $Liab_Cap$ = dummy variable coded 1 when there was an upper limit for an audit firm's liability in year t , 0 otherwise;
- $Liab_Reg$ = dummy variable coded 1 when there was a proportionate liability for audit firms in year t , 0 otherwise;
- NAS_const = dummy variable coded 1 when the scope of non-audit services statutory auditors are allowed to provide to their audit clients was restricted in year t , 0 otherwise;
- NAS_forb = dummy variable coded 1 when the joint supply of audit and non-audit service was entirely forbidden in year t , 0 otherwise;
- $Part_Rot$ = dummy variable coded 1 when audit partner rotation was mandatory in year t , 0 otherwise;

Table 1.5 (continued)

Controls

FDI = net inflow (new investment inflows less disinvestment) of foreign investors in percentage of the *GDP* in year *t*;

Gov_Eff = the yearly measure “Government Effectiveness” taken from (Kaufmann et al. 2012);

IFRS_Share = share of firms within a country that prepared financial statements on the basis of the *IFRS* in year *t*;

Market_Cap = market capitalization of all companies listed on a country’s stock exchange in percent of the country’s *GDP* in year *t*;

Year_t = dummy variable coded 1 if year is *t* = 2001, ..., 2010; 0 otherwise;

Note: Dependent variables, explanatory variables, and controls used in our study.

Table 1.6: Number of countries in which the specific regulations are effective

<i>Panel A: Countries in which the regulations are effective</i>											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	<i>In % of all country-years</i>
<i>EU_Dir_06</i>	0	0	0	0	0	0	0	8	17	20	15.52%
<i>Liab_Cap</i>	4	4	4	4	4	5	5	5	6	7	16.55%
<i>Liab_Reg</i>	3	3	3	4	4	4	4	4	4	4	12.76%
<i>NAS_const</i>	2	2	4	6	10	11	11	11	13	13	28.62%
<i>NAS_forb</i>	3	3	4	4	4	4	4	4	4	4	13.10%
<i>Fee_Cap</i>	2	2	3	3	5	5	5	7	9	9	17.24%
<i>Joint_man</i>	2	2	2	2	1	1	1	1	1	1	4.83%
<i>Part_Rot</i>	2	2	7	9	12	12	14	18	25	27	44.14%
<i>Firm_Rot</i>	2	2	4	4	4	4	4	3	3	3	11.38%
<i>Fee_Disc</i>	7	9	13	15	16	17	19	22	26	28	59.31%

<i>Panel B: Number of changes in the regulations we consider</i>											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	<i>Total number of changes</i>
<i>EU_Dir_06</i>	0	0	0	0	0	0	0	8	9	3	20
<i>Liab_Cap</i>	0	0	0	0	0	1	0	0	1	1	3
<i>Liab_Reg</i>	1	0	0	1	0	0	0	0	0	0	2
<i>NAS_const</i>	0	0	2	2	4	1	0	0	2	0	11
<i>NAS_forb</i>	0	0	1	0	0	0	0	0	0	0	1
<i>Fee_Cap</i>	0	0	1	0	2	0	0	2	2	0	7
<i>Joint_man</i>	0	0	0	0	1	0	0	0	0	0	1
<i>Part_Rot</i>	1	0	5	2	3	0	2	4	7	2	26
<i>Firm_Rot</i>	0	0	2	0	0	0	0	1	0	0	3
<i>Fee_Disc</i>	1	2	4	2	1	1	2	3	4	2	22

Note: Number of countries in which the specific regulations are effective in each observed year, and the number of changes in the specific regulations during the sample period.

Table 1.7: Descriptive statistics - control variables

<i>country</i>	<i>Market_Cap</i>		<i>FDI</i>		<i>IFRS_Share</i>		<i>Gov_Eff</i>	
	<i>value</i>	<i>(sd)</i>	<i>value</i>	<i>(sd)</i>	<i>value</i>	<i>(sd)</i>	<i>value</i>	<i>(sd)</i>
Australia	1.19	(0.26)	0.03	(0.03)	0.50	(0.52)	1.80	(0.09)
Austria	0.29	(0.19)	0.05	(0.10)	0.80	(0.18)	1.85	(0.10)
Belgium	0.66	(0.19)	0.15	(0.09)	0.58	(0.37)	1.73	(0.19)
Brazil	0.55	(0.23)	0.02	(0.01)	0.10	(0.28)	0.01	(0.09)
Canada	1.15	(0.27)	0.03	(0.02)	0.00	(0.00)	1.89	(0.07)
Czech Republic	0.26	(0.08)	0.05	(0.03)	0.67	(0.43)	0.95	(0.07)
Denmark	0.63	(0.16)	0.01	(0.03)	0.53	(0.40)	2.20	(0.10)
Estonia	0.27	(0.13)	0.10	(0.05)	0.89	(0.24)	1.01	(0.18)
Finland	0.99	(0.49)	0.03	(0.02)	0.63	(0.47)	2.17	(0.09)
France	0.81	(0.17)	0.03	(0.01)	0.46	(0.39)	1.61	(0.13)
Germany	0.45	(0.19)	0.01	(0.01)	0.62	(0.25)	1.62	(0.12)
Greece	0.51	(0.23)	0.01	(0.01)	0.57	(0.48)	0.69	(0.09)
Hungary	0.24	(0.08)	0.12	(0.23)	0.79	(0.13)	0.86	(0.13)
Ireland	0.47	(0.23)	0.05	(0.12)	0.52	(0.41)	1.57	(0.15)
Italy	0.38	(0.15)	0.01	(0.01)	0.60	(0.47)	0.60	(0.19)
Japan	0.78	(0.29)	0.00	(0.00)	0.00	(0.00)	1.36	(0.15)
Korean Republic	0.74	(0.26)	0.00	(0.00)	0.01	(0.01)	1.04	(0.13)
Luxembourg	1.65	(0.65)	3.46	(1.01)	0.73	(0.25)	1.80	(0.17)
Netherlands	0.91	(0.23)	0.05	(0.06)	0.54	(0.40)	1.89	(0.15)
Norway	0.56	(0.21)	0.02	(0.01)	0.58	(0.48)	1.91	(0.11)
Poland	0.29	(0.13)	0.03	(0.01)	0.49	(0.35)	0.52	(0.08)
Portugal	0.39	(0.09)	0.02	(0.02)	0.57	(0.45)	1.04	(0.13)
Slovenia	0.27	(0.14)	0.02	(0.02)	0.63	(0.44)	1.01	(0.11)
Spain	0.87	(0.19)	0.03	(0.02)	0.57	(0.45)	1.31	(0.43)
Sweden	1.04	(0.28)	0.04	(0.03)	0.49	(0.38)	1.99	(0.08)
Switzerland	2.37	(0.41)	0.04	(0.03)	0.67	(0.12)	2.00	(0.10)
Turkey	0.29	(0.19)	0.02	(0.01)	0.69	(0.41)	0.17	(0.13)
United Kingdom	1.29	(0.23)	0.04	(0.02)	0.46	(0.42)	1.72	(0.12)
United States	1.24	(0.29)	0.01	(0.01)	0.00	(0.00)	1.60	(0.13)

Note: Descriptive statistics for the control variables. All means are calculated over the years 2001–2010.

The values of our country-level control variables vary widely. Financial market development as measured by *Market_Cap* has a mean value of 0.74 and ranges from a country-specific mean of 0.24 in Hungary to 2.37 in Switzerland. *FDI* can be positive or negative and has an overall mean value of 0.15. Japan has the lowest mean value for *FDI* (0.0018), whereas Luxembourg has the highest (3.46). *IFRS_Share* ranges from a country-specific mean of 0 percent in the U.S., Canada, and Japan, to 89 percent in Estonia. The overall mean of *IFRS_Share* is 0.483. *Gov_Eff*, which is defined in the range between -2.5 to + 2.5, has a mean value of 1.38. With 0.01, Brazil has the lowest mean,

whereas Denmark, Finland, and Switzerland have the highest mean values of 2.20, 2.17, and 2.00.

We do not find significant correlations between our explanatory and control variables. There are weak positive correlations between *EU_Dir_06*, *Part_Rot*, and *IFRS_Share*, between *Liab_Cap* and *Fee_Cap*, between *NAS_Const* and *Fee_Cap*, between *NAS_forb* and *Joint_man*, and between *Market_Cap* and *Gov_Eff*, as well as a negative correlation between *Firm_Rot* and *Gov_Eff*. However, the values of the respective correlation coefficients (*Spearman*, *Pearson*) do not exceed 0.56.

1.4 Regression Analysis

1.4.1 Regression Model

To isolate the effects of the audit regulations on the market structure, we regress the concentration and competition metrics $CR_4(M)$, $CR_4(\ln(TA))$, $HHI(M)$, $HHI(\ln(TA))$, AC_R , $MOB(M)$ and $MOB(\ln(TA))$ respectively, on our explanatory variables *EU_Dir_06*, *Liab_Cap*, *Liab_Reg*, *NAS_const*, *NAS_forb*, *Fee_Cap*, *Joint_man*, *Part_Rot*, *Firm_Rot*, and *Fee_Disc*. To control for country-specific factors and to mitigate an omitted variable bias, we include the control variables *Market_Cap*, *FDI*, *IFRS_Share*, and *Gov_Eff* in the regressions. We also add indicators for each year to capture the temporal development of concentration and competition.

Apart from the audit regulations and the controls included in our regressions, the countries within our sample differ in many unobserved factors, which are likely to be correlated both to the dependent and the independent variables of our regressions. As an example, results of several cross-country studies show that the quality of accounting information is higher in countries with a larger degree of the legal protection of shareholders (Ball et al. 2000; Leuz et al. 2003; Burgstahler et al. 2006; Bushman and Piotroski 2006; DeFond et al. 2007). A *Hausman* test shows that a fixed effects model is appropriate, which is in line with the findings of Francis et al. (2013). Furthermore, we can reject the hypothesis that all fixed effects are zero (p -value = 0.000). Therefore, we use a country-fixed effects model, although the results do also hold with a random-effects model. By including country-fixed effects, we provide a strong control for omitted country-level variables. To the extent that unobserved factors are time-invariant, the coefficients on the country-fixed effects control for systematic cross-country differences

and their effects on our concentration and competition measures. Because only the effects of time-variant variables can be identified in a fixed effects model, we cannot include in the regressions some country-specific variables (e.g., a country's legal origin as defined in La Porta et al. (1998)) and variables that do not change during the observation period (e.g., the maximum period the audit contract can be signed for). For similar reasons, we are unable to include the adoption of the *International Standards on Auditing (ISA)* as a variable, because reliable information starts only from 2008. Our model has the general form:

$$C_{kt} = \alpha + \alpha_k + \sum_{r=1}^R \beta_r \cdot regulation_{rkt} + \sum_{s=1}^S \beta_s \cdot control_{skt} + \sum_{t=02}^{T=10} Year_t + \varepsilon_{kt}. \quad (1.1)$$

In this model, C_{kt} are our concentration and competition metrics computed for each country k and each year t . α is the intercept. ε_{kt} are assumed to be independent random variables identically distributed over country k and year t , and α_k are indicator variables for each country k that capture unobserved heterogeneity. *regulation* (*control*) denote the time-variant explanatory variables for audit regulation (controls). $Year_t$ are indicators that take on the value of 1 if the observation is from the respective year (2002–2010). Note that we focus only on the estimated coefficients β_r and β_s , because a consistent estimation of the country-specific variables α_k is only possible for $T \rightarrow \infty$.

1.4.2 Results of the Regression Analysis

Table 1.8 and Table 1.9 show the main findings of our regression models for the concentration and competition metrics: The adoption of the Directive on Statutory Audits (2006/43/EC) indeed does not seem to affect any of our concentration measures. The variable EU_Dir_06 has a significantly positive effect only in the regression for $MOB(\ln(TA))$.

A restriction on auditor's liability does also not have an effect on supplier concentration or competition. The existence of a proportionate liability system, in contrast, has a highly significant negative effect on a country's $CR_4(M)$ and $CR_4(\ln(TA))$, and a weakly significant negative effect on its $HHI(M)$ and $HHI(\ln(TA))$, i.e., the dominating audit firms in a country with proportionate liability have fewer and smaller clients. In addition, countries with a proportionate liability system have highly significantly

larger values for the market share mobility measures $MOB(M)$ and $MOB(\ln(TA))$, so there is more competition among the audit firms.⁴⁴ Because the existence of a proportionate liability system does not affect the auditor-client-ratio AC_R , unlimited liability does not seem to crowd out smaller suppliers, but to make it easier for second-tier audit firms to increase their market shares.

Restrictions regarding the scope of services auditors are allowed to supply to their audit clients do not significantly affect concentration and competition. The prohibition of the joint supply of audit and non-audit services, in contrast, has a highly significant negative effect on $CR_4(M)$ and $CR_4(\ln(TA))$, and a weakly significant positive effect on AC_R . The effect on $HHI(M)$ and $HHI(\ln(TA))$ is also negative, although not significant. Thus, without the possibility to supply non-audit services, the market leaders lose part of their market shares, and smaller audit firms successfully enter the market segment we consider. The reason could be that the comparative advantage of the big audit firms resulting from the ability to provide a broad scope of services and the possibility to cross-subsidize their audit services are lost in such a setting. The result that the coefficients on NAS_forb in the regressions for $MOB(M)$ and $MOB(\ln(TA))$ are negative and significant at the 5 percent level is in line with Buijink et al. (1998), who found that the Dutch audit market, which is more liberal than the German audit market, has a higher degree of competition. Our findings regarding the effect of NAS_forb on the market share mobility could be due to the fact that the competition for audit mandates gets less intense when audit firms lack the possibility to simultaneously offer lucrative non-audit services.

The existence of a cap on total fees significantly decreases a country's $HHI(M)$ and $HHI(\ln(TA))$ and weakly significantly increases its auditor-client-ratio AC_R , but does not affect the market share of the four leading audit firms or the market share mobility. One reason might be that smaller audit firms have a strong incentive to acquire more than just one or two listed audit clients in order to prevent market exit.

The coefficient on $Joint_man$ is highly significant and positive in our regressions for $CR_4(M)$, $CR_4(\ln(TA))$, $HHI(M)$, and $HHI(\ln(TA))$, and negative in the regressions

⁴⁴ This result is in contrast to the findings presented in Dunn et al. (2011), who found that market shares are more equally distributed in high-litigation industries.

for $MOB(M)$ and $MOB(\ln(TA))$. These results suggest that clients favor to choose two big audit firms as members of the audit consortium if there is no legal requirement to hire a second-tier audit firm as a joint auditor, and thus smaller firms have a disadvantage if joint audits are mandatory. The lower degree of competition we observe for countries where joint audits are mandatory might be a result of a comparatively low number of possible audit firms that can form an audit consortium.

Whereas the internal auditor rotation does not affect our concentration measures and decreases the mobility of market shares only when client size is taken as a basis, the coefficient on $Firm_Rot$ is positive and significant in the regressions for $CR_4(M)$ and $CR_4(\ln(TA))$. This finding is in line with Cameran et al. (2005), who document that supplier concentration in Italy has increased due to the implementation of the external rotation. One reason for the observed increase in the absolute concentration could be that clients tend to choose one of the market leaders as a successor when an auditor change is required. This interpretation is in line with the argument that clients use audit firms' market shares as a proxy for audit quality (Ferguson et al. 2006). An explanation for the significantly positive coefficient on $Firm_Rot$ in the regressions for $MOB(M)$ and $MOB(\ln(TA))$ could be the increase in forced auditor changes. The necessity to make audit fees publicly available does not affect our concentration and competition measures.

Among our control variables, FDI has significantly negative effects on all of our concentration measures, and positive effects on the competition measures AC_R and $MOB(M)$. Thus, it seems that international investors do not only favor the market leaders in the countries they invest in, but probably retain one of the audit firms that are prominent in their home country. This result is in line with the situation in Hong Kong, where the FDI is rather high and at least one local audit firm has a market share similar to that of the Big 4 (DeFond et al. 2000).⁴⁵

⁴⁵ In a comparable period, DeFond et al. (2000) observed a mean FDI for Hong Kong of 0.2, which is higher than for most of the countries in our sample.

Table 1.8: Regression results for the concentration ratio CR_4 and the *Hirschmann-Herfindahl-index HHI*

$C_{kt} = const + b_1 \cdot EU_Dir_06 + b_2 \cdot Liab_Cap + b_3 \cdot Liab_Reg + b_4 \cdot NAS_const + b_5 \cdot NAS_forb + b_6 \cdot Fee_Cap + b_7 \cdot Joint_Man + b_8 \cdot Part_Rot + b_9 \cdot Firm_Rot + b_{10} \cdot Fee_Disc + b_{11} \cdot Market_Cap + b_{12} \cdot FDI + b_{13} \cdot IFRS_Share + b_{14} \cdot Gov_Eff + \sum b_i \cdot Year_t + \varepsilon_{kt}$				
<i>Variable</i>	$CR_4(M)$	$CR_4(\ln(TA))$	$HHI(M)$	$HHI(\ln(TA))$
<i>EU_Dir_06</i>	0.001 (0.020)	0.003 (0.019)	-0.001 (0.010)	-0.001 (0.010)
<i>Liab_Cap</i>	-0.037 (0.029)	-0.037 (0.025)	0.043 (0.038)	0.042 (0.038)
<i>Liab_Reg</i>	-0.106 (0.018) ***	-0.111 (0.017) ***	-0.028 (0.015) *	-0.029 (0.014) *
<i>NAS_const</i>	-0.003 (0.021)	-0.003 (0.020)	0.011 (0.012)	0.011 (0.012)
<i>NAS_forb</i>	-0.087 (0.027) ***	-0.083 (0.026) ***	-0.047 (0.031)	-0.044 (0.031)
<i>Fee_Cap</i>	-0.032 (0.022)	-0.033 (0.021)	-0.033 (0.016) **	-0.033 (0.016) **
<i>Joint_man</i>	0.086 (0.018) ***	0.084 (0.017) ***	0.059 (0.012) ***	0.058 (0.012) ***
<i>Part_Rot</i>	0.004 (0.012)	0.005 (0.011)	-0.001 (0.006)	-0.001 (0.006)
<i>Firm_Rot</i>	0.036 (0.009) ***	0.032 (0.008) ***	0.008 (0.024)	0.008 (0.024)
<i>Fee_Disc</i>	0.003 (0.014)	0.001 (0.013)	-0.003 (0.008)	-0.003 (0.008)
<i>Market_Cap</i>	0.025 (0.014) *	0.020 (0.013)	0.002 (0.015)	0.002 (0.016)
<i>FDI</i>	-0.037 (0.008) ***	-0.036 (0.007) ***	-0.013 (0.005) **	-0.013 (0.005) **
<i>IFRS_Share</i>	0.031 (0.042)	0.025 (0.040)	0.012 (0.021)	0.010 (0.021)
<i>Gov_Eff</i>	0.036 (0.031)	0.035 (0.029)	0.050 (0.035)	0.050 (0.034)
const	0.669 (0.047) ***	0.687 (0.043) ***	0.099 (0.050) *	0.103 (0.048) **
<i>n</i>	290	290	290	290
<i>N</i>	29	29	29	29
<i>F-Statistic</i>	2.558	2.827	2.203	2.255
prob <i>F</i>	0.000	0.000	0.000	0.000
R^2	0.198	0.215	0.176	0.179

Note: Results of our regressions for the concentration ratio CR_4 and the *Hirschmann-Herfindahl-index HHI* (robust standard errors in parentheses). *, **, and *** indicate significance at the 10, 5, and 1 percent level, respectively. The R^2 shows the model fit after the country-fixed effects are subtracted. Year dummies are included in the model, but not tabulated.

Table 1.9: Regression results for the auditor-client-ratio AC_R and the market share mobility measure MOB

$C_{kt} = const + b_1 \cdot EU_Dir_06 + b_2 \cdot Liab_Cap + b_3 \cdot Liab_Reg + b_4 \cdot NAS_const + b_5 \cdot NAS_forb + b_6 \cdot Fee_Cap + b_7 \cdot Joint_Man + b_8 \cdot Part_Rot + b_9 \cdot Firm_Rot + b_{10} \cdot Fee_Disc + b_{11} \cdot Market_Cap + b_{12} \cdot FDI + b_{13} \cdot IFRS_Share + b_{14} \cdot Gov_Eff + \sum b_i \cdot Year_t + \varepsilon_{kt}$									
<i>variable</i>	<i>AC_R</i>			<i>MOB(M)</i>			<i>MOB(ln(TA))</i>		
<i>EU_Dir_06</i>	0.015	(0.028)		0.003	(0.011)		0.020	(0.009)	**
<i>Liab_Cap</i>	-0.041	(0.050)		0.008	(0.028)		-0.008	(0.031)	
<i>Liab_Reg</i>	0.008	(0.020)		0.059	(0.014)	***	0.062	(0.013)	***
<i>NAS_const</i>	-0.030	(0.025)		0.004	(0.014)		0.001	(0.012)	
<i>NAS_forb</i>	0.073	(0.042)	*	-0.061	(0.024)	**	-0.054	(0.025)	**
<i>Fee_Cap</i>	0.040	(0.020)	*	-0.005	(0.015)		0.000	(0.014)	
<i>Joint_man</i>	-0.023	(0.017)		-0.096	(0.015)	***	-0.087	(0.014)	***
<i>Part_Rot</i>	-0.010	(0.011)		-0.015	(0.011)		-0.017	(0.007)	**
<i>Firm_Rot</i>	-0.023	(0.024)		0.029	(0.012)	**	0.027	(0.016)	*
<i>Fee_Disc</i>	0.005	(0.015)		-0.013	(0.011)		-0.008	(0.010)	
<i>Market_Cap</i>	0.011	(0.024)		-0.012	(0.013)		0.013	(0.014)	
<i>FDI</i>	0.034	(0.019)	*	0.007	(0.003)	**	-0.004	(0.004)	
<i>IFRS_Share</i>	-0.043	(0.051)		-0.020	(0.021)		-0.020	(0.020)	
<i>Gov_Eff</i>	-0.052	(0.052)		0.014	(0.025)		0.007	(0.027)	
const	0.244	(0.071)	***	0.178	(0.049)	***	0.159	(0.050)	***
<i>n</i>	290			261			261		
<i>N</i>	29			29			29		
<i>F-Statistic</i>	2.187			9.823			10.922		
prob <i>F</i>	0.000			0.000			0.000		
<i>R</i> ²	0.175			0.487			0.514		

Note: Results of our regressions for the auditor-client-ratio AC_R and the market share mobility measure MOB (robust standard errors in parentheses). *, **, and *** indicate significance at the 10, 5, and 1 percent level, respectively. The R^2 shows the model fit after the country-fixed effects are subtracted. Year dummies are included in the model, but not tabulated.

The literature on supplier concentration and audit pricing documents an increase in the market concentration resulting from the Big 4 consolidation (Abidin et al. 2010; Ballas and Fafaliou 2008; Beattie et al. 2003; Hamilton et al. 2008; United States General Accounting Office 2008). Because mergers between the major audit firms have not occurred since 2003, we do not expect that consolidation significantly affects our concentration and competition metrics. Among the year dummies, only $Year_{02}$ has a significant positive coefficient in the regressions for $CR_4(M)$, $CR_4(\ln(TA))$, $HHI(M)$, and $HHI(\ln(TA))$; in the regression for $CR_4(\ln(TA))$, also $Year_{03}$ is sig-

nificantly positive. An explanation might be the demise of *Arthur Anderson* in 2002.⁴⁶ In the regression for AC_R , we observe significantly positive coefficients for $Year_{03}$, $Year_{04}$, and $Year_{05}$. In the regressions for $MOB(M)$ and $MOB(\ln(TA))$, however, the significantly positive and increasing year dummies indicate a time trend. This finding is in line with the increase over time reported in Buijink et al. (1998). Note that there is no visible effect of the years of the financial crisis.

Overall, the model fit as indicated by the R^2 of 19.8 and 21.5 in the regressions for $CR_4(M)$ and $CR_4(\ln(TA))$ shows that our model explains a considerable part of the concentration ratios. The explanatory power of our models for the *Hirschmann-Herfindahl*-index is slightly lower (17.6 for the $HHI(M)$ and 17.9 for the $HHI(\ln(TA))$ regression), but still provides reasonable insights. With 17.5, the fit of the regression for the auditor-client-ratio is similar to that of the other models. The regressions for $MOB(M)$ and $MOB(\ln(TA))$ have the best model fit (69.6 and 70.4, respectively). Note that the R^2 indicates the model fit after deduction of the country-fixed effects. The F -Statistics show that all models indeed explain the context.

1.4.3 Robustness Checks

In a first set of robustness checks, we run several regressions to test whether our main results are driven by the range of our explanatory variables (checks 1, 2 and 3), the choice of the countries in the sample (checks 4 to 6), or the sample period (checks 7 and 8). In addition, we calculate MOB in two additional ways (checks 9 and 10). All these robustness checks are based on our main panel-fixed effects model with robust standard errors. In the second set of robustness checks, we investigate whether there is indeed a causal relationship between our dependent variables and the regulations, i.e., whether the regulation has an influence on concentration and competition, or whether the effect runs in the opposite direction (checks 11 to 13).

In check 1, we include the variable “Rule of Law” ($Rule_Law$) from Kaufmann et al. (2012), which captures peoples’ perceptions regarding the quality of contract enforcement and property rights, instead of “government effectiveness” (Gov_Eff). Due to the high correlation between $Rule_Law$ and Gov_Eff (95.3 percent), we do not include both

⁴⁶ There could also be an issue with data availability for 2001, in particular for clients with small audit firms. Thus, we exclude the year 2001 as a robustness check, but our results are qualitatively identical.

metrics in our regression. *Rule_Law* has been used in prior cross-country studies on accounting topics (Daske et al. 2008) and could be an important factor for the choice of the audit firm. Francis et al. (2003), for example, show that the combined market share of the five largest audit firms is higher in countries with stronger legal systems, and Francis and Wang (2008) document that earnings quality is jointly affected by the investor protection environment and the choice of a Big 4 audit firm. In check 2, we exclude the dummy variable *EU_Dir_06* indicating the full adoption of the European Directive on Statutory Audits 2006/43/EC. We exclude this variable because the Statutory Auditor Directive contains a large number of regulations, and some countries had already implemented some of them before the Directive had been published, i.e., the influence of *EU_Dir_06* might be imprecise. Because our main model contains the audit partner rotation (Art. 42 of the Directive) and the disclosure of auditor fees (recital 33 of the Directive) as separate explanatory variables, we included these regulations actually twice. On the other hand, our main model does not consider some elements of the Directive as separate variables (e.g., the establishment of an audit oversight board (Art. 32 of the Directive) or the need to have an audit committee (Art. 41 of the Directive)), although the law of some non-EU countries partly covered these regulations. In check 3, we include the share of big client firms in a country (*Big_Firm_Share*) to our regression model. The variable shows the percentage of big client firms in a country and year measured as the percentage of firms that have an above median value of total assets over all countries for each year. We additionally include this variable because small audit firms might possibly not be able to audit big clients. Hence, a large amount of big clients in a country might have an influence on the market structure.⁴⁷

In check 4, we exclude all former socialist countries from the sample because these countries are special with respect to their history and their development. Whereas there was free market entry for all audit firms in the remaining countries, this was not (or only partly) the case for the former socialist countries. Market entry, however, could have influenced the current audit market structure (e.g., a non-Big 4 audit firm is the market leader in Poland). In check 5, we exclude all countries that have at least one observation with a concentration ratio equal to 1, because the extreme values observed for our dependent variable and the low number of audit firms in these markets could bias our results. In check 6, we use only EU countries for our analysis to investigate the effects of

⁴⁷ We thank Jere R. Francis for this helpful comment.

audit regulations in an economic area with a similar political environment. Moreover, within each of the EU countries, legislation is uniformly implemented for the entire country. In Canada, in contrast, all states follow the same main audit regulations, but each federal state is allowed to set its own regulations. The resulting differences between the states might aggravate country-comparisons. One drawback of check 6 is that we cannot include the variables *Liab_Reg*, *NAS_forb*, and *Firm_Rot* in our regressions, because for the countries within the EU, the values of these variables remained constant during the observed period.

Checks 7 and 8 constrain the number of periods taken into account. As the coefficients on our year dummies indicate, we observe lower concentration measures for 2001 and a visible increase in 2002 (in 2001, the mean CR_4 is about 4 percent and the mean *HHI* is 0.019 lower than in 2002). We also observe a comparatively larger change of the concentration measures from 2009 to 2010 (in 2010, the mean CR_4 is about 2.8 percent and the mean *HHI* is 0.007 higher than in 2009). In contrast to 2001, however, we do not observe an outlying number of available firm information for 2010. To rule out biased results, we exclude all country-year observations from 2001 in check 7 and all observations from 2001 and 2010 in check 8.

In all robustness checks, we observe nearly the same results for CR_4 as in our main regression (see Table 1.10). The proportionate liability (*Liab_Reg*), the prohibition of non-audit services (*NAS_forb*), joint audits (*Joint_man*), and a audit firm rotation (*Firm_Rot*) are still highly significant and the coefficients have the same signs as in the main regressions. In contrast to our main results, the negative coefficient on the variable *NAS_const*, indicating a constraint on the joint supply of audit and non-audit services, gets weakly significant in check 4. The coefficients of the control variables *Market_Cap* and *FDI* have the same signs as in the main regressions and are significant at the same or at even lower levels. Only in checks 1 and 6, *Market_Cap* is not significant, whereas it is borderline significant in the main regression on $CR_4(M)$. Moreover, higher values for *Gov_Eff* significantly increase $CR_4(M)$ if we exclude the former socialist countries (check 3). The share of big client firms in check 3 has a significant positive influence on the concentration ratio indicating that large firms prefer the market leaders as auditors.

Table 1.10: Robustness checks for the concentration ratio CR_4

$CR_{4,kt} = \text{const} + b_1 \cdot \text{EU_Dir_06} + b_2 \cdot \text{Liab_Cap} + b_3 \cdot \text{Liab_Reg} + b_4 \cdot \text{NAS_const} + b_5 \cdot \text{NAS_forb}$ $+ b_6 \cdot \text{Fee_Cap} + b_7 \cdot \text{Joint_Man} + b_8 \cdot \text{Part_Rot} + b_9 \cdot \text{Firm_Rot} + b_{10} \cdot \text{Fee_Disc}$ $+ b_{11} \cdot \text{Market_Cap} + b_{12} \cdot \text{FDI} + b_{13} \cdot \text{IFRS_Share} + b_{14} \cdot \text{Gov_Eff} + \sum b_i \cdot \text{Year}_t + \varepsilon_{kt}$								
variable	check 1		check 2		check 3		check 4	
	"Rule of Law" instead of "Gov_Eff"		Without EU_Dir_06		With Big_Firm_Share		Without former socialist countries	
	M	ln(TA)	M	ln(TA)	M	ln(TA)	M	ln(TA)
EU_Dir_06	0.003 (0.019)	0.005 (0.018)	-	-	0.008 (0.015)	0.009 (0.014)	0.001 (0.021)	0.003 (0.020)
Liab_Cap	-0.040 (0.029)	-0.040 (0.025)	-0.037 (0.029)	-0.037 (0.025)	-0.039 (0.031)	-0.038 (0.027)	-0.039 (0.035)	-0.037 (0.030)
Liab_Reg	-0.097 *** (0.018)	-0.102 *** (0.018)	-0.106 *** (0.019)	-0.112 *** (0.018)	-0.092 *** (0.016)	-0.098 *** (0.016)	-0.110 *** (0.020)	-0.115 *** (0.019)
NAS_const	-0.002 (0.022)	-0.002 (0.02)	-0.003 (0.022)	-0.004 (0.020)	-0.001 (0.018)	-0.001 (0.016)	-0.001 (0.023)	-0.002 (0.021)
NAS_forb	-0.091 *** (0.025)	-0.088 *** (0.024)	-0.088 *** (0.026)	-0.085 *** (0.025)	-0.146 *** (0.045)	-0.138 *** (0.043)	-0.093 *** (0.031)	-0.089 *** (0.030)
Fee_Cap	-0.032 (0.022)	-0.033 (0.022)	-0.032 (0.022)	-0.033 (0.021)	-0.024 (0.021)	-0.026 (0.021)	-0.033 (0.023)	-0.034 (0.022)
Joint_man	0.078 *** (0.017)	0.077 *** (0.017)	0.086 *** (0.016)	0.084 *** (0.016)	0.076 *** (0.017)	0.075 *** (0.017)	0.089 *** (0.021)	0.087 *** (0.020)
Part_Rot	0.001 (0.012)	0.002 (0.011)	0.004 (0.013)	0.005 (0.012)	0.011 (0.011)	0.011 (0.010)	0.004 (0.012)	0.005 (0.011)
Firm_Rot	0.043 *** (0.015)	0.04 *** (0.014)	0.036 *** (0.008)	0.033 *** (0.007)	0.042 *** (0.011)	0.038 *** (0.009)	0.036 *** (0.010)	0.032 *** (0.009)
Fee_Disc	0.004 (0.015)	0.003 (0.014)	0.004 (0.015)	0.002 (0.014)	0.002 (0.014)	0.001 (0.013)	0.003 (0.015)	0.001 (0.014)
Market_Cap	0.026 (0.015)	0.021 (0.014)	0.025 * (0.014)	0.020 (0.013)	0.036 ** (0.015)	0.031 ** (0.013)	0.028 * (0.015)	0.023 (0.013)
FDI	-0.036 *** (0.009)	-0.035 *** (0.008)	-0.037 *** (0.008)	-0.036 *** (0.008)	-0.033 *** (0.005)	-0.032 *** (0.005)	-0.037 *** (0.008)	-0.036 *** (0.007)
IRFS_Share	0.028 (0.041)	0.022 (0.038)	0.031 (0.04)	0.025 (0.037)	0.021 (0.031)	0.016 (0.029)	0.039 (0.046)	0.032 (0.043)
Gov_Eff	0.043 (0.066)	0.045 (0.064)	0.036 (0.03)	0.035 (0.028)	0.011 (0.025)	0.011 (0.023)	0.041 (0.035)	0.040 (0.033)
Big_Firm_Share	-	-	-	-	0.252 ** (0.105)	0.232 ** (0.098)	-	-
const	0.665 *** (0.080)	0.679 *** (0.078)	0.669 *** (0.046)	0.687 *** (0.042)	0.575 *** (0.066)	0.601 *** (0.061)	0.637 *** (0.053)	0.656 *** (0.049)
n	290	290	290	290	290	290	240	240
N	29	29	29	29	29	29	24	24
F-Statistic	2.489	2.769	2.558	2.826	4.194	4.381	3.304	3.644
prob F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R ²	0.194	0.211	0.198	0.215	0.297	0.306	0.283	0.303

Table 1.10 (continued)

$CR_{4,kt} = \text{const} + b_1 \cdot \text{EU_Dir_06} + b_2 \cdot \text{Liab_Cap} + b_3 \cdot \text{Liab_Reg} + b_4 \cdot \text{NAS_const} + b_5 \cdot \text{NAS_forb} \\ + b_6 \cdot \text{Fee_Cap} + b_7 \cdot \text{Joint_Man} + b_8 \cdot \text{Part_Rot} + b_9 \cdot \text{Firm_Rot} + b_{10} \cdot \text{Fee_Disc} \\ + b_{11} \cdot \text{Market_Cap} + b_{12} \cdot \text{FDI} + b_{13} \cdot \text{IFRS_Share} + b_{14} \cdot \text{Gov_Eff} + \sum b_i \cdot \text{Year}_i + \varepsilon_{kt}$								
variable	check 5		check 6		check 7		check 8	
	Without $CR_4 = 1$ countries		EU countries only		Without year 2001		Without years 2001 and 2010	
	<i>M</i>	<i>ln(TA)</i>	<i>M</i>	<i>ln(TA)</i>	<i>M</i>	<i>ln(TA)</i>	<i>M</i>	<i>ln(TA)</i>
<i>EU_Dir_06</i>	0.001 (0.021)	0.003 (0.020)	-0.005 (0.022)	-0.004 (0.022)	0.006 (0.017)	0.007 (0.016)	-0.006 (0.021)	-0.006 (0.020)
<i>Liab_Cap</i>	-0.039 (0.035)	-0.037 (0.030)	-0.028 (0.026)	-0.03 (0.024)	-0.031 (0.03)	-0.032 (0.026)	-0.025 (0.03)	-0.029 (0.027)
<i>Liab_Reg</i>	-0.110 *** (0.020)	-0.115 *** (0.019)	-	-	-0.098 *** (0.018)	-0.104 *** (0.017)	-0.096 *** (0.017)	-0.101 *** (0.017)
<i>NAS_const</i>	-0.001 (0.023)	-0.002 (0.021)	-0.002 (0.024)	-0.002 (0.023)	-0.003 (0.020)	-0.004 (0.019)	-0.005 (0.022)	-0.008 (0.021)
<i>NAS_forb</i>	-0.093 *** (0.031)	-0.089 *** (0.030)	-	-	-0.114 *** (0.03)	-0.107 *** (0.03)	-0.113 *** (0.025)	-0.106 *** (0.026)
<i>Fee_Cap</i>	-0.033 (0.023)	-0.034 (0.022)	-0.039 (0.026)	-0.037 (0.026)	-0.026 (0.021)	-0.025 (0.021)	-0.030 (0.023)	-0.029 (0.022)
<i>Joint_man</i>	0.089 *** (0.021)	0.087 *** (0.020)	0.082 *** (0.020)	0.080 *** (0.019)	0.077 *** (0.016)	0.077 *** (0.016)	0.080 *** (0.016)	0.08 *** (0.016)
<i>Part_Rot</i>	0.004 (0.012)	0.005 (0.011)	0.006 (0.015)	0.006 (0.013)	0.001 (0.011)	0.001 (0.011)	0.006 (0.013)	0.007 (0.012)
<i>Firm_Rot</i>	0.036 *** (0.010)	0.032 *** (0.009)	-	-	0.041 *** (0.011)	0.037 *** (0.012)	0.044 *** (0.014)	0.04 ** (0.016)
<i>Fee_Disc</i>	0.003 (0.015)	0.001 (0.014)	-0.005 (0.013)	-0.004 (0.013)	-0.003 (0.016)	-0.003 (0.015)	0.001 (0.017)	0.001 (0.017)
<i>Market_Cap</i>	0.028 * (0.015)	0.023 (0.013)	0.018 (0.018)	0.013 (0.015)	0.032 ** (0.015)	0.029 ** (0.013)	0.027 * (0.015)	0.025 * (0.014)
<i>FDI</i>	-0.037 *** (0.008)	-0.036 *** (0.007)	-0.037 *** (0.007)	-0.036 *** (0.006)	-0.041 *** (0.006)	-0.04 *** (0.006)	-0.042 *** (0.011)	-0.039 *** (0.010)
<i>IRFS_Share</i>	0.039 (0.046)	0.032 (0.043)	0.084 (0.090)	0.074 (0.084)	0.022 (0.04)	0.016 (0.038)	0.019 (0.044)	0.014 (0.042)
<i>Gov_Eff</i>	0.041 (0.035)	0.040 (0.033)	0.026 (0.036)	0.023 (0.033)	0.037 (0.035)	0.037 (0.033)	0.037 (0.036)	0.038 (0.035)
<i>Big_Firm_Share</i>	-	-	-	-	-	-	-	-
const	0.637 *** (0.053)	0.656 *** (0.049)	0.682 *** (0.068)	0.701 *** (0.063)	0.696 *** (0.062)	0.721 *** (0.057)	0.711 *** (0.053)	0.726 *** (0.05)
<i>n</i>	270	270	200	200	261	261	232	232
<i>N</i>	27	27	20	20	29	29	29	29
<i>F-Statistic</i>	2.526	2.798	1.742	1.848	2.442	2.593	2.160	2.246
<i>prob F</i>	0.000	0.000	0.008	0.004	0.000	0.000	0.000	0.000
<i>R²</i>	0.209	0.226	0.187	0.196	0.204	0.214	0.200	0.206

Note: Results of the robustness checks 1 to 8 for the concentration ratio CR_4 (robust standard errors in parentheses below the coefficients). *, **, and *** indicate significance at the 10, 5, and 1 percent level, respectively. The R^2 shows the model fit after the country-fixed effects are subtracted. Year dummies are included in the model, but not tabulated.

Table 1.11: Robustness checks for the *Hirschmann-Herfindahl-index HHI*

$HHI_{kt} = \text{const} + b_1 \cdot EU_Dir_06 + b_2 \cdot Liab_Cap + b_3 \cdot Liab_Reg + b_4 \cdot NAS_const + b_5 \cdot NAS_forb$ $+ b_6 \cdot Fee_Cap + b_7 \cdot Joint_Man + b_8 \cdot Part_Rot + b_9 \cdot Firm_Rot + b_{10} \cdot Fee_Disc$ $+ b_{11} \cdot Market_Cap + b_{12} \cdot FDI + b_{13} \cdot IFRS_Share + b_{14} \cdot Gov_Eff + \sum b_t \cdot Year_t + \varepsilon_{kt}$								
variable	check 1		check 2		check 3		check 4	
	"Rule of Law" instead of "Gov_Eff"		Without EU_Dir_06		With Big_Firm_Share		Without former socialist countries	
	M	ln(TA)	M	ln(TA)	M	ln(TA)	M	ln(TA)
EU_Dir_06	0.002 (0.010)	0.002 (0.010)	-	-	0.002 (0.008)	0.002 (0.008)	0.008 (0.005)	0.007 (0.005)
Liab_Cap	0.038 (0.037)	0.037 (0.037)	0.043 (0.038)	0.042 (0.037)	0.042 (0.039)	0.041 (0.038)	0.004 (0.008)	0.004 (0.008)
Liab_Reg	-0.014 (0.011)	-0.016 (0.011)	-0.027* (0.014)	-0.029** (0.014)	-0.022 (0.013)	-0.024* (0.013)	-0.017 (0.013)	-0.019 (0.014)
NAS_const	0.012 (0.013)	0.012 (0.013)	0.011 (0.012)	0.011 (0.012)	0.012 (0.011)	0.012 (0.011)	-0.003 (0.007)	-0.003 (0.007)
NAS_forb	-0.055* (0.032)	-0.053 (0.032)	-0.046 (0.030)	-0.044 (0.030)	-0.072* (0.037)	-0.069* (0.037)	-0.029 (0.020)	-0.027 (0.020)
Fee_Cap	-0.033* (0.017)	-0.034* (0.017)	-0.033** (0.016)	-0.033** (0.016)	-0.030* (0.015)	-0.030* (0.015)	-0.012 (0.008)	-0.013 (0.008)
Joint_man	0.049*** (0.010)	0.048*** (0.010)	0.059*** (0.012)	0.058*** (0.012)	0.054*** (0.012)	0.054*** (0.012)	0.057*** (0.012)	0.057*** (0.012)
Part_Rot	-0.005 (0.007)	-0.004 (0.007)	-0.001 (0.006)	-0.001 (0.006)	0.002 (0.006)	0.003 (0.005)	0.002 (0.005)	0.003 (0.006)
Firm_Rot	0.019 (0.023)	0.019 (0.023)	0.008 (0.024)	0.007 (0.024)	0.011 (0.027)	0.010 (0.027)	0.011 (0.01)	0.011 (0.01)
Fee_Disc	-0.001 (0.009)	-0.001 (0.009)	-0.003 (0.010)	-0.003 (0.010)	-0.004 (0.008)	-0.004 (0.008)	-0.001 (0.006)	-0.001 (0.006)
Market_Cap	0.003 (0.014)	0.003 (0.015)	0.002 (0.015)	0.002 (0.015)	0.007 (0.012)	0.006 (0.012)	0.015 (0.011)	0.015 (0.011)
FDI	-0.012* (0.006)	-0.012* (0.006)	-0.013** (0.005)	-0.013** (0.005)	-0.011** (0.004)	-0.011** (0.004)	-0.009** (0.003)	-0.009** (0.004)
IRFS_Share	0.009 (0.021)	0.007 (0.021)	0.012 (0.021)	0.010 (0.021)	0.008 (0.018)	0.006 (0.018)	0.001 (0.014)	-0.001 (0.014)
Gov_Eff	0.068 (0.053)	0.068 (0.054)	0.050 (0.034)	0.050 (0.034)	0.039 (0.030)	0.040 (0.029)	0.005 (0.012)	0.006 (0.011)
Big_Firm_Share	-	-	-	-	0.106** (0.041)	0.104** (0.041)	-	-
const	0.082 (0.067)	0.087 (0.068)	0.099* (0.049)	0.104** (0.048)	0.060 (0.050)	0.065 (0.050)	0.147*** (0.021)	0.151*** (0.020)
n	290	290	290	290	290	290	240	240
N	29	29	29	29	29	29	24	24
F-Statistic	2.020	2.063	2.203	2.253	2.747	2.764	1.920	1.926
prob F	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001
R ²	0.163	0.166	0.176	0.179	0.217	0.218	0.186	0.187

Table 1.11 (continued)

$HHI_{kt} = const + b_1 \cdot EU_Dir_06 + b_2 \cdot Liab_Cap + b_3 \cdot Liab_Reg + b_4 \cdot NAS_const + b_5 \cdot NAS_forb$ $+ b_6 \cdot Fee_Cap + b_7 \cdot Joint_Man + b_8 \cdot Part_Rot + b_9 \cdot Firm_Rot + b_{10} \cdot Fee_Disc$ $+ b_{11} \cdot Market_Cap + b_{12} \cdot FDI + b_{13} \cdot IFRS_Share + b_{14} \cdot Gov_Eff + \sum b_i \cdot Year_t + \varepsilon_{kt}$								
variable	check 5		check 6		check 7		check 8	
	Without $CR_4 = 1$ countries		EU countries only		Without year 2001		Without years 2001 and 2010	
	<i>M</i>	<i>ln(TA)</i>	<i>M</i>	<i>ln(TA)</i>	<i>M</i>	<i>ln(TA)</i>	<i>M</i>	<i>ln(TA)</i>
<i>EU_Dir_06</i>	0.001 (0.008)	0.001 (0.008)	-0.026 (0.027)	-0.027 (0.027)	0.001 (0.009)	0.001 (0.009)	-0.009 (0.013)	-0.010 (0.014)
<i>Liab_Cap</i>	0.005 (0.011)	0.005 (0.01)	0.055 (0.04)	0.054 (0.039)	0.047 (0.038)	0.045 (0.038)	0.008 (0.011)	0.006 (0.011)
<i>Liab_Reg</i>	-0.013 (0.012)	-0.015 (0.012)	-	-	-0.02 (0.013)	-0.022 (0.013)	-0.02 (0.013)	-0.022 (0.013)
<i>NAS_const</i>	0.006 (0.009)	0.006 (0.009)	0.026 (0.018)	0.027 (0.018)	0.012 (0.012)	0.012 (0.013)	0.008 (0.012)	0.007 (0.012)
<i>NAS_forb</i>	-0.028 (0.019)	-0.027 (0.020)	-	-	-0.054* (0.027)	-0.05* (0.027)	-0.055** (0.026)	-0.051* (0.025)
<i>Fee_Cap</i>	-0.012 (0.008)	-0.013 (0.008)	-0.051* (0.025)	-0.051* (0.025)	-0.034** (0.017)	-0.035** (0.017)	-0.025** (0.010)	-0.025** (0.011)
<i>Joint_man</i>	0.049*** (0.011)	0.048*** (0.011)	0.056*** (0.017)	0.056*** (0.017)	0.046*** (0.01)	0.047*** (0.010)	0.053*** (0.011)	0.053*** (0.011)
<i>Part_Rot</i>	0.001 (0.005)	0.002 (0.005)	0.001 (0.008)	0.002 (0.008)	-0.001 (0.006)	-0.001 (0.006)	-0.003 (0.007)	-0.002 (0.007)
<i>Firm_Rot</i>	0.012 (0.011)	0.011 (0.011)	-	-	0.019 (0.019)	0.019 (0.018)	0.021 (0.018)	0.02 (0.017)
<i>Fee_Disc</i>	-0.004 (0.006)	-0.004 (0.006)	-0.014 (0.013)	-0.014 (0.013)	-0.006 (0.010)	-0.005 (0.009)	0.001 (0.009)	0.001 (0.009)
<i>Market_Cap</i>	0.013 (0.008)	0.013 (0.008)	0.015 (0.015)	0.015 (0.016)	0.001 (0.016)	0.001 (0.016)	0.002 (0.013)	0.001 (0.013)
<i>FDI</i>	-0.012** (0.005)	-0.012** (0.005)	-0.011* (0.006)	-0.011* (0.006)	-0.014*** (0.005)	-0.014*** (0.005)	-0.012** (0.005)	-0.012** (0.005)
<i>IRFS_Share</i>	0.008 (0.018)	0.007 (0.018)	0.011 (0.046)	0.005 (0.047)	0.002 (0.021)	0.001 (0.021)	0.007 (0.022)	0.005 (0.022)
<i>Gov_Eff</i>	0.003 (0.015)	0.003 (0.014)	0.064 (0.047)	0.064 (0.045)	0.042 (0.032)	0.043 (0.032)	0.039 (0.030)	0.041 (0.031)
<i>Big_Firm_Share</i>	-	-	-	-	-	-	-	-
const	0.153*** (0.023)	0.157*** (0.021)	0.069 (0.078)	0.073 (0.077)	0.141*** (0.049)	0.147*** (0.049)	0.136*** (0.045)	0.14*** (0.046)
<i>n</i>	270	270	200	200	261	261	232	232
<i>N</i>	27	27	20	20	29	29	29	29
<i>F-Statistic</i>	1.976	2.029	2.242	2.263	2.036	2.066	1.444	1.423
<i>prob F</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.043	0.049
<i>R²</i>	0.171	0.175	0.229	0.230	0.176	0.178	0.143	0.141

Note: Results of the robustness checks 1 to 8 for the *Hirschmann-Herfindahl*-index *HHI* (robust standard errors in parentheses below the coefficients). *, **, and *** indicate significance at the 10, 5, and 1 percent level, respectively. The R^2 shows the model fit after the country-fixed effects are subtracted. Year dummies are included in the model, but not tabulated.

The results of the regressions on *HHI* (see Table 1.11) deviate slightly more from those of our main model. The coefficient on *Joint_man* is positive and highly significant in all the regressions. The coefficient on *Fee_Cap* is negative in all of our regressions, but significant only in the main regression and in six out of the eight robustness checks. The coefficient on *NAS_forb* is negative in all of our regressions and significant in the regressions for *HHI(M)* in check 1 and in the regressions for both *HHI* measures in checks 3, 7 and 8. Furthermore, the coefficient on *Liab_Reg* always has a negative sign, but is significant only in the main regression, in check 2 and in check 3 for the *HHI(ln(TA))* regression. The control variables show the similar results in all *HHI* regressions. As in the regression for the concentration ratio *Big_Firm_Share* in check 3 has a significant positive influence on the *HHI*.

In the robustness checks for *AC_R*, the coefficient on *NAS_forb* (*Fee_Cap*) has a positive sign in all regressions and is significant in the main regression and in checks 1, 2, 3, 4, 7, and 8 (1, 2, 6, 7) (see Table 1.12). If former socialist countries are excluded (check 4), *Liab_Cap* (*Joint_man*) has a significantly positive (negative) effect on *AC_R*, and the included control variable *Big_Firm_Share* in check 3 is significant negative.

To determine the market share mobility measure (*MOB*), only audit firms that were active in the market segment over the entire sample period can be used. This restriction excludes some smaller audit firms that frequently enter and leave the market segment from the calculation of *MOB*, leading to a biased market share mobility for the remaining audit firms. For check 9, we thus only use the four audit firms with the highest market share to calculate *MOB*, because the market entries or exits of smaller suppliers only negligibly influence the market shares of the market leaders. Moreover, Buijink et al. (1998) found a time pattern slightly different from their main analysis when taking into account only the largest audit firms. In check 10, we use a different calculation method for *MOB*. To calculate the variable *MOB* for the main regressions and checks 1–6 and 9 (checks 7 and 8), we compared all the market shares of the remaining years to the market shares of the base year 2001 (2002). However, as the highly significant positive year dummies indicate, our base year might be an outlier because of the *Arthur Andersen* demise. To rule out that the choice of the base year has an influence on our results, we calculated yearly changes in the market shares, i.e., we compare the market shares of each year t to the preceding year $t-1$.

Table 1.12: Robustness checks for the auditor-client ratio AC_R

$AC_{R_{it}} = const + b_1 \cdot EU_Dir_06 + b_2 \cdot Liab_Cap + b_3 \cdot Liab_Reg + b_4 \cdot NAS_const + b_5 \cdot NAS_forb$ $+ b_6 \cdot Fee_Cap + b_7 \cdot Joint_Man + b_8 \cdot Part_Rot + b_9 \cdot Firm_Rot + b_{10} \cdot Fee_Disc$ $+ b_{11} \cdot Market_Cap + b_{12} \cdot FDI + b_{13} \cdot IFRS_Share + b_{14} \cdot Gov_Eff + \sum b_t \cdot Year_t + \varepsilon_{it}$								
	<i>check 1</i>	<i>check 2</i>	<i>check 3</i>	<i>check 4</i>	<i>check 5</i>	<i>check 6</i>	<i>check 7</i>	<i>check 8</i>
<i>variable</i>	“Rule of Law” instead of “Gov_Eff”	Without EU_Dir_06	With Big_Firm_Share	w/o former socialist countries	w/o CR ₄ = 1 countries	EU countries only	w/o year 2001	w/o years 2001 and 2010
<i>EU_Dir_06</i>	0.011 (0.025)	-	0.007 (0.015)	-0.018 * (0.010)	0.010 (0.027)	0.056 (0.046)	0.008 (0.024)	0.028 (0.031)
<i>Liab_Cap</i>	-0.031 (0.048)	-0.040 (0.049)	-0.039 (0.027)	0.027 ** (0.013)	0.006 (0.027)	-0.048 (0.054)	-0.052 (0.052)	-0.007 (0.033)
<i>Liab_Reg</i>	-0.008 (0.016)	0.004 (0.019)	-0.009 (0.037)	0.014 (0.012)	-0.004 (0.020)	-	0.009 (0.017)	0.006 (0.018)
<i>NAS_const</i>	-0.030 (0.026)	-0.031 (0.028)	-0.033 ** (0.014)	0.005 (0.009)	-0.031 (0.027)	-0.033 (0.024)	-0.028 (0.025)	-0.030 (0.029)
<i>NAS_forb</i>	0.095 * (0.047)	0.066 * (0.035)	0.145 *** (0.052)	0.065 *** (0.018)	0.060 (0.037)	-	0.081 * (0.044)	0.078 * (0.039)
<i>Fee_Cap</i>	0.039 * (0.021)	0.039 * (0.021)	0.031 * (0.017)	0.023 (0.016)	0.020 (0.016)	0.053 * (0.031)	0.036 * (0.02)	0.021 (0.014)
<i>Joint_man</i>	-0.014 (0.018)	-0.026 (0.016)	-0.011 (0.035)	-0.047 *** (0.008)	-0.018 (0.019)	-0.026 (0.023)	-0.027 * (0.013)	-0.029 * (0.014)
<i>Part_Rot</i>	-0.005 (0.013)	-0.007 (0.013)	-0.019 (0.013)	-0.008 (0.009)	-0.011 (0.011)	-0.006 (0.013)	-0.006 (0.012)	-0.003 (0.013)
<i>Firm_Rot</i>	-0.040 (0.027)	-0.019 (0.022)	-0.030 (0.028)	-0.016 (0.011)	-0.027 ** (0.013)	-	-0.029 (0.025)	-0.029 (0.025)
<i>Fee_Disc</i>	0.001 (0.014)	0.009 (0.019)	0.007 (0.013)	0.001 (0.011)	0.003 (0.017)	0.012 (0.021)	0.013 (0.019)	0.015 (0.019)
<i>Market_Cap</i>	0.009 (0.023)	0.010 (0.023)	-0.002 (0.019)	0.002 (0.008)	-0.003 (0.017)	-0.005 (0.029)	-0.005 (0.024)	-0.015 (0.023)
<i>FDI</i>	0.034 * (0.020)	0.035 * (0.019)	0.029 * (0.017)	0.014 *** (0.004)	0.034 * (0.019)	0.035 * (0.017)	0.037 ** (0.018)	0.031 (0.020)
<i>IRFS_Share</i>	-0.042 (0.050)	-0.039 (0.047)	-0.031 * (0.019)	-0.013 (0.016)	-0.053 (0.054)	-0.102 (0.126)	-0.035 (0.049)	-0.044 (0.055)
<i>Gov_Eff</i>	-0.114 (0.078)	-0.050 (0.051)	-0.021 (0.025)	-0.002 (0.017)	-0.010 (0.040)	-0.081 (0.071)	-0.059 (0.052)	-0.053 (0.054)
<i>Big_Firm_Share</i>	-	-	-0.305 *** (0.050)	-	-	-	-	-
const	0.316 *** (0.095)	0.242 *** (0.068)	0.358 *** (0.042)	0.133 *** (0.032)	0.173 *** (0.058)	0.366 *** (0.12)	0.278 *** (0.076)	0.262 *** (0.075)
<i>n</i>	290	290	290	240	270	200	261	232
<i>N</i>	29	29	29	24	27	20	29	29
<i>F-Statistic</i>	1.842	2.142	3.994	4.141	2.302	2.165	1.952	1.425
<i>prob F</i>	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.049
<i>R²</i>	0.185	0.172	0.287	0.286	0.182	0.222	0.170	0.141

Note: Results of the robustness checks 1 to 8 for the auditor-client ratio AC_R (robust standard errors in parentheses below the coefficients). *, **, and *** indicate significance at the 10, 5, and 1 percent level, respectively. The R^2 shows the model fit after the country-fixed effects are subtracted. Year dummies are included in the model, but not tabulated.

Table 1.13: Robustness checks for the mobility share *MOB*

$$MOB_{kt} = const + b_1 \cdot EU_Dir_06 + b_2 \cdot Liab_Cap + b_3 \cdot Liab_Reg + b_4 \cdot NAS_const + b_5 \cdot NAS_forb + b_6 \cdot Fee_Cap + b_7 \cdot Joint_Man + b_8 \cdot Part_Rot + b_9 \cdot Firm_Rot + b_{10} \cdot Fee_Disc + b_{11} \cdot Market_Cap + b_{12} \cdot FDI + b_{13} \cdot IFRS_Share + b_{14} \cdot Gov_Eff + \sum b_i \cdot Year_t + \varepsilon_{kt}$$

variable	check 1		check 2		check 3		check 4		check 5	
	"Rule of Law" instead of "Gov_Eff"		Without EU_Dir_06		With Big_Firm_Share		Without former socialist countries		Without CR ₄ = 1 countries	
	M	ln(TA)	M	ln(TA)	M	ln(TA)	M	ln(TA)	M	ln(TA)
EU_Dir_06	0.004 (0.012)	0.020** (0.008)	-	-	0.002 (0.010)	0.018* (0.009)	0.006 (0.012)	0.018** (0.008)	0.004 (0.012)	0.021** (0.009)
Liab_Cap	0.013 (0.028)	-0.003 (0.03)	0.008 (0.028)	-0.007 (0.031)	0.008 (0.018)	-0.007 (0.017)	0.015 (0.011)	0.002 (0.01)	-0.001 (0.029)	-0.026 (0.03)
Liab_Reg	0.060*** (0.011)	0.062*** (0.009)	0.058*** (0.013)	0.057*** (0.013)	0.055** (0.026)	0.059** (0.026)	0.051*** (0.012)	0.055*** (0.009)	0.064*** (0.014)	0.069*** (0.013)
NAS_const	0.006 (0.014)	0.003 (0.011)	0.004 (0.014)	-0.001 (0.013)	0.004 (0.010)	0.001 (0.010)	-0.009 (0.013)	-0.005 (0.011)	0.004 (0.014)	0.001 (0.012)
NAS_forb	-0.047* (0.025)	-0.042 (0.027)	-0.063*** (0.022)	-0.062** (0.024)	-0.04 (0.041)	-0.032 (0.04)	-0.065*** (0.022)	-0.065** (0.023)	-0.049* (0.024)	-0.041 (0.028)
Fee_Cap	-0.006 (0.015)	-0.001 (0.014)	-0.005 (0.015)	-0.001 (0.015)	-0.007 (0.012)	-0.002 (0.011)	0.002 (0.016)	0.012 (0.012)	-0.001 (0.015)	0.009 (0.012)
Joint_man	-0.099*** (0.011)	-0.088*** (0.011)	-0.097*** (0.015)	-0.092*** (0.014)	-0.093*** (0.024)	-0.083*** (0.023)	-0.083*** (0.011)	-0.074*** (0.01)	-0.100*** (0.014)	-0.090*** (0.014)
Part_Rot	-0.015 (0.011)	-0.017** (0.007)	-0.014 (0.010)	-0.014* (0.007)	-0.017** (0.008)	-0.02** (0.008)	-0.011 (0.010)	-0.015** (0.006)	-0.012 (0.010)	-0.015** (0.006)
Firm_Rot	0.024 (0.016)	0.022 (0.018)	0.030** (0.011)	0.033** (0.014)	0.025 (0.019)	0.024 (0.019)	0.029* (0.014)	0.032* (0.017)	0.025* (0.014)	0.025 (0.019)
Fee_Disc	-0.016 (0.011)	-0.010 (0.01)	-0.012 (0.013)	-0.003 (0.011)	-0.013 (0.009)	-0.008 (0.009)	-0.014* (0.008)	-0.009 (0.008)	-0.022** (0.008)	-0.014 (0.009)
Market_Cap	-0.012 (0.013)	0.012 (0.014)	-0.012 (0.013)	0.011 (0.015)	-0.016 (0.013)	0.008 (0.013)	-0.016 (0.012)	0.022 (0.015)	-0.019 (0.013)	0.013 (0.015)
FDI	0.008*** (0.003)	-0.004 (0.003)	0.008** (0.003)	-0.003 (0.004)	0.007 (0.011)	-0.005 (0.011)	0.006* (0.004)	-0.008** (0.003)	0.009** (0.003)	-0.004 (0.004)
IRFS_Share	-0.024 (0.020)	-0.023 (0.019)	-0.019 (0.022)	-0.014 (0.021)	-0.019 (0.012)	-0.019 (0.012)	-0.027 (0.019)	-0.005 (0.015)	-0.033 (0.021)	-0.028 (0.020)
Gov_Eff	-0.027 (0.039)	-0.028 (0.031)	0.015 (0.025)	0.010 (0.027)	0.023 (0.017)	0.016 (0.016)	0.030* (0.017)	0.030 (0.018)	0.003 (0.024)	-0.009 (0.029)
Big_Firm_Share	-	-	-	-	-0.086** (0.035)	-0.087** (0.034)	-	-	-	-
const	0.236*** (0.059)	0.208*** (0.048)	0.179*** (0.049)	0.160*** (0.051)	0.104*** (0.029)	0.099*** (0.029)	0.167*** (0.042)	0.100*** (0.032)	0.211*** (0.044)	0.183*** (0.047)
n	261	261	261	261	261	261	216	216	243	243
N	29	29	29	29	29	29	24	24	27	27
F-Statistic	9.843	11.014	9.808	10.502	9.964	11.093	13.125	13.662	10.329	10.778
prob F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R ²	0.488	0.516	0.487	0.504	0.501	0.528	0.610	0.620	0.519	0.530

Table 1.13 (continued)

$MOB_{it} = const + b_1 \cdot EU_Dir_06 + b_2 \cdot Liab_Cap + b_3 \cdot Liab_Reg + b_4 \cdot NAS_const + b_5 \cdot NAS_forb + b_6 \cdot Fee_Cap + b_7 \cdot Joint_Man + b_8 \cdot Part_Rot + b_9 \cdot Firm_Rot + b_{10} \cdot Fee_Disc + b_{11} \cdot Market_Cap + b_{12} \cdot FDI + b_{13} \cdot IFRS_Share + b_{14} \cdot Gov_Eff + \sum b_i \cdot Year_t + \varepsilon_{it}$										
variable	check 6		check 7		check 8		check 9		check 10	
	EU countries only		Without year 2001		Without years 2001 and 2010		Calculated with 4 biggest auditors		Yearly MOB calculation	
	M	ln(TA)	M	ln(TA)	M	ln(TA)	M	ln(TA)	M	ln(TA)
EU_Dir_06	0.018 (0.015)	0.026 * (0.015)	-0.004 (0.010)	0.011 (0.008)	0.022 ** (0.010)	0.021 ** (0.010)	0.028 *** (0.008)	0.025 *** (0.009)	0.001 (0.017)	0.001 (0.018)
Liab_Cap	0.005 (0.035)	-0.007 (0.033)	-0.006 (0.018)	-0.015 (0.021)	-0.017 (0.020)	-0.020 (0.021)	-0.014 (0.027)	-0.018 (0.029)	-0.062 (0.053)	-0.067 (0.054)
Liab_Reg	-	-	0.040 *** (0.010)	0.050 *** (0.008)	0.046 *** (0.008)	0.050 *** (0.008)	0.004 (0.012)	0.003 (0.013)	0.044 ** (0.018)	0.045 ** (0.019)
NAS_const	-0.008 (0.019)	0.008 (0.018)	-0.009 (0.011)	-0.009 (0.010)	-0.001 (0.009)	-0.004 (0.010)	-0.005 (0.011)	-0.004 (0.011)	-0.006 (0.019)	-0.007 (0.020)
NAS_forb	-	-	-	-	-	-	-0.063 ** (0.023)	-0.063 ** (0.024)	-0.113 *** (0.033)	-0.108 *** (0.034)
Fee_Cap	-0.001 (0.024)	-0.001 (0.02)y	-0.006 (0.017)	0.002 (0.014)	0.011 (0.010)	0.011 (0.011)	-0.002 (0.012)	-0.002 (0.012)	0.027 (0.017)	0.027 (0.018)
Joint_man	-0.095 *** (0.019)	-0.090 ** (0.020) *	-0.039 *** (0.011)	-0.021 ** (0.009)	-0.025 *** (0.008)	-0.013 (0.009)	-0.093 *** (0.013)	-0.092 *** (0.013)	-0.046 *** (0.014)	-0.051 *** (0.015)
Part_Rot	-0.006 (0.013)	-0.016 (0.010)	-0.008 (0.009)	-0.009 (0.008)	-0.017 ** (0.007)	-0.017 ** (0.008)	-0.017 ** (0.007)	-0.017 ** (0.007)	-0.025 * (0.014)	-0.029 * (0.014)
Firm_Rot	-	-	-0.010 (0.013)	-0.024 ** (0.011)	0.004 (0.012)	-0.011 (0.013)	0.027 * (0.014)	0.027 * (0.015)	0.099 *** (0.009)	0.098 *** (0.012)
Fee_Disc	-0.010 (0.014)	-0.009 (0.014)	-0.006 (0.011)	-0.005 (0.009)	-0.011 (0.011)	-0.007 (0.011)	-0.006 (0.01)	-0.004 (0.010)	0.016 (0.018)	0.023 (0.019)
Market_Cap	-0.018 (0.014)	0.008 (0.017)	-0.028 * (0.014)	-0.006 (0.016)	-0.007 (0.017)	-0.008 (0.018)	0.014 (0.013)	0.011 (0.014)	-0.01 (0.026)	-0.013 (0.026)
FDI	0.005 (0.004)	-0.004 (0.004)	0.018 ** (0.009)	0.009 (0.007)	-0.003 (0.017)	-0.002 (0.016)	-0.008 ** (0.003)	-0.008 ** (0.003)	0.002 (0.011)	0.002 (0.012)
IRFS_Share	0.017 (0.034)	-0.055 (0.033)	-0.014 (0.016)	-0.023 (0.017)	-0.028 (0.017)	-0.030 (0.018)	-0.012 (0.019)	-0.014 (0.020)	0.001 (0.022)	0.003 (0.024)
Gov_Eff	0.001 (0.037)	-0.003 (0.038)	0.025 (0.019)	0.031 (0.020)	0.012 (0.020)	0.018 (0.021)	0.017 (0.025)	0.017 (0.026)	0.151 *** (0.052)	0.167 *** (0.06)
Big_Firm_Share	-	-	-	-	-	-	-	-	-	-
const	0.136 (0.083)	0.182 ** (0.083)	0.139 *** (0.034)	0.115 *** (0.035)	0.083 ** (0.033)	0.073 ** (0.033)	0.111 ** (0.045)	0.118 ** (0.048)	-0.069 (0.064)	-0.095 (0.072)
n	180	180	232	232	203	203	261	261	261	261
N	20	20	29	29	29	29	29	29	29	29
F-Statistic	6.344	7.404	14.135	14.330	16.074	15.501	6.222	6.232	2.441	2.685
prob F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R ²	0.456	0.494	0.597	0.600	0.650	0.641	0.418	0.418	0.191	0.206

Note: Results of the robustness checks 1 to 10 for the market share mobility measure MOB (robust standard errors in parentheses below the coefficients). *, **, and *** indicate significance at the 10, 5, and 1 percent level, respectively. The R^2 shows the model fit after the country-fixed effects are subtracted. Year dummies are included in the model, but not tabulated.

The robustness checks for the market share mobility measures (see Table 1.13) show results that are mainly in line with our main findings. In particular, the coefficient on *Liab_Reg (Firm_Rot)* is positive in all of the regressions and nonsignificant only in check 9 (check 1, 3 and 8), and the coefficient on *Joint_man (NAS_forb)* is negative and nonsignificant only in the regression for $MOB(\ln(TA))$ in check 8 (in check 3 and for $MOB(\ln(TA))$ in checks 1 and 5). The included control variable *Big_Firm_Share* in check 3 has a significant negative influence on the mobility share. Note that the time trend visible in our main regressions cannot be observed in the regressions for check 10.

Taken together, the robustness checks 1 to 10 support the findings from our main regressions.

However, Puro (1984) documents that the audit firms have a significant influence on the new standards considered by the *Financial Accounting Standards Board (FASB)*. Furthermore, McLeay et al. (2000) found that audit firms had an influence on the implementation of the Fourth European Company Law Directive into German law. Thus, there is the possibility that audit firms lobby also in the case of the implementation of audit market regulations. In countries with a high level of concentration, the market leaders might have more power to effectively prevent the parliament from introducing stricter regulations for their profession than in countries with a lower concentration. To investigate whether the causal relationship between the audit regulation and the market structure we assumed is valid, we test whether there is also the opposite effect, i.e., concentration has an influence on the degree of regulation. In check 11, we include all regulations lagged by one year in our main regression. A significant influence of the (lagged) regulations on the level of concentration is an indication that our assumed relationship is valid, because a future concentration cannot influence the regulation in previous years. As the concentration measures are naturally correlated between the observed periods, we additionally use a Poisson regression model (count data model) with robust standard errors to investigate whether the concentration has an influence on the number of implemented regulations (check 12) or the number of regulatory changes in a country and year (check 13). In these count data models, we regress the number of active regulations and the number of changes in the regulatory environment, respectively, on our concentration measures (CR_4 or HHI), our country control variables, the year dummies, and the country indicators.

Unreported results show that using the lagged regulations in check 11 leads to results that are similar to those of our main regressions. The coefficients on the lagged variables *Liab_Reg*, *NAS_forb*, *Joint_man*, and *Firm_rot* again are significant and have the same signs as in our main regression. This result indicates that the regulations also have an effect on the concentration in the following year. The results of the Poisson regressions show that CR_4 and *HHI* do not have a significant influence on the number of active regulations in each country and year or on the number of changes in the regulations in each country and year. A higher degree of government effectiveness (market capitalization), in contrast, has a significantly positive (negative) effect on the number of active regulations, whereas *FDI* has a significant positive effect on the number of changes in the regulations. To sum up the results of the untabulated checks 11–13, the assumption that regulation causes changes in the market structure seems reasonable.

1.5 Conclusion

In this paper, we present the results of a cross-country study for the years 2001–2010 designed to investigate the effects of single audit regulations both on the supplier concentration and the degree of competition on national audit markets. Our final sample consists of 141,190 firm-year observations of listed companies with a total of 2,439 audit firms, taken from 29 countries. The results of our country-fixed effects models indicate that the existence of a proportionate liability system and the prohibition of the joint supply of audit and non-audit services significantly decrease supplier concentration, whereas joint audits and the mandatory audit firm rotation have the opposite effect. In addition, the prohibition of the joint supply of audit and non-audit services and mandatory joint audits decrease the market share mobility, whereas a proportionate liability regime and the mandatory audit firm rotation are competition-enhancing. Thus, our study confirms that measures intended to increase audit quality indeed have effects on supplier concentration and competition, and that in some cases, these side-effects are not desired by the regulator.

We contribute to the literature in several ways: First, we give a detailed overview of a set of audit regulations effective in various countries. Second, policy setters around the world expressed their concerns about the high level of audit market concentration. The United States Congress, for example, committed the General Accounting Office to conduct a study on supplier concentration and competition as part of the Sarbanes-

Oxley Act of 2002 (United States General Accounting Office 2003a, 2008). Similarly, in the aftermath of the financial crisis, the Commission of the European Union has proposed several measures to improve audit quality *and* to decrease the “systemic risk” arising from the existence of only a handful of audit firms capable of providing statutory audits to large financial institutions (Commission of the European Communities 2011b). The question whether regulations proposed to increase audit quality do also affect supplier concentration and competition at the national level is thus of particular importance to regulators. Third, the majority of audit market studies describe the development of supplier concentration over time, whereas other studies focus on the consequences of a high level of concentration on competition and audit quality. If the reasons for the actual level of supplier concentration are examined, the aspect of supply-side mergers is given prominence. To the best of our knowledge, this study is the first that investigates additional explanations for the *status quo* of supplier concentration. Forth, in emphasizing the interrelations between auditors’ and clients’ decision-making (micro-level) and the regulatory environment (macro-level), we contribute to the ongoing discussion on the relative advantageousness of regulatory means.

One major drawback of our study is that our variables measuring audit regulation take on the value of 1 from that point in time when the respective regulation became effective. To a large extent, we thus neglect the possibility of a lagged influence of the regulations on supplier concentration. In addition, we do not take into account that audit firms and their clients might anticipate future audit market regulations and choose a more efficient auditor-client matching even before the regulations become effective. We refrain from including lagged variables for a detailed analysis because we do not know the appropriate lag for each regulation, and, moreover, we do not have data for a sufficient time span in order to econometrically address this question. If, however, there is a lagged increase (decrease) in concentration, our estimation for the coefficients is rather conservative, because neglecting the lagged effects leads to an observation of lower (higher) concentration levels in the first year(s) after the regulation became effective, which actually lowers the significance of our findings. Furthermore, we do not investigate the effect of an interaction of different regulations. For example, the need for joint audits combined with a fee cap might be more severe than joint audits without a fee cap, and therefore, the effect of the combined regulations on concentration and competition might be more pronounced than the sum of the single effects we document. Because of

the limited sample size, we cannot include all the possible interactions into our model. Further limitations of our study are that our hand-collected data on audit regulation might be sensitive to measurement bias and our dataset is limited, because—by definition—we have only one observation per country and year, and we only observe a period of 10 years.

1.A Appendix

Table 1.14: Audit regulations in various countries

	adoption of Directive 2006/43/EC ¹	liability cap	prohibition of joint supply of audit and non-audit services	mandatory joint audits	duration of single audit contract ²	audit firm rotation	audit partner rotation	disclosure of audit fees	audit fee caps
Australia	no	until 2003: no; since 2004: proportionate liability ³	no ⁴	no (but permitted) ⁵	1 year ⁶	no	until 2002: no; since 2003: yes (7 years) ⁷ , since 2006: 5 years ⁸	yes ⁹	no ¹⁰
Austria	2009	yes ¹¹	partially (some services are forbidden) ¹²	no (but permitted) ¹³	1 year	no ¹⁴	until 2004: no; since 2005: yes (5 years) ¹⁵	until 2007: no; since 2008: yes ¹⁶	yes ¹⁷
Belgium	2009	until 2005: no; since 2006: yes (12 Mio. €) ¹⁸	yes, entirely ¹⁹	no (but permitted) ²⁰	3 years ²¹	no	until 2007: no; since 2008: yes (6 years) ²²	until 2006: no; since 2007: yes ²³	until 2007: no; since 2008: yes ²⁴
Brazil	no	no ²⁵	until 2004: no; since 2005: partially (some services are forbidden) ²⁶	no	since 1999: 5 years ²⁷ ; since 2012: 10 years ²⁸	since 1999: yes ²⁹ (5 years); since 2011: 10 years ³⁰	until 2010: no; since 2011: partially ³¹	until 2002: no; since 2003: yes ³²	until 2002: no; since 2003: yes ³³
Canada ³⁴	no	until 2000: no; since 2001: proportionate liability with exceptions ³⁵	until 2003: no; since 2004: partially (some services are forbidden) ³⁶	no ³⁷	1 year ³⁸	no	until 2002: no; since 2003: yes (5 years) ³⁹ ; since 2010 (7 years) ⁴⁰	until 2003: no; since 2004: yes ⁴¹	no
Czech Republic	2009	no ⁴²	no ⁴³	no ⁴⁴	none	no	until 2008: no; since 2009: yes (7 years) ⁴⁵	until 2008: no; since 2009: yes ⁴⁶	no ⁴⁷
Denmark	2008	no ⁴⁸	no ⁴⁹	1930–2004: yes; ⁵⁰ since 2005: no (but permitted) ⁵¹	1 year	no	until 2002: no; since 2003: yes (7 years) ⁵²	until 2001: no; since 2002: yes ⁵³	until 2008: no; since 2009: yes ⁵⁴

Table 1.14 (continued)

	adoption of Directive 2006/43/EC	liability cap	prohibition of joint supply of audit and non-audit services	mandatory joint audits	duration of single audit contract	audit firm rotation	audit partner rotation	disclosure of audit fees	audit fee caps
Estonia	2010	until 2009: no; since 2010: yes ⁵⁵	no ⁵⁶	no (but permitted) ⁵⁷	none	no	until 2009: no; since 2010: yes (7 years) ⁵⁸	until 2009: no; since 2010: yes ⁵⁹	no
Finland	2008	no	no ⁶⁰	no (but permitted) ⁶¹	none	no	until 2007: no; since 2008: yes (7 years) ⁶²	until 2002: no; since 2003: yes ⁶³	no
France	2008	no	yes, entirely ⁶⁴	yes (for firms that publish consolidated accounts) ⁶⁵	6 years ⁶⁶	no	until 2003: no; since 2004: yes (6 years) ⁶⁷	until 2002: no; since 2003: yes ⁶⁸	no
Germany	2009	since 1998: yes (4 Mio. €) ⁶⁹	until 2004: no; since 2005: partially (some services are forbidden) ⁷⁰	no (but permitted) ⁷¹	1 year	no	yes (7 years) ⁷²	until 2004: no; since 2005: yes ⁷³	yes ⁷⁴
Greece	2009	yes ⁷⁵	no ⁷⁶	no (but permitted) ⁷⁷	1 year	no ⁷⁸	until 2008: no; since 2009: yes (7 years) ⁷⁹	until 2008: no; since 2009: yes ⁸⁰	no
Hungary	2008	no ⁸¹	yes, entirely ⁸²	no (even forbidden) ⁸³	5 years ⁸⁴	no	until 2007: no; since 2008: yes (5 years) ⁸⁵	until 2007: no; since 2008: yes ⁸⁶	no
Ireland ⁸⁷	2010	no	until 2004: no; since 2005: partially (some services are forbidden) ⁸⁸	no (but permitted) ⁸⁹	1 year ⁹⁰	no	until 2004: no; since 2005: yes (7 years) ⁹¹	yes ⁹²	until 2004: no; since 2005: yes ⁹³
Italy	2009	no	until 2005: no; since 2006: partially (some services are forbidden) ⁹⁴	no (even forbidden) ⁹⁵	3 years	since 1974: yes (9 years) ⁹⁶	until 2006: no; since 2007: yes ⁹⁷	until 2005: no; since 2006: yes ⁹⁸	no
Japan	no	no ⁹⁹	until 2003: no; since 2004: partially (some services are forbidden) ¹⁰⁰	no	4 years ¹⁰¹	no	until 2003: no; since 2004: yes (5 or 7 years) ¹⁰²	until 2003: no; since 2004: yes ¹⁰³	no

Table 1.14 (continued)

	adoption of Directive 2006/43/EC	liability cap	prohibition of joint supply of audit and non-audit services	mandatory joint audits	duration of single audit contract	audit firm rotation	audit partner rotation	disclosure of audit fees	audit fee caps
Korean Republic	no	no ¹⁰⁴	until 2002: no; since 2003: partially (some services are forbidden) ¹⁰⁵	no	3 years ¹⁰⁶	until 2002: no ¹⁰⁷ ; since 2003: yes ¹⁰⁸ (6 years)	until: 2000: no; since 2001: yes (3 years) ¹⁰⁹	until 2000: no; since 2001: yes ¹¹⁰	no
Luxembourg	2009	no	no ¹¹¹	no (but permitted) ¹¹²	1 year	no	until 2009: no; since 2010: yes (7 years) ¹¹³	until 2009: no; since 2010: yes ¹¹⁴	no
Netherlands	2008	no ¹¹⁵	no ¹¹⁶	no (even forbidden) ¹¹⁷	1 year	no ¹¹⁸	until 2006: no; since 2007: yes (7 years) ¹¹⁹	until 2007: no; since 2008: yes ¹²⁰	no
Norway	no	no	partially (some services are forbidden) ¹²¹	no (even forbidden) ¹²²	1 year	no	until 2008: no; since 2009: yes ¹²³	yes ¹²⁴	no ¹²⁵
Poland	2009	until 2008: no; since 2009: yes ¹²⁶	no ¹²⁷	no (but permitted) ¹²⁸	1 year	no	until 2008: no; since 2009: yes (5 years) ¹²⁹	until 2008: no; since 2009: yes ¹³⁰	until 2008: no; since 2009: yes ¹³¹
Portugal	2008	no	until 2008: no; since 2009: partially (some services are forbidden) ¹³²	no (even forbidden) ¹³³	4 years ¹³⁴	no	until 2008: no; since 2009: yes (7 years) ¹³⁵	until 2008: no; since 2009: yes ¹³⁶	no ¹³⁷
Slovenia	2008	yes ¹³⁸	until 2008: no; since 2009: partially (some services are forbidden) ¹³⁹	no (even forbidden) ¹⁴⁰	1 year	no	until 2008: no; since 2009: yes (7 years) ¹⁴¹	until 2006: no; since 2007: yes ¹⁴²	no
Spain	2010	proportionate liability ¹⁴³	no ¹⁴⁴	no (but permitted) ¹⁴⁵	3 years ¹⁴⁶	between 1989 and 1995: yes (9 years); since 1995: no ¹⁴⁷	until 2002: no; since 2003: yes (7 years) ¹⁴⁸	until 2002: no; since 2003: yes ¹⁴⁹	no
Sweden	2009	no	no ¹⁵⁰	no (but permitted) ¹⁵¹	5 years ¹⁵²	no	until 2008: no; since 2009: yes (7 years) ¹⁵³	yes ¹⁵⁴	no

Table 1.14 (continued)

	adoption of Directive 2006/43/EC	liability cap	prohibition of joint supply of audit and non-audit services	mandatory joint audits	duration of single audit contract	audit firm rotation	audit partner rotation	disclosure of audit fees	audit fee caps
Switzerland	no	no	no ¹⁵⁵	no (but permitted)	1 year	no	until 2007: no; since 2008: yes (7 years) ¹⁵⁶	until 2001: no; since 2002: yes ¹⁵⁷	until 2007: no; since 2008: yes ¹⁵⁸
Turkey	no ¹⁵⁹	no	until 2002: no; since 2003: the provision of non-audit services is entirely forbidden ¹⁶⁰	no (but permitted) ¹⁶¹	since 2003: 7 years ¹⁶²	until 2002: no; since 2003: yes ¹⁶³	no	no	no
United Kingdom	2008	no ¹⁶⁴	until 2004: no; since 2005: partially (some services are forbidden) ¹⁶⁵	no (but permitted) ¹⁶⁶	1 year	no	until 2004: no; since 2005: yes (5 years) ¹⁶⁷	yes ¹⁶⁸	until 2004: no; since 2005: yes ¹⁶⁹
United States	no	proportionate liability ¹⁷⁰	until 2002: no; since 2003: partially (some services are forbidden) ¹⁷¹	no (but permitted) ¹⁷²	1 year	no	until 2002: no; since 2003: yes (5 years) ¹⁷³	yes ¹⁷⁴	no

Note: The table shows various audit regulations for different countries. The separate notes to Table 1.14 are given below the table.

Notes on Table 1.14

- 1 See Commission of the European Communities (2010b).
- 2 If not indicated otherwise, information is taken from Le Vourc'h and Morand (2011), p. 53f.
- 3 The proportionate liability has been introduced in 2004 with the Audit Reform and Corporate Disclosure Act No. 103.
- 4 The requirements regarding non-audit services are laid down in § 290.158 of the Accounting Professional & Ethical Standards (APES) 110: Code of Ethics for Professional Accountants from 2006, which is based on the International Federation of Accountants (IFAC) Code.
- 5 This information was provided by the Australian Financial Reporting Council.
- 6 See Div. 6, Subdiv. A of the Australian Corporations Act.
- 7 A partner rotation after seven years and a cooling-off period of two years has been introduced with the Professional Statement F1: Professional Independence (F1 2002) (31.12.2003).
- 8 The maximum auditor tenure was shortened to five years with the Corporate Law Economic Reform Program 9 from 07/2004 (effective 2006). However, the Australian Securities and Investments Commission can extend this period for certain audit firms up to seven years (see (Financial Reporting Council (FRC) 2006).
- 9 See § Aus 126.1 and Aus 126.2 of the Australian Accounting Standard Board (AASB) document 101, Presentation of Financial Statements. Since 2004, this regulation is also included in Sec. 300 of the Australian Corporations Act.
- 10 This information was provided by the Australian Financial Reporting Council.
- 11 According to §272 (2) UGB (Unternehmensgesetzbuch), the upper cap depends on the client's size and is between two and 12 Mio. €.
- 12 The regulation regarding the supply of non-audit services can be found in §§ 271, 271a, and 271b UGB (Unternehmensgesetzbuch).
- 13 The information on regulation regarding joint audits was provided by the Austrian Ministry of Justice (Bundesministerium für Justiz).
- 14 A mandatory audit firm rotation after six years was introduced in 2004, but abandoned before the effective date of the law (Parlament der Republik Österreich 2005, 3).
- 15 § 271a Abs. 1 Z 4 UGB (Unternehmensgesetzbuch) requires the rotation of audit partners after five years (effective 2005).
- 16 The disclosure of auditor fees is specified in § 266 Abs. 11 UGB (Unternehmensgesetzbuch) (effective 2008).
- 17 The rules on fee caps can be found in §§ 271 Abs. 2 Nr. 7, 271a Abs. 1 Nr. 1 UGB (Unternehmensgesetzbuch).
- 18 See Commission of the European Communities (2007). Although Belgium has a proportional liability system, the audit market is characterized by a low litigation risk (Knechel and Vanstraelen 2007).
- 19 The independence requirements are laid down in the Royal Decree of January 10th, 1994, in Sections 133 and 134 of the Belgian Companies Code, and in Art. 183 to 186 of the Royal Decree of January 30th, 2001 (PricewaterhouseCoopers 2009). Independence issues are also described in the standards of the Belgian Institute of Registered Auditors (Institut des Réviseurs d'Entreprises (IBR-IRE) 2007). See also Vanstraelen and Willekens (2008).
- 20 If a joint audit is performed, a joint audit report must be issued (Commission of the European Communities 2001b).
- 21 The maximum time span of audit contracts is specified in the Belgian Company Law, Section III, Art. 13. The auditor's term can be renewed without limitation for additional three-year periods (Knechel and Vanstraelen 2007).
- 22 See Institut des Réviseurs d'Entreprises (IBR-IRE) (2007), Standard 6.
- 23 See Van Caneghem (2010).

- 24 See Institut des Réviseurs d'Entreprises (IBR-IRE) (2007), Standard 5.2. For calculating the critical fee threshold (20 percent of the audit network's total revenues within three years), the two years preceding the effective date of June 29th, 2008 are taken into account.
- 25 See Worldbank (2005).
- 26 See CVM Instruction 308 of 05/1999, Art. 23.
- 27 An independent audit firm may not provide services for the same client for a period of more than five consecutive years. A minimum interval of three years before being re-contracted is required (see CVM Instruction 308 of 05/1999, Art. 31).
- 28 Since 2012, companies that have an audit committee can hire an audit firm for up to ten consecutive years (see CVM Instruction 509 of 11/2011).
- 29 An independent audit firm may not provide services for the same client for a period of more than five consecutive years (see CVM Instruction 308 of 05/1999, Art. 31). From 2008 to 2011, due to the introduction of the International Financial Reporting Standards, this rule was postponed and re-instated in 2012 (International Forum of Independent Audit Regulators 2012).
- 30 Since 2012, companies with an audit committee can hire an audit firm for up to ten consecutive years (see CVM Instruction 509 of 11/2011).
- 31 According to information provided by the Brazil Audit Oversight (Comissao de Valores Mobiliarios (CVM)), for firms that extended their rotation period to ten years, since 2011 the CVM requires the rotation of the engagement team's key members after five years.
- 32 See CVM Instruction 381 of 01/2003.
- 33 The revenues an auditor can derive from a single client are restricted to 25 percent of the auditor's total revenues (Worldbank 2005).
- 34 In 1985, the parliament enacted the Business Corporations Act, but the provinces and territories are still responsible for the securities and accounting regulation. They are organized under the Canadian Securities Administrators (CSA) and the Canadian Public Accountability Board (CPAB) as country-wide voluntary umbrella organizations.
- 35 See amendment to the Canadian Business Corporation Act from 2001. There is a proportionate liability for the respective share of judgment. If the other defendants are not able to pay, auditors are liable for payments of up to 50 percent of their own liability.
- 36 This rule has been introduced in 2004 by the Rules of Professional Conduct, Rule 204 of the Institute of Chartered Accountants of Alberta (ICAA) and its counterparts in the other provinces. The aggregate amount of all non-audit services may not exceed 5 percent of the total amount of fees paid to the external auditor during the fiscal year (see instrument Audit Committees MI 52-110, 2.4).
- 37 Until 2002 joint audits were required for banks (Ratzinger-Sackel et al. 2012).
- 38 See Canadian Business Corporation Act, Chapter 57, Part 7, Division 2.
- 39 The disclosure of audit fees has been introduced in 2003 by the ICAA (Rules of Professional Conduct, Rule 204.4 (20)) and its counterparts in the other provinces.
- 40 See the ICAA Rules of Professional Conduct, Rule 204.4 (20) from 2010.
- 41 This rule has been introduced in 2004 by the Ontario Securities Commission (OSC) with instrument Audit Committees MI 52-110 and part of an initiative by the members of the CSA.
- 42 See Commission of the European Communities (2007).
- 43 General independence issues are laid down in the Czech Corporate Governance Code (2004) (Czech Securities Commission 2004) and in Section 14 of the Czech Act on Auditors (2009) (effective March 26th, 2009).
- 44 The information on regulation regarding joint audits was provided by the Czech Audit Public Oversight Council.
- 45 The mandatory partner rotation has been implemented with Section 45 (3) of the Czech Act on Auditors (2009).
- 46 The disclosure of auditor fees was introduced with the Czech Act on Auditors (2009), Section 43 (1ci).
- 47 According to the Czech Audit Public Oversight Council, the amount of fees paid to the audit firm should not threaten auditor independence.

48 Contractual limitations of the auditor's liability are possible.

49 The last change regarding the regulation on the joint provision of audit and non-audit services was made with the Executive Order No. 663 of June 26th, 2008, p. 2f.

50 The Danish Companies Act had prescribed joint audits already in 1930; the regulation is laid down in the Danish Act on Commercial Enterprises' Presentation of Financial Statements, Chapter 25, 165 (6).

51 For financial statements of fiscal years starting from 2005, joint audits have been disestablished in 2001 (André et al. 2011; Ratzinger-Sackel et al. 2012). According to information provided by the Danish Commerce and Companies Agency, joint audits are still permitted (Holm and Thinggaard 2010). The responses to the Green Paper indicate that 16 of Denmark's 64 largest public companies still voluntarily have a joint audit (Commission of the European Communities 2011c, 27).

52 The internal auditor rotation is laid down in the Danish Act on Approved Auditors and Audit Firms, Part 4, p. 25.

53 The disclosure of auditor fees is specified in the Danish Act on Commercial Enterprises' Presentation of Financial Statements (June 7th, 2001), Section 96 (2).

54 The restrictions regarding the maximum fees per client have been implemented with the Danish Act on Approved Auditors and Audit Firms (2008), Part 4, p. 26. Thus, audit firms are not allowed to earn more than 20 percent of their turnover with the same client for five consecutive years.

55 A liability cap has been implemented with the Estonian Accountant Act (January 27th, 2010), § 62(2), (effective March 8th, 2010). The auditor's liability is limited to the tenfold of the client's contract fee.

56 The joint supply of audit and non-audit services is regulated in the Estonian Accountant Act (January 27th, 2010), § 47 and § 59 (3) 3, (effective March 8th, 2010).

57 The information on joint audits was provided by the Estonian Auditors Activities Oversight Council.

58 The mandatory partner rotation has been implemented with the Estonian Accountant Act (January 27th, 2010), § 58 (3) (effective March 8th, 2010).

59 The disclosure of auditor fees has been implemented with the Estonian Accountant Act (January 27th, 2010), § 59 (1) 2 (effective March 8th, 2010).

60 The joint provision of audit and non-audit services is regulated in the Finnish Auditing Act (459/2007), Sections 24 and 25 (effective July 1st, 2007).

61 See Karjalainen (2009). According to information provided by the Auditing Board of the Central Chamber of Commerce (Tilintarkastuslautakunta (TTLA)), joint audits are allowed, but not obligatory. If a joint audit is performed, a joint audit report must be issued (Commission of the European Communities 2001b).

62 The requirement of the internal auditor rotation has been established with the Finnish Auditing Act (459/2007), Section 27 (effective July 1st, 2007).

63 The disclosure of auditor fees has been implemented with the Corporate Governance Recommendation for Listed Companies, Recommendation 54 (effective July 1st, 2004) (Corporate Governance Working Group 2004).

64 The prohibition of the joint supply of audit and non-audit services was accepted in the Code de Commerce, Chapter II, Art. L822-11 II in 2004. Prior to 2004, similar regulations were included in the French Code of Ethics (Gonthier-Besacier and Schatt 2007; Francis et al. 2009; André et al. 2011; Baker et al. 2008; Mikol and Standish 1998).

65 Joint audits are regulated in the Code de Commerce, Chapter II, Art. L 823-2 (effective already in 1966) (Francis et al. 2009, 59f; Ratzinger-Sackel et al. 2012).

66 The maximum time span of an audit contract is specified in the Code de Commerce, Chapter I, Art. L821-1 (4) (André et al. 2011).

67 The requirement of audit partner rotation is laid down in the Code de Commerce, L822-14 (effective 2004).

68 Rules regarding the disclosure of auditor fees can be found in the Loi de Sécurité Financière (2003). Separate information has to be given on audit fees and on non-audit fees paid to each of the two auditors (André et al. 2011).

69 A liability cap exists already since 1931. With the "Gesetz zur Kontrolle und Transparenz im Unternehmensbereich (KonTraG)", the last change of the upper cap was made in 1998. Currently, the upper cap is four Mio. € for audits of listed companies (§ 323 (2) HGB (Handelsgesetzbuch)).

70 Details on restrictions regarding the provision of non-audit services can be found in § 319, Abs. 3, Nr. 3 HGB (Handelsgesetzbuch), which was introduced with the "Bilanzrechtsreformgesetz (BilReG)" 2004 (effective 2005).

- 71 For details on the regulation regarding joint audits, see IDW Institut der Wirtschaftsprüfer in Deutschland e. V. (1999). Although joint audits are permitted, they are used very seldom: In 2011, for example, none of the DAX 30 companies had a joint audit.
- 72 The internal auditor rotation with a cooling-off-period of two years is specified in § 319a, Abs. 1, Nr. 4 HGB (Handelsgesetzbuch).
- 73 § 285, Satz 1, Nr. 17, and § 314, Abs. 1, Nr. 9 HGB (Handelsgesetzbuch). For fiscal years starting after December 31st, 2004, regulations of the “BiReG (Bilanzrechtsreformgesetz)” (2001), which was effective 2005, required the disclosure of the *expenses* for audit and non-audit services in the client’s notes to the financial statements. The “BilMoG (Gesetz zur Modernisierung des Bilanzrechts)”, however, prescribes the disclosure of the total *fees* charged by the audit firm. In addition, since 2007, audit firms providing audit services to public-interest entities are obliged to publish a transparency report that also contains the total of audit and non-audit fees charged (§ 55c WPO (Wirtschaftsprüferordnung), introduced with the BARefG (Berufsaufsichtsreformgesetz)).
- 74 See § 319, Abs. 3, Nr. 5 HGB (Handelsgesetzbuch). An auditor is not allowed to perform the audit for a company from which he/she has earned more than 30 percent of his/her total revenues during the last five years, and if this is expected to be the case also for the current fiscal year.
- 75 According to the Commission of the European Communities (2001a), p. 8, the upper cap is five times the total of the annual emoluments of the President of the Supreme Court or the total of the fees of the liable certified auditor in the previous financial year, provided that the latter exceeds the former limit.
- 76 The last reform of the rules regarding the joint provision of audit and non-audit services was introduced with Law 3693/2008, Chapter IV, Art. 20 (2) and 23 (effective 2008).
- 77 If a joint audit is performed, a joint audit report must be issued (Commission of the European Communities 2001b).
- 78 The external rotation of audit firms was formerly mandatory, but the requirement was removed in 1994 (Ruiz-Barbadillo et al. 2009, Fn. 3).
- 79 The rotation of audit partners was introduced with Law 3693/2008, Chapter X, Art. 38, 2A (effective 2008).
- 80 The disclosure of auditor fees was introduced with Law 3693/2008, Chapter X, Art. 1 (i) (effective 2008).
- 81 See Act LXXV (2007), Section 60.
- 82 The information on the regulation of non-audit services was provided by the Chamber of Hungarian Auditors. The rules were revised by Act LXXV (2007); the relevant articles can be found in sections 53 and 63.
- 83 The information on joint audits was provided by the Chamber of Hungarian Auditors.
- 84 A similar regulation already existed before the introduction of Act LXXV (2007), Section 58 (1) (Worldbank 2004).
- 85 The internal rotation has been implemented with the Act LXXV (2007), Section 58 (2) (effective 2008).
- 86 The mandatory disclosure of auditor fees has been implemented with the Act LXXV (2007), Section 55 (i) (effective 2008).
- 87 All statutory auditors in Ireland are also bound to the standards of the Auditing Practices Board (APB), which is part of the U.K. Financial Reporting Council (FRC).
- 88 Detailed requirements regarding the joint supply of non-audit services have been introduced in 2004 with Ethical Standard 5, and revised in 2008 and 2010 (Auditing Practices Board 2011). Information on the Ethical Standards can also be found in Beattie et al. (2011).
- 89 See section “Appointment of Auditors” - S160 of the Companies Act (1963) and section “Auditors Report” - S193 of the Companies Act (1990). A joint report is not required (Commission of the European Communities 2001b).
- 90 The duration of the audit contract is described in the S160 (1) of the Irish Companies Act (1963).
- 91 The key partner rotation was introduced with Auditing Practices Board Ethical Standard 3 in 2004 and revised in 2008 and 2009 (Auditing Practices Board 2009).
- 92 Since 1963, audit fees have to be disclosed in the notes to the profit and loss account, but different categories are not required (Companies Act of 1963, Sixth Schedule, Part I, 13). With Regulation 120 of Statutory Instrument 220 of 2010, the requirement for a detailed presentation of the fees has been inserted into Section 161D of the Companies Act for fiscal years ending on or after August 20th, 2010.
- 93 See Turley (2008).

- ⁹⁴ The joint provision of audit and non-audit services is specified in the Decreto Legislativo (February 24th, 1998), n. 58, Art. 160 (modified December 23rd, 2005).
- ⁹⁵ According to the information provided by the Italian audit oversight Commissione Nazionale per le Società e la Borsa (CONSOB), joint audits of two or more audit firms are forbidden (see Commission of the European Communities (2001)).
- ⁹⁶ Decreto Legislativo (February 24th, 1998), n. 58, Art. 159 (4) prescribes the audit firm rotation. The cooling-off period is three years (Cameran 2008, 160).
- ⁹⁷ See Decreto Legislativo (February 24th, 1998), n. 58, Art. 160 (modified December 25th, 2006).
- ⁹⁸ See Cameran (2008).
- ⁹⁹ See Audit Special Exceptions Law of the Commercial Code.
- ¹⁰⁰ The restrictions have been introduced with Art. 24-2 and 34-11-2 of the Certified Public Accountant Act from 2003. Tax consulting had been already forbidden before 2004 (see Art. 52 Licensed Tax Accounting Law).
- ¹⁰¹ See Japanese Company Law Art. 336 (1).
- ¹⁰² The seven-year partner rotation with a two-year cooling-off period has been introduced with Art. 24-3 and 34-11-3 of the Certified Public Accountant Act from 2003. According to Art. 34-11-4 of the Certified Public Accountant Act from 2007, for audit firms with 100 or more listed clients, there is a five-year rotation rule with a five-year cooling-off period.
- ¹⁰³ The fee disclosure has been introduced in 2003 with the corporate disclosure system reform.
- ¹⁰⁴ See Art. 17 of the Korean Act on External Audit of Stock Companies from 12/1980.
- ¹⁰⁵ This regulation was implemented with Art. 21 (2) of Act No. 6994 from 12/2003 amending the Certified Public Accountant Act.
- ¹⁰⁶ See Art. 4-2 of the Act on External Audit of Stock Companies from 12/1980: Any stock-listed corporation shall appoint an auditor every three business years.
- ¹⁰⁷ From 1991 to 2002, Korea had a selective auditor rotation, i.e., the regulatory authority could designate an audit firm to clients with a high potential for manipulations (Kim and Yi 2009).
- ¹⁰⁸ The audit firm rotation has been introduced with Art. 4-2 (4) of Act No. 6991 of 12/2003, amending the Act on External Audit of Stock Companies.
- ¹⁰⁹ The audit partner rotation is mandatory due to Art. 3(5) and (6) from Act No. 6427 of 03/2001, amending the Act on External Audit of Stock Companies.
- ¹¹⁰ Since 2001, audit hours and audit fees have to be published (Behn and Lee 2009).
- ¹¹¹ Independence issues are described in the Luxembourg Law on the Audit Profession (December 18th, 2009), Chapter 3, Art. 19 (2).
- ¹¹² If a joint audit is performed, a joint audit report must be issued (Commission of the European Communities 2001b).
- ¹¹³ The internal auditor rotation has been implemented with the Luxembourg Law on the Audit Profession (December 18th, 2009), Chapter 9, Art. 75 (2).
- ¹¹⁴ The disclosure of the auditor fees has been adopted with the Luxembourg Law on the Audit Profession (December 18th, 2009), Chapter 9, Art. 73 (i).
- ¹¹⁵ Contractual limitations of auditor liability are possible (Meuwissen and Wallage 2008).
- ¹¹⁶ Further details on the scope of services can be found in the Dutch Audit Firms Supervision Act (January 19th, 2006), Art. 23 (b). On February 14th, 2012, however, the Dutch Parliament approved a bill that prohibits the provision of non-audit services to the company for which the auditor provides the statutory audit.
- ¹¹⁷ According to the information provided by the Netherlands Institute of Chartered Accountants (Nederlandsche Beroepsorganisatie van Accountants (NBA)), it is permitted to hire two or more auditors. But according to the law, only one auditor is responsible for the audit report, and shared liability is not allowed.
- ¹¹⁸ On February 14th, 2012, the Dutch Parliament approved a bill that requires the external rotation after eight years and a cooling-off period of two years. It is expected that mandatory audit firm rotation will be applicable as of January 2014.
- ¹¹⁹ For the regulation on audit partner rotation, see the Dutch Audit Firms Supervision Act (19.01.2006), Art. 24 (1).
- ¹²⁰ The disclosure of auditor fees is laid down in the Dutch Audit Firms Supervision Act (19.01.2006), Art. 2:382a BW (enforced 2008).

- ¹²¹ For details regarding the scope of services, see the Act on Auditing and Auditors (effective 1999), Sections 4-5 and 4-6, in 2005 amended by the Regulations on Auditing and Auditors, Sections 4-3, 4-4, and 4-5.
- ¹²² The regulation regarding shared audits is contained in the Act on Auditing and Auditors (1999), Section 2-2; see also the regulations contained in the Auditors Act (1964). According to the information provided by the Department for Accounting and Auditing Supervision, an entity may elect more than one auditor, but in the last decades, this had not happened in practice. Moreover, if two or more auditors were to be elected, they would have to submit their own audit report (and not a single report), i.e., joint audits are prohibited (at least since 1999).
- ¹²³ For the regulation on partner rotation, see the Act on Auditing and Auditors (1999), Section 5a-4, revised in 2009 due to the Statutory Audit Directive (effective July 1st, 2009).
- ¹²⁴ The disclosure of auditor fees is mandatory since 1990 (Firth 1997).
- ¹²⁵ The fees earned from one client should not constitute such a large proportion of the auditor's total fees that they might influence the auditor's independence (see Act on Auditing and Auditors (1999), Section 4-6).
- ¹²⁶ Liability caps have been introduced with the Act on Statutory Auditors, Their Self-Governing Organisation, Entities Authorised to Audit Financial Statements and on Public Oversight (7 May 2009), Art. 51.
- ¹²⁷ Non-audit services are described in the Act on Statutory Auditors, Their Self-Governing Organisation, Entities Authorised to Audit Financial Statements and on Public Oversight (7 May 2009), Art. 48 (2). Independence issues are described in Art. 56 (3).
- ¹²⁸ According to the information provided by the Polish Ministry of Finance, joint audits are neither required nor prohibited by law.
- ¹²⁹ Independence issues are specified in the Act on Statutory Auditors, Their Self-Governing Organisation, Entities Authorised to Audit Financial Statements and on Public Oversight (7 May 2009), Art. 89 (1).
- ¹³⁰ The mandatory disclosure of auditor fees has been established with the Act on Statutory Auditors, Their Self-Governing Organisation, Entities Authorised to Audit Financial Statements and on Public Oversight (7 May 2009). This information was provided by the Polish Ministry of Finance.
- ¹³¹ The restrictions regarding the maximum fees per client have been established with the Act on Statutory Auditors, Their Self-Governing Organisation, Entities Authorised to Audit Financial Statements and on Public Oversight (7 May 2009). This information was provided by the Polish Ministry of Finance.
- ¹³² The corresponding restriction on non-audit services has been introduced by the Decreto-Lei n° 224/2008 (Order of Chartered Accountants) (November 20th, 2008), Title 2, Section 5, Art. 68 (7-12).
- ¹³³ According to information provided by the Portuguese Institute of Statutory Auditors (Ordem dos Revisores Oficiais de Contas (OROC)), due to the Portuguese Commercial Companies Code and the Portuguese Commercial Registry Code, only one auditor can be appointed and be responsible for signing the audit report.
- ¹³⁴ See Decreto-Lei Nr. 487/99 (November 16th, 1999), Title II, Chapter I, Section II, Art. 54.
- ¹³⁵ The internal auditor rotation is specified in the Decreto-Lei n° 224/2008 (November 20th, 2008), Art. 54 (2).
- ¹³⁶ The disclosure of auditor fees is regulated in the Decreto-Lei n° 224/2008 (November 20th, 2008), Art. 62, 1 (i).
- ¹³⁷ The restrictions regarding the maximum fees per client are contained in the Decreto-Lei n° 224/2008 (November 20th, 2008), Art. 68 (6): The risk of personal interest exists especially when the independence of the auditor may be endangered (...) by virtue of a direct or indirect financial contribution by the client or a reliance on the fees payable by the customer for audit or other services.
- ¹³⁸ See Commission of the European Communities (2001a, 9).
- ¹³⁹ The restrictions regarding the provision of non-audit services have been established with the Slovenian Auditing Act (ZRev-2) (June 30th, 2008), Art. 45 (1) (effective 2009).
- ¹⁴⁰ According to information provided by the Slovenian Agency for Public Oversight of Auditing, the possibility to perform joint audits is not set out in the Slovenian legislation.
- ¹⁴¹ The audit partner rotation has been introduced with the Slovenian Auditing Act (ZRev-2) (June 30th, 2008), Art. 45 (2) (effective 2009).

- ¹⁴² The mandatory disclosure of audit fees has been introduced with the Slovenian Companies Act (2006) (effective 2007).
- ¹⁴³ The auditor is liable only for his/her share of judgment. The auditor's liability is laid down in Royal Legislative Decree 19/1988 (July 12th, 1988), Art. 11. It was amended by Royal Legislative Decree 1/2011 (July 1st, 2011), Art. 22.
- ¹⁴⁴ Further details on the scope of services can be found in the Spanish Act on Auditing, approved by the Royal Legislative Decree 1/2011 (July 1st, 2011), Art. 13.
- ¹⁴⁵ Joint audits are described in the By-Law Royal Decree 1636/1990 (December 29th, 1990), Art. 12.2.
- ¹⁴⁶ See Real Decreto Legislativo 1/2011 (July 1st, 2011), Chapter III, Art. 19 (1).
- ¹⁴⁷ The mandatory audit firm rotation has been introduced with the Spanish Audit Law, Art. 8.4 (enacted in 1988 in response to the Company Law Directives of the European Economic Union), and abandoned in 1995 (Ruiz-Barbadillo et al. 2009).
- ¹⁴⁸ The audit partner rotation has been introduced with the Spanish Act on Auditing (2002), which has been modified by the Act on Auditing approved by the Royal Legislative Decree 1/2011 (July 1st, 2011), Art. 19.2.
- ¹⁴⁹ The disclosure of auditor fees has been implemented with the Spanish Financial System Reform Act (2002).
- ¹⁵⁰ Non-audit services are described in the Swedish Auditors Act (2001:883), Section 21 (effective January 1st, 2002).
- ¹⁵¹ Swedish firms can voluntarily engage more than one audit firm to perform the audit (Haapamäki et al. 2011). Although a joint audit report is not required, it is current practice if a joint audit is performed (Commission of the European Communities 2001b). According to information provided by the Swedish Supervisory Board of Public Accountants (Revisorsnämnden), this regulation is effective at least since the Swedish Companies Act of 1975 (1975:103), which has been revised with the Companies Act of 2005 (2005:551).
- ¹⁵² See Swedish Auditors Act (2001:883), Section 18: "The period of validity for approval, authorization and registration is five years."
- ¹⁵³ The audit partner rotation has been introduced with the Swedish Companies Act (2005:551), Chapter 9, Section 21 (effective July 1st, 2009).
- ¹⁵⁴ The disclosure of auditor fees was adopted with the Swedish Annual Accounts Act (1995:1554), Chapter 5 § 21.
- ¹⁵⁵ Non-audit services are described in Art. 729 of the Obligationenrecht. However, audit firms have to follow the "Independence Guidelines" of the Swiss Federal Audit Oversight Authority (Richtlinien zur Unabhängigkeit, December 6th, 2010). Thus, the auditor is not allowed to provide corporate finance, management consulting or IT services related to accounting, or to take over any management responsibility.
- ¹⁵⁶ The corresponding Art. 730a (2) has been added to the Obligationenrecht in 2005 (effective January 1st, 2008). The cooling-off period is three years.
- ¹⁵⁷ The disclosure of auditor fees has been introduced with the Corporate Governance-Richtlinie in 2002 (SWX Swiss Exchange 2008).
- ¹⁵⁸ See Revisionsaufsichtsgesetz (2005), Art. 11 (a) (effective January 1st, 2008): The fees earned from providing audit and non-audit services to a single entity are restricted to 10 percent of the audit firms' total fees.
- ¹⁵⁹ Some parts of the Directive 2006/43/EC have been adopted (e.g., the liability requirements).
- ¹⁶⁰ A restriction on the provision of non-audit services has been introduced in 2002 (Capital Markets Board of Turkey 2002a).
- ¹⁶¹ Under certain conditions, joint audits are allowed (Worldbank 2007).
- ¹⁶² See Capital Markets Board of Turkey (2002b).
- ¹⁶³ A mandatory rotation of audit firms has been introduced in 2002 (Capital Markets Board of Turkey 2002b); listed companies and financial institutions have to change their audit firms after a continued auditor-client contractual relationship of seven years, at the maximum. The first mandatory audit firm changes thus took place in 2010.
- ¹⁶⁴ Contractual limitations of the auditor's liability have been introduced with sections 532 to 538 of the Companies Act from 2006 (effective April 8th, 2008).
- ¹⁶⁵ Detailed requirements on non-audit services have been introduced with Ethical Standard 5 in 2004 and revised in 2008 and 2010 (Auditing Practices Board 2011).
- ¹⁶⁶ If a joint audit is performed, a joint audit report must be issued (Commission of the European Communities 2001b).

- ¹⁶⁷ The key partner rotation has been implemented with Auditing Practices Board Ethical Standard 3 in 2004 and has been revised in 2008 and 2009 (Auditing Practices Board 2009).
- ¹⁶⁸ The disclosure of audit fees has been implemented in 1967 (Companies Act 1967) and the additional disclosure of non-audit fees in 1991 (Companies Act 1989). Both disclosure requirements have been revised in Statutory Instrument (2005), No. 2417, Nr. 4.
- ¹⁶⁹ See Turley (2008).
- ¹⁷⁰ Auditors are held liable in proportion to their share of professional judgment (a detailed discussion of the U.S. liability rules can be found in Hemraj (2002) and Francis (2008).
- ¹⁷¹ The Sarbanes-Oxley Act of 2002, Title II, Sec. 201 (g) prohibits any registered audit firm from providing to public companies bookkeeping, financial information system design or implementation, appraisal and valuation services, actuarial services, internal audit outsourcing, management and human resources functions, investment advising services, legal services, and expert services. Sec. 202 clarifies that the statutory auditor can supply some kinds of non-audit services, but only if the audit committee approves this course of action.
- ¹⁷² This information was provided by the United States Securities and Exchange Commission (SEC).
- ¹⁷³ The audit partner rotation has been implemented with the Sarbanes-Oxley Act of 2002, Title II, Sec. 203 (j). The cooling-off period for key audit partners is two years.
- ¹⁷⁴ The disclosure of auditor fees was introduced in 2000 (Securities and Exchange Commission 2000; Choi et al. 2008, 68).

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Chapter 2:
Audit Market Regulation and Earnings
Characteristics: Cross-Country Evidence on the
Role of the Audit Market Structure

2.1 Introduction

The seminal papers of Ball et al. (2003) and Leuz et al. (2003) document the importance of a countries' institutional and legal environment for accounting information. Subsequent studies have extended our understanding of the influence of country-level factors on the characteristics of the earnings reported. In addition to the accounting standard system applied, the literature has identified several country-specific attributes that affect management's reporting behavior, including capital requirements, tax regulations, non-tax regulations, and litigation (this classification follows Dechow et al. 2010).

Some of the research on non-tax regulations addresses the audit profession. A credible control of the published accounting information conducted by the statutory auditor is necessary to maintain or establish trust and market confidence in corporate reporting. Because a published financial statement is always a joint statement of the reporting firm and its auditor (Antle and Nalebuff 1991), the existence of a strong link between the audit regulation and management's accounting choices does not come as a surprise. In the aftermath of the 2007 financial crisis, the audit profession once more came under regulatory pressure (see Association of Chartered Certified Accountants (ACCA) 2011, for an overview) and several oversight bodies have initiated new debates about audit regulation.⁴⁸ However, some of the proposed regulatory measures already had appeared in the public debate during the last decade, but had been rejected by the regulatory authorities in most countries. These measures include the mandatory audit firm rotation, joint audits, and a limitation of the fees paid to the audit firm. Some other frequently discussed measures, including the restriction of the joint supply of audit and non-audit services, the mandatory audit partner rotation, and the disclosure of the fees paid to the audit firm have been implemented in most of the countries. Finally, some regulations had been discussed in the past, but are not part of the current debate anymore (e.g., restrictions on auditor liability). Despite the ongoing debate among regulators, academics, and practitioners, the empirical evidence on the association between regulatory measures intended to improve the quality of audited financial statements and earnings characteristics is mixed. Therefore, it is an empirical question whether the already implemented or currently discussed regulatory measures fulfill their intended purpose to increase the quality of accounting information. Our paper aims at shedding more light

⁴⁸ See European Commission (2010) and Public Company Accounting Oversight Board (2011).

on the marginal effects of different audit regulations in a cross-country context, and thus answers the call for future research on the role of institutions issued by Francis (2011).

Prior research points towards the importance of a country's underlying legal framework for the management's incentives to truthfully report its earnings (Ball et al. 2000; Leuz et al. 2003; Burgstahler et al. 2006; Bushman and Piotroski 2006; Lang et al. 2006; Francis and Wang 2008).⁴⁹ Regarding audit market regulation, there is so far no conclusive empirical evidence on the marginal effect of single regulatory interventions. A common limitation of most studies is grounded in their focus on single measures in isolated settings, neglecting possible complementarities and substitution effects with other regulatory measures. To the best of our knowledge, Maijor and Vanstraelen (2006) is the only study that analyzes the level of earnings management conditional on the full regulatory environment of the audit profession by comparing France, Germany, and the U.K. These authors document that the level of abnormal working capital accruals is lowest for France, which they characterize as the country with the tightest restrictions for the audit profession. However, by using an aggregated country indicator, Maijor and Vanstraelen (2006) focus on the regulatory environment as a whole and do not differentiate between the various measures in place. Therefore, the measures' marginal effects and potential complementarities or substitution effects cannot be identified.

A second explanation for the mixed empirical findings regarding the effects of regulatory measures on earnings characteristics is using data from a single country instead of applying cross-country designs. Countries differ widely in their audit market structures (Francis et al. 2013; Hess and Stefani 2013) and so far it is unclear whether and how the audit market structure affects the influence of the regulatory measures. However, there is evidence for an association between audit market concentration and different characteristics of earnings (Kallapur et al. 2010; Boone et al. 2012; Francis et al. 2013). Hence, if the market concentration has an influence on the initial value of an earnings characteristic, the effectiveness of the audit regulation might, among others, depend on the level of concentration. For example, it is reasonable to assume a less pronounced effect of a regulation that decreases discretionary accruals in a scenario where the initial level of discretionary accruals is already low. The assumption that the effect of a regula-

⁴⁹ The analyzed dimensions of the legal framework are, for example, the countries' legal origin, the level of investor protection, the quality of the judicial system, the strength of public and private enforcement, and the level of state involvement in the economy.

tory measure depends on the market structure could at least partly explain the diverging findings documented in the empirical literature.

Moreover, there could be several indirect or secondary effects resulting from an effect of audit regulations on earnings characteristics. For example, prior research has documented a significant influence of the characteristics of the reported earnings on the companies' cost of capital. More specifically, Bhattacharya et al. (2003) find a positive (negative) correlation between the costs of capital (trading volume) and the level of earnings opacity (measured as earnings aggressiveness, loss avoidance, and smoothing). The results obtained by Francis et al. (2004) confirm these findings. Moreover, DeFond et al. (2007) report a higher informativeness of annual earnings announcements in countries with lower levels of earnings management. Furthermore, Biddle et al. (2009) find a lower likelihood of over- and under-investments in firms with a higher accrual quality. These results highlight the countries' needs to establish a reliable reporting and investment environment to guarantee a well-functioning capital market. Audit market regulation can be seen as one possible way to reach this goal.

In the present study, we rely on Hess and Stefani (2013), who provide time-series data on the existence of seven regulatory measures (i.e., the auditor's liability regime, the joint supply of audit and non-audit services, joint audits, mandatory audit firm rotation, mandatory audit partner rotation, the disclosure of auditor fees, and the limitation of the auditor fees) for 29 countries. Thus, we are able to identify the marginal effects of a single regulatory measure on audit quality, taking into account the existence of other regulations and the market structure of a national audit market. This approach mitigates the identification problems inherent in prior research. By conducting an analysis of the effect of regulations conditional on the market structure, we improve our understanding of the interaction between audit regulations, the levels of concentration and competition, and earnings characteristics. Our analysis is based on a sample of 88,180 firm-year observations of 12,639 firms for the period between 2002 and 2011. We focus on three commonly used earnings characteristics: (1) discretionary accruals (absolute discretionary accruals and subsamples of firms with positive (negative) discretionary accruals), (2) the tendency of firms to avoid small losses, and (3) the asymmetric recognition of economic profits and losses in accounting income. Reported financial statements are a joint statement of the auditor and the client (Antle and Nalebuff 1991) and, hence, a high quality of the earnings directly relates to audit quality. For example, if the auditor

restricts opportunistic earnings management, the audit is of a higher quality (Becker et al. 1998; Francis et al. 1999). Therefore, we use the earnings characteristics as measures for audit quality.

For several regulatory measures, we document an effect on our used characteristics of earnings. However, some of these measures work in different directions, i.e., whereas some regulations increase audit quality, others have a negative effect on quality. Moreover, we find that also the structure of the audit market has an influence on the regulatory measures' effectiveness. We document that most of the regulatory measures have an effect only in markets with either a high or a low level of concentration. Overall, we document a quality-enhancing effect for the restriction of the joint supply of audit and non-audit services, the disclosure of auditor fees, and a restriction on auditor fees. In contrast, a mandatory audit firm rotation requirement reduces audit quality. The effect of the auditor's liability regime, joint audits, and the mandatory audit partner rotation is more ambiguous, because they influence only single proxies of audit quality. Nevertheless, all significant coefficients are negative. Thus, these regulations are either ineffective or even lead to undesired effects. Taking into account the audit market structure, we find that regulations that increase discretionary accruals are more likely to be effective in audit markets with a high level of concentration. In contrast, regulations that restrict earnings management through discretionary accruals are more likely to work in audit markets with a low level of concentration. Regarding loss avoidance and conservatism, the level of audit market concentration is less important, although we document more significant effects in audit markets with a low concentration. In contrast to the concentration, the level of competition in the audit market does not seem to have an influence on whether a regulatory measure has an effect on our used earnings characteristics.

Our findings contribute to the literature in several ways and have important practical implications. In contrast to prior studies, we investigate the individual effect of the most prominent audit regulations on various earnings characteristics, simultaneously using a large set of regulatory measures. Thus, we provide an explanation for the mixed evidence regarding the influence of regulatory measures on the characteristics of reported earnings, as documented in prior studies. Our findings further extend the understanding of the potential consequences of audit regulations. This issue is especially important because different audit regulations affect the earnings characteristics we investigate in different directions. Our findings imply that regulators have to be careful with the intro-

duction of new regulatory measures, because some of them might have no effect on audit quality or even have undesired consequences in a given regulatory regime. Furthermore, we provide empirical evidence on a regulation's effectiveness conditional on the respective market structure. We thus combine two streams of audit research, namely on audit market structure and on the audit profession's institutional environment. With respect to these two areas, Francis (2011, 140) states that "*we have barely scratched the surface in our understanding.*" Our findings highlight the necessity of a comprehensive research approach to reflect these interactions. This information is also important for regulators, since they should consider the level of concentration in their assessment of the effectiveness of a planned regulation. As a further consequence, the international harmonization of audit regulation does not necessarily level the playing field, as long as national audit markets are characterized by different market structures and different starting positions regarding the regulations in place.

The remainder of this paper is structured as follows. Section 2.2 describes the regulatory measures considered and reviews the existing literature on their association with key characteristics of earnings. Section 2.3 explains the earnings characteristics we use in our study, and Section 2.4 presents the research design and describes our sample. We report our results in Section 2.5, and in Section 2.6 we present several robustness checks. Section 2.7 contains a conclusion.

2.2 Background

There are various factors that influence the characteristics of earnings. In addition to company-specific characteristics and audit firm-specific attributes (e.g., audit fees, the size of the audit firm, the industry specialization of the audit firm), the institutional and the regulatory environment as well as the structure of the audit market have a significant influence on the characteristics of the reported earnings (see Dechow et al. 2010, for an overview). So far, research addressing the institutional setting of the audit profession has only focused on single regulatory measures and their effects on the reported earnings. However, these studies do not fully take into account the effect of other regulations already in existence (or regulatory changes) and the underlying audit market structure. For example, the fact that the Sarbanes-Oxley Act contained several regulatory changes hinders the identification of the marginal effects if only single regulations are investigated. We address this issue by analyzing within one model several regulations

that might influence the audit firms' behavior and, as a consequence, the firms' accounting choices. The following sections describe the regulatory measures we take into account, give a brief review of the corresponding literature, and discuss possible effects on audit quality. Detailed literature overviews for company- and audit firm-specific attributes and their influence on the earnings characteristics can be found, for example, in Francis (2004), Francis (2011), and Knechel et al. (2013).

Restricted Auditor Liability

The auditor's liability can be classified into three major regimes: (1) An unlimited liability (in some countries with the possibility for contractual limitations), where auditors are jointly and severally liable with other parties for the plaintiff's loss, (2) a proportionate liability, where auditors are liable only for their share of judgment, and (3) a liability regime where the auditor's liability is limited to an upper bound specified within a country's law (i.e., a liability cap in the form of a fixed amount or a multiple of the auditor fees).

The arguments in favor of a restriction of the auditors' liability are based on the role of unlimited liability as a barrier to market entry. But the auditors' liability also influences audit quality. Because audit effort is a function not only of the client's size and complexity, but also of the auditor's risk, auditors should react with a reduction of audit effort if the litigation risk (or the corresponding payment) is reduced. Moreover, restricted liability diminishes the incentive to report detected accounting standard violations, which would result in a lower level of audit quality. However, as Ewert and London Economics (2006) point out, the "*ultimate evaluation of this effect*" depends on the specific market context (see Ewert and London Economics 2006, 143 f., for a discussion).

The empirical evidence regarding the consequences of a restricted liability on audit quality is mixed. Based on a reduced legal liability in the U.S. (an increased legal liability in Germany), Lee and Mande (2003), Francis and Krishnan (2002), Geiger et al. (2006), and Gassen and Skaife (2009) document a decrease (an increase) in audit quality. Francis and Wang (2008) compare 42 countries and report less total and abnormal accruals in countries with greater investor protection (using the La Porta et al. (2006) liability index that specifically reflects the auditors' liability). In contrast, Ewert and

London Economics (2006) find no significant differences with respect to accrual quality in 17 EU-Member states with different liability regimes.

Joint Provision of Audit and Non-Audit Services

A restriction or prohibition of the joint supply of audit and non-audit services for the statutory auditor is the most frequently discussed measure to increase the independence of the auditor from his/her client. Whereas the *International Standards on Auditing (ISA)* require the audit firm to eliminate self-review threats (*ISA* 220 Para. 11, *ISA* 260 Para. 17, *ISA* 260 Para. A. 21 and A. 22), today several countries have more restrictive regulations regarding the joint supply of audit and non-audit services. In most countries, these restrictions were introduced in the years after the prominent accounting scandal of Enron in 2001. Moreover, in a few countries, for the statutory auditors it is entirely forbidden to provide any non-audit services to their audit clients (see Hess and Stefani 2013). The 2007 financial crisis again triggered a discussion on tighter restrictions on the supply of non-audit services (see European Commission 2010). The current draft of the new EU-Directive, approved by the European Parliament on 3rd April 2014, contains more rigorous restrictions on the supply of non-audit services, including a prohibition of certain non-audit services in Article 5. Paragraph 1 further specifies that these restrictions are limited to (1) the period between the beginning of the fiscal year audited and the issuing of the audit report and (2) the financial year immediately preceding this period (European Parliament 2014). Irrespective of the period where non-audit services are supplied, the fees for non-audit services are limited to 70% of the average of the fees paid for the audit in the last three consecutive financial years (Article 4, paragraph 2).

The effect of a restriction on the joint supply of audit and non-audit services on audit quality is ambiguous. On the one hand, non-audit services create knowledge spillovers that can increase audit quality. On the other hand, a large amount of fees for non-audit services is seen as a threat to auditor independence because larger fees increase the auditors' economic dependence from their clients. Beck and Wu (2006) use a theoretical approach to analyze the influence of non-audit services on audit quality. They show that a large amount of non-audit services can reduce audit quality, because there is an incentive for the auditor to supply services that increase the auditor's engagement risk and reduce audit quality. In contrast, the theoretical work of Bleibtreu and Stefani (2012b) shows that non-audit services can increase audit quality due to a higher number of audit firms active in the market and the resulting increase in auditor industry specialization.

However, Bleibtreu and Stefani (2012b) also show that the relation between the auditor's scope of services and audit quality depends on the kind of non-audit service supplied, i.e., a decrease of audit quality is also possible.

In addition, there is no conclusive empirical evidence in favor of an association between the joint supply of non-audit services and audit quality. Mainly based on non-audit fees as a proxy for the extent of non-audit services provided, DeFond et al. (2002), Ashbaugh et al. (2003), Chung and Kallapur (2003), Larcker and Richardson (2004), Reynolds et al. (2004), and Ruddock et al. (2006) do not find evidence for a connection between different earnings characteristics and the provision of non-audit services. Frankel et al. (2002), Ferguson et al. (2004), Srinidhi and Gul (2007), Basioudis et al. (2008), and Hoitash et al. (2007), in contrast, report a negative association between non-audit services and various measures for audit quality, i.e., the joint provision of audit and non-audit services decreases the quality of audited financial statements. In addition, it is still unclear whether market participants indeed regard non-audit services as critical. For example, Raghunandan (2003), Francis and Ke (2006), and Quick and Warming-Rasmussen (2009) show that investors react negatively to large amounts of non-audit fees, but Ghosh et al. (2009) find no association between high non-audit fee levels and earnings response coefficients.⁵⁰

Disclosure of Auditor Fees

In most of the countries we analyze, the disclosure of the fees paid to the statutory audit firm is mandatory. However, there are substantial differences with respect to the date of the introduction of this rule and the scope of information required to be disclosed. For example, listed companies in the European Union and in the U.S. have to disclose their fees paid to the auditor in four categories (audit fees, audit-related fees, tax fees, and other fees), whereas companies in Australia have to separate their auditor fees only into three categories (audit fees, non-audit fees, and related practice fees), and firms in Switzerland have to distinguish only between audit fees and non-audit fees.

The disclosure of the auditor fees can have an ex-ante disciplining function on the client's reporting behavior. Schelleman and Knechel (2010) show that auditors react to more aggressive earnings management by increasing the audit effort, which, in turn, increases audit fees. An increased audit or estimation risk will also result in higher audit

⁵⁰ For an overview and further discussions see Beattie and Fearnley (2002), Canning and Gwilliam (2003), and Francis (2006).

fees. For example, Mohrmann et al. (2013) document that abnormal audit fees charged by non-Big 4 auditors⁵¹ contain information about the overall reliability of the financial statements and about the riskiness of a bank's Level 3 fair value portfolio. Thus, high levels of audit fees are a possible indication for earnings management or managerial discretion. Therefore, the client could anticipate the probability of the uncovering of manipulations and ex-ante reduce the level of earnings management. In this case, the auditor fee disclosure requirement could increase audit quality. The disclosure of the non-audit fees⁵² can also reveal possible economic bonds between the client and the auditor. This should have a disciplining function on both the client and the auditor that leads to the avoidance of lawsuits filed because of a perceived independence violation.

To the best of our knowledge, there is only one working paper from Chang et al. (2013) that links the auditor fee disclosure requirement to reported earnings. Chang et al. (2013) document an influence of the audit fee disclosure rule on firms' accounting choices. Using a differences-in-differences design, Chang et al. (2013) report an increase in audit quality after the introduction of the fee disclosure rule in Taiwan. This finding is also supported by the evidence regarding market perceptions. Francis and Ke (2006) find significantly smaller earnings response coefficients for firms that disclose high levels of non-audit fees in the first year of the fee disclosure requirement in the U.S., compared to firms that disclose low levels of non-audit fees.

Fee Caps

A limitation of the fees paid by one specific client to the statutory auditor (predominantly, there is a limitation to a percentage of the total revenue of the audit firm) aims at reducing the economic dependence of the auditors from their clients. Fee caps have become more popular in the last years. Apart from a few countries that already have prescribed a limitation for more than 10 years, a fee cap has been introduced in seven more industrialized countries in the last decade (see Hess and Stefani 2013). In its current draft of the new audit directive (Article 4), the European Commission, approved by the European Parliament on 3rd April 2014, also suggests an extensive limitation of the total auditor fees (i.e., the total auditor fees from one client should not exceed 15% of the total annual fees received by the auditor, see European Parliament (2014)).

⁵¹ The Big 4 auditors are *Deloitte & Touche*, *Ernst & Young*, *PricewaterhouseCoopers*, and *KPMG*.

⁵² Note that in our sample a fee disclosure contains always audit and non-audit fees.

In general, a reduction of the economic dependence of the auditors from their clients through a cap on the total auditor fees should strengthen independence and thus increase audit quality. Given the total revenue of the market leaders, a fee cap should only constitute a limitation for smaller audit firms. If we assume that large audit firms provide higher audit quality (Becker et al. 1998; Francis et al. 1999), restrictions that prevent smaller firms from providing audits to larger clients could further increase the market's average audit quality. However, a cap on the non-audit fees restricts the amount of non-audit services provided. In this case, the effect of a cap on audit quality depends on the influence of the non-audit services on audit quality as discussed above. We are unaware of any study that investigates the effect of a fee cap on audit quality.

Joint Audits

Regulators, academics, and the audit profession have frequently discussed the implementation of joint audits, i.e., the requirement that two or more audit firms jointly carry out the audit with shared liability, as a way to improve auditor independence, increase audit quality, and foster competition (see European Commission 2010). However, today France is the only larger country that requires joint audits for all consolidated annual reports (see Ratzinger-Sackel et al. (2012) for an overview of countries with joint audits).

On the one hand, joint audits could improve audit quality. With two auditors, the independence threat should be lower because it is unlikely that both auditors would agree on not to report discovered accounting breaches. Moreover, the economic dependence of the auditors, through audit or non-audit fees, should be lower because of shared fees. On the other hand, insufficient coordination because of high coordination costs might decrease audit quality. In addition, a free-riding behavior of one of the auditors might decrease audit quality (see the discussion in Zerni et al. 2012). However, arguments in favor of an increase as well as of a decrease in audit quality depend on the size of the audit firms involved (Deng et al. 2012). Therefore, the effect of joint audits on the overall audit quality could also depend on the specific form of the legislation.

The empirical evidence regarding accounting based earnings characteristics is mixed and depends on the size difference between the audit firms involved. Whereas Zerni et al. (2012) document a higher audit quality for voluntary joint audits, Holm and Thinggaard (2010) do not find significant differences between joint audits and single

audits. The perceived audit quality is higher for joint audits (see Karjalainen 2009, for results of voluntary joint audits in Finland and; Zerni et al. 2012, for results from Sweden). Francis et al. (2009) report an increase in audit quality as the number of Big 4 auditors taking part in the audit consortium increases. This result is in line with the theoretical work of Deng et al. (2012). In contrast, Marmousez (2006) reports a lower reporting quality when two Big 4 audit firms are hired, relative to a joint audit with one Big 4 and one non-Big 4 audit firm.

Mandatory Audit Firm Rotation

For decades, in many countries there has been a recurrent discussion about the introduction of a mandatory change of the audit firm after a certain period.⁵³ Supporter of a mandatory audit firm rotation intend to reduce the familiarity threat that arises through long auditor tenures and to improve auditor independence. However, opponents of a mandatory firm rotation argue that a change of the audit firm leads to a loss of client-specific knowledge, which results in a lower audit quality in the first years of the engagement (General Accounting Office (GAO) 2003).

The theoretical models are not conclusive about the relation between mandatory auditor rotation and audit quality.⁵⁴ Empirical studies that – mainly based on U.S. data – investigate the audit quality resulting after an auditor change also show mixed results (see Ewelt-Knauer et al. (2012) for an overview of various empirical studies). However, these studies are based on voluntary auditor changes and, therefore, are not completely

⁵³ In 1976, the report of the U.S. Senate's Metcalf Committee started a first discussion about the mandatory audit firm rotation in the U.S. (see US Senate 1976). However, the introduction was refused with reference to cost-benefit considerations (see American Institute of Certified Public Accountants (AICPA) 1978). In 2011, the PCAOB again called for a mandatory audit firm rotation (see Public Company Accounting Oversight Board 2011), which was again refused by the House of Representatives in 2013. In the European Union, the discussion on the mandatory audit firm rotation started in 1996 with the preparation of the European Commission's Green Paper "The Role, the Position and the Liability of the Statutory Auditor within the European Union" (see European Commission 1996). However, the resulting 5th Directive on Company Law did not contain a corresponding regulation. Article 17, paragraph 3 of the current draft of the EU-Directive, approved by the European Parliament, contains a maximum period of 10 years with a cooling-off period of four years. However, in Article 17, paragraph 4 there are several exceptions that allow for an increase up to 20 years or in case of a joint audit up to 24 years (European Parliament 2014). For a detailed overview of mandatory audit firm regulations in various countries around the world see Ewelt-Knauer et al. (2012).

⁵⁴ Elitzur and Falk (1996) show that audit quality is lower in the last engagement period and further decreases in the long run. In addition, Arrunada and Paz-Ares (1997) argue that a negative effect on audit quality is likely, and Summer (1998) shows that auditor independence is lower in short term engagements. In contrast, Gietzmann and Sen (2002) report a positive effect, however only in markets with few active audit firms. In the model of Bleibtreu and Stefani (2013), mandatory auditor rotation has a positive effect on audit quality, except for audit firms with a low degree of specialization that cannot re-acquire their clients as fast as possible.

comparable to changes induced by law. So far, there are only few studies investigating mandatory audit firm changes. Mainly based on Italian and Korean samples, these studies also document mixed results. For example, for samples of enforced changes by the Korean supervisor, Chung (2004) and Kim et al. (2004) show an increase in audit quality occurring after the change. In contrast to these special sample selections, Kwon et al. (2010) compare voluntary and mandatory changes in the Korean market and for both groups report no differences in the discretionary accruals before and after the change. Two studies analyze the mandatory auditor rotation in Italy. Cameran et al. (2014) document an increase in audit hours following a mandatory auditor change but no change in audit quality, whereas Cameran et al. (2012) report that audit quality is highest in the engagement period preceding the mandatory change.

Mandatory Partner Rotation

A mandatory change of the responsible key audit partner(s) was introduced in most of the industrialized countries in the last decade (see Hess and Stefani 2013). However, the maximum audit partner tenure differs across countries and varies from three years in the Korean Republic to seven years in most of the European countries, with a cooling-off period for a re-engagement of two or three years.

The arguments in favor of a mandatory partner rotation are similar to those of a mandatory audit firm rotation. The aim is to reduce the familiarity threat and foster auditor independence. However, in contrast to the audit firm rotation, the client-specific knowledge of the former audit partner is not necessarily completely lost. Therefore, a possible negative effect will be lower in the case of the audit partner rotation.

Due to the lack of information about the responsible audit partners, so far there are only few studies investigating the effect of audit partner tenure and the partner rotation on audit quality. Carey and Simnett (2006) report a decreasing propensity to issue a going-concern opinion and an increased likelihood of reporting a small profit for long partner tenures. However, they do not find a connection between tenure and abnormal working capital accruals. In contrast, Chen et al. (2008) and Chi et al. (2009) report the lowest level of audit quality in the first year of the partner-client relationship. Chi and Huang (2005) find a hump-shaped development of audit quality with its peak at the five-year tenure.

Market Structure

In the last decade, the high concentration on the national audit markets has been frequently discussed by regulators and oversight bodies in various countries.⁵⁵ Francis et al. (2013, 327) note: “*The unsubstantiated claim in all (...) reports is that the concentration of supply in audit markets is harmful (in part) because the lack of competition reduces the incentives of Big 4 auditors to conduct high-quality audits*”. Therefore, regulators around the world seek to foster audit quality by further regulating auditing with the aims to reduce the high level of concentration and to increase the degree of competition. However, the industrial organizations literature shows mixed evidence on the association between the degree of market concentration and product quality (see Francis et al. 2013, footnote 8, for a discussion)

Highly concentrated markets might lead to a higher audit quality if the market leaders provide a higher quality than smaller audit firms (Becker et al. 1998; Francis et al. 1999). In addition, a lower risk of being replaced due to the client’s constrained audit firm choice might increase audit quality (Boone et al. 2012). But the market dominance of a few generalist audit firms can also result in a lower audit quality, compared to a market with more specialized auditors with a higher industry-specific knowledge (Bleibtreu and Stefani 2012a). Moreover, a high level of market concentration could also increase the complacency among the market leaders, which would also result in lower audit quality (General Accounting Office (GAO) 2008). The overall audit quality in a country might not only depend on the level of concentration but also on the degree of competition among the audit firms. Competition might force the auditors to stay innovative, which, in turn, increases audit quality (United States Treasury (2008)). In contrast, Kallapur et al. (2010) argue that competition affects the auditor’s cost of telling the truth. Lower profits in a competitive environment lead to lower truth-telling costs and thus increase audit quality, whereas the higher probability of losing the client increases these costs and results in lower audit quality. It is an empirical question which effect prevails.

⁵⁵ For Australia, see Australian Financial Reporting Council - The Treasury (2010) and Department of Finance and Deregulation (2011); for the European Union, see European Commission (2010); for the U.K., see Oxera Consulting Ltd. (2006, 2007), House of Lords (2010), and Office of Fair Trading (2011a, 2011b); and for the U.S., see General Accounting Office (GAO) (2003), General Accounting Office (GAO) (2008), United States Treasury (2006), and United States Treasury (2008).

Empirical studies investigating the connection between market concentration and audit quality show mixed results. Based on U.S. data from the metropolitan statistical areas, Kallapur et al. (2010) and Boone et al. (2012) report contradictory findings. Kallapur et al. (2010) as well as Francis et al. (2013) for a cross-country study document an association of a higher market concentration with lower discretionary accruals, whereas Boone et al. (2012) find an increased likelihood of meeting and beating analyst forecasts in higher concentrated areas. Nevertheless, Francis et al. (2013) also find an association of the level of accruals with the distribution of the market shares within the Big 4 group, where a more unequal distribution is associated with lower audit quality. In line with the results of Francis et al. (2013), the cross-country study of Fung et al. (2012) shows a positive relation between concentration and audit quality as perceived by the addressees.

There is no study that directly links competition in the audit market and audit quality. Most regulators argue that a lower concentration is in line with more competition. In this case, the presented results can also be interpreted in terms of competition. But Boone et al. (2012, 1173) note that “*the effects of auditor concentration on audit quality does not necessarily translate into the effects of competition on audit quality*” (Dedman and Lennox (2009), discuss this issue in more detail). Therefore, empirical evidence on the role of competition for audit quality is still missing.

In general, one should have in mind that the regulations influence the market structure (see Hess and Stefani 2013). Therefore, a regulation that decreases or increases concentration or competition could have a secondary effect on audit quality via the market structure.

2.3 Earnings Characteristics

The prior literature relies on a wide variety of characteristics to describe earnings (see Dechow et al. 2010, for an extensive overview of the literature). Because reported financial statements are a joint statement of the auditor and the client (Antle and Nalebuff 1991) a high quality of the earnings directly relates to audit quality. For example, if the auditor restricts opportunistic earnings management, the audit is of a higher quality (Becker et al. 1998; Francis et al. 1999). Therefore, earnings quality is often used as a proxy for audit quality. We use three different earnings characteristics to analyze the effects of audit regulations and market structure: (1) the amount of discretionary accruals, (2) the tendency to avoid small losses, and (3) the asymmetric timeliness

of earnings (i.e., conditional conservatism). Although all three proxies are outcome-based (Leuz et al. 2003), they measure different dimensions of earnings. Discretionary accruals tend to measure the overall level of distortions due to earnings management and an imperfect measurement system (Dechow et al. 2010). Hence, it is a general measure of quality. In contrast, the preference to avoid a small loss is a more specific indicator of earnings quality, because it requires not only the potential and incentives for earnings manipulations, but also a small loss. Our third measure of earnings quality, conditional conservatism, is predominantly based on contracting and litigation explanations (Watts 2003a, 2003b). Conservative earnings restrict the dividend payments and the overpayment of executives if the executives' compensation is based on accounting earnings. Thus, conservatism is helpful not only for shareholders but also (or even more) for creditors. In this section, we explain our empirical proxies for these concepts and briefly discuss their interpretation put forward in prior research.

2.3.1 Discretionary Accruals

Discretionary accruals are one of the most frequently used earnings characteristics. In general, accrual models try to disentangle the normal portion of accruals that reflect fundamental performance from discretionary accruals that represent earnings management (Dechow et al. 2010). In the empirical literature, discretionary accruals are predominantly interpreted as opportunistic earnings manipulation and, hence, high levels of discretionary accruals (positive and negative) are assumed to indicate a low quality of the reported earnings (Dechow et al. 2010). However, earnings management can also be seen as a signaling channel for managers to communicate their private information, i.e., the assumption is a positive relation between discretionary accruals and earnings quality. This view is prevalent in analytical models (see Ewert and Wagenhofer (2011) for exemplary models).

We use the modified Jones model to estimate discretionary accruals (Dechow et al. 1995). This model estimates the normal accruals as a function of sales growth, growth in credit sales, and property, plant, and equipment. Specifically, we estimate the following regression model:

$$TACC_{it}/TA_{it} = \beta_0 1/TA_{it} + \beta_1 (\Delta REV_{it} - \Delta REC_{it})/TA_{it} + \beta_2 PPE_{it}/TA_{it} + \varepsilon_{it} \quad (2.1)$$

where:

$TACC_{it}$ = total accruals, defined as net income less cash flow from operations;

TA_{it} = total assets;

REV_{it} = total revenues;

REC_{it} = accounts receivables;

PPE_{it} = gross property, plant, and equipment;

and i indicates the firm and t the year.

We estimate Model (2.1) for every country-industry-year combination with at least 10 observations, using the Barth et al. (1998) industry classification.⁵⁶ The abnormal accruals are the residuals of Model (2.1). Because both earnings overstatements and understatements are an indication of earnings management, we use the absolute value of discretionary accruals, $ABSDA$, as our first earnings characteristic. However, it is possible that audit regulation differently affects the audits of firms with overstated and understated earnings, e.g., because the auditors' litigation risk is higher for earnings overstatements (St. Pierre and Anderson 1984; Heninger 2001). Moreover, underestimation of earnings due to negative discretionary accruals is a special form of conservatism (unconditional conservatism). It is unclear whether the effects of unconditional conservatism are advantageous or harmful (Watts 2003b; Ball and Shivakumar 2005; Beaver and Ryan 2005). To consider this differentiation, we run all our analyses also with subsamples of firms with positive (negative) discretionary accruals.

2.3.2 Loss Avoidance

Our second earnings characteristic is the probability of reporting a small net income. This metric goes back to the empirical work of Burgstahler and Dichev (1997), who document a discontinuity in the earnings distribution around zero. There are fewer firms than expected that report a small loss, whereas there are too many firms reporting a small profit.⁵⁷ This finding can be explained by opportunistic earnings management: To avoid negative capital market reactions, firms with a small loss use accounting discretion to report a small profit. We approximate the tendency to avoid small losses with the

⁵⁶ Using different industry specifications like two digits SIC codes does not change our results.

⁵⁷ We note the ongoing discussion whether there are really discontinuities in the earnings distribution. Durtschi and Easton (2005) and Durtschi and Easton (2009) argue that the observed discontinuities are induced by research design choices, whereas Burgstahler and Chuk (2013) defend the evidence for loss avoidance.

indicator variable *LOSSAV* that takes on the value of one if a firm reports a small profit, defined as net income scaled by lagged total assets between 0 and 0.01. Supporters of the loss avoidance hypothesis interpret a higher probability of a small profit as evidence for opportunistic earnings management.

2.3.3 Asymmetric Timeliness

Our third earnings characteristic is the extent of accounting conservatism. We measure conservatism in the form of asymmetric timeliness in the sense that economic losses should be incorporated timelier in accounting income than economic profits (conditional conservatism). Dechow et al. (2010) refer to a measure for asymmetric timeliness based on the Basu (1997) reverse regression approach as the most frequently used metric. However, the Basu (1997) model approximates economic income by stock returns, which was found to be a problematic proxy in cross-country studies (Holthausen 2003). Therefore, we use the accrual-based conservatism measure proposed by Ball and Shivakumar (2005) that uses cash flows from operations as a proxy for economic income. This model has already been used to analyze the effect of audit market concentration (Francis et al. 2013) and the influence of legal institutions (Bushman and Piotroski 2006) on reported earnings. The estimation of the level of conservatism is based on a piecewise-linear regression of accruals on cash flows.

$$TACC_{it} = \beta_0 + \beta_1 NEGCF_{it} + \beta_2 CFO_{it} + \beta_3 NEGCF_{it} \times CFO_{it} + \varepsilon_{it} \quad (2.2)$$

where:

$NEGCF_{it}$ = indicator variable that takes on the value one if the cash flow from operations is negative;

CFO_{it} = cash flow from operations scaled by beginning total assets and all other variables are as defined before.

Because of the accrual component of earnings, net income is less noisy than cash flows (Dechow et al. 1998). This explanation is in line with the negative correlation of accruals and cash flows observed in empirical studies. Ball and Shivakumar (2005) argue that the timely recognition of gains and losses is a second aim of accruals, which positively relates accruals to cash flows (they assume the first effect to prevail, and, hence, expect a negative coefficient on β_2). However, Ball and Shivakumar (2005) further argue that this second effect is asymmetric, i.e., economic losses are recognized

timelier than economic gains (β_3 is expected to be positive in this case). The model denotes earnings as more conservative if firms with negative cash flows have a less negative correlation between cash flows and accruals than firms with positive cash flows, i.e., a higher coefficient of β_3 . Although conservatism is commonly accepted as a preferable earnings characteristic, the optimal level of conservatism is unknown (Holthausen 2003), i.e., it is also possible that earnings become too conservative.

2.4 Data and Research Design

2.4.1 Research Design

This study aims at identifying the effects of audit regulations on several earnings characteristics, conditional on a country's audit market structure and competition. Our inferences are based on the coefficient estimates of indicator variables that take on the value of one if the observation is subject to the analyzed regulatory measure.⁵⁸ Specifically, we define the variables *LIABILITY_CAP* (*LIABILITY_PROP*) that takes on the value of one if there is an upper limit for the audit firms' liability (if a proportionate liability regime is implemented) within the country in the respective year), the variable *NAS_REGULATED* that takes on the value of one if non-audit services are either restricted or forbidden, the variable *FEE_DISC* that takes on the value of one if the audit client has to disclose the auditor fees (i.e., the audit fees and the fees earned from the provision of non-audit services), the variable *FEE_CAP* that takes on the value of one if there is an upper limit for the total fees a single client pays to the audit firm, the variable *JOINT_AUDITS* that takes on the value of one if joint audits are mandatory, the variable *FIRM_ROT* that takes on the value of one if audit firm rotation is mandatory, and the variable *PARTNER_ROT* that takes on the value of one if the rotation of the key audit partner(s) is mandatory. To account for the structure of a national audit market, we take the market share of the four largest audit firms in a country (CR_4) as our concentration metric.⁵⁹ In addition, we measure the level of competition with the variable mobility share (*MOB*) proposed by Buijink et al. (1998), which sums up for a country-year the absolute changes in the market shares of all the audit firms that are continuously active on the market, i.e., $MOB_{kt} = \sum_j (|x_{jkt} - x_{jk0}|) / 2$. MOB_{kt} is the mobility share for country k in year t , x_{jkt} is the market share of audit firm j in country k and year t , and x_{jk0} is the

⁵⁸ Variation in these variables is given in the cross-section due to differences in the regulatory framework and in the time-series due to the change (the introduction) of (new) regulations.

⁵⁹ Note that these are not necessarily the audit firms commonly known as the Big 4.

market share of audit firm j in country k in the base year 2002.⁶⁰ The indicator variable $HIGHCR_4$ ($HIGHMOB$) takes on the value of one for all observations of a country-year for which the corresponding CR_4 (MOB) is above the median-value calculated across all country-years. We interact the set of regulatory indicator variables with $HIGHCR_4$ ($HIGHMOB$) to identify the effect of each regulatory measure for the subsample of firm-years operating in a highly concentrated (highly competitive) and weakly concentrated (weakly competitive) audit market. We conduct separate analyses for concentration and competition, because recent research has concluded that a higher concentration is not necessarily associated with a lower degree of competition (see, among others, Schelleman and Knechel 2010).

For the estimation of the regulatory measures' effects on our first earnings characteristic, the discretionary accruals, we use a firm-fixed effect regression model specified as:

$$\begin{aligned}
 DA_{it} = & \alpha_0 + \sum_r \beta_r REGULATION_{itr} + \beta_{r+8} REGULATION_{itr} \times HIGH_{it} \\
 & + \gamma_1 MARKETST_{it} + \gamma_2 SIZE_{it} + \gamma_3 CFO_{it} + \gamma_4 LEVERAGE_{it} + \gamma_5 LOSS_LAG_{it} \\
 & + \gamma_6 GROWTH_{it} + \gamma_7 QUALOPINION_{it} + \gamma_8 BIG4_{it} + \gamma_9 AUDITORCHANGE_{it} \\
 & + \gamma_{10} AUD_IND_SPEC_{it} + \gamma_{11} INTERN_GAAP_{it} + \gamma_{12} RULE_OF_LAW_{it} \\
 & + \gamma_{13} MARKETCAP_{it} + \gamma_{14} FDI_PER_GDP_{it} + \gamma_{15} GDP_GROWTH_{it} \\
 & + \text{Firm-Fixed Effects} + \text{Year-Fixed Effects} + \varepsilon_{it}
 \end{aligned} \tag{2.3}$$

where:

DA_{it} = discretionary accruals metric, either absolute discretionary accruals ($ABSDA$), positive discretionary accruals ($DA+$), or negative discretionary accruals ($DA-$);

$REGULATION_{it}$ = set of indicator variables that take on the value of one if an observation is subject to a regulatory measure ($LIABILITY_CAP$, $LIABILITY_PROP$, $NAS_REGULATED$, FEE_DISC , FEE_CAP , $JOINT_AUDITS$, $FIRM_ROT$, $PARTNER_ROT$);

⁶⁰ The relative number of auditor changes in a country-year is a more direct measure of competition. However, because some of the countries within our sample have a mandatory auditor rotation rule in place, the number of auditor changes is not comparable across countries.

$HIGH_{it}$	= either $HIGHCR_4$ or $HIGHMOB$; $HIGHCR_4$ ($HIGHMOB$) is an indicator variable that takes on the value of one for all country-year observations that have an above-median value of CR_4 (MOB);
$MARKETST_{it}$	= variable representing the market structure, either CR_4 or MOB ;
$SIZE_{it}$	= natural logarithm of total assets;
$LEVERAGE_{it}$	= total liabilities divided by total assets;
$LOSS_LAG_{it}$	= indicator variable that takes on the value of one if a client reported a negative net income in the previous year;
$GROWTH_{it}$	= change in total assets;
$QUALOPINION_{it}$	= indicator variable that takes on the value of one if a firm receives a qualified audit opinion;
$BIG4_{it}$	= indicator variable that takes on the value of one if a firm is audited by a Big 4 audit firm;
$AUDITORCHANGE_{it}$	= indicator variable that takes on the value of one if a firm has a new auditor;
$AUD_IND_SPEC_{it}$	= auditor industry specialization, measured as the market share of an audit firm in an industry, times the industry's portfolio share of the audit firm's total fees (Neal and Riley 2004);
$INTERN_GAAP_{it}$	= indicator variable that takes on the value of one if a firm applies either <i>IFRS</i> or <i>U.S.-GAAP</i> ;
$RULE_OF_LAW_{it}$	= rule of law variable taken from Kaufmann et al. (2012);
$MARKETCAP_{it}$	= total market capitalization of a country, divided by its <i>GDP</i> ;
$FDI_PER_GDP_{it}$	= net inflow (new investment inflows less disinvestments) of foreign investors, scaled by a country's <i>GDP</i> ;
GDP_GROWTH_{it}	= growth rate of a country's <i>GDP</i> .

In addition to our variables of interest, we include several firm- and country-level control variables that are known to be related to earnings management. Regarding firm-level characteristics, we control for size (*SIZE*), performance (*CFO* and *LOSS_LAG*), debt (*LEVERAGE*), firm growth (*GROWTH*), audit firm characteristics (*QUAL_OPINION*, *BIG4*, *AUDITORCHANGE*, *AUD_IND_SPEC*), and reporting prac-

tices (*INTERN_GAAP*). We refer to Dechow et al. (2010) for a discussion of studies that document the influence of these variables. The firm-fixed effects control for time-invariant firm characteristics that are not represented by the control variables. To account for cross-country differences, we also include several country-level controls that are based on the discussion in Hess and Stefani (2013). Specifically, we include controls for the legal system (*RULE_OF_LAW*) and the development of the capital market (*MARKETCAP*, *FDI_PER_GDP*). Additionally, we include a control for the dynamics of an economy (*GDP_GROWTH*) to account for possible effects on the firms' earnings. To control for time trends, we include year-fixed effects.

We investigate our second earnings characteristic, the avoidance of small losses, with a Logit model. Due to a lack of time-series variation in the dependent variable *LOSSAV* for a considerable number of firms, it is not possible to include firm-fixed effects.⁶¹ Instead, we include country-, industry-, and year-fixed effects; the control variables are the same as in the discretionary accruals regressions.

$$\begin{aligned}
LOSSAV_{it} = & \beta_0 + \sum_r \beta_r REGULATION_{itr} + \beta_{r+8} REGULATION_{itr} \times HIGH_{it} \\
& + \gamma_1 MARKETST_{it} + \gamma_2 SIZE_{it} + \gamma_3 CFO_{it} + \gamma_4 LEVERAGE_{it} + \gamma_5 LOSS_LAG_{it} \\
& + \gamma_6 GROWTH_{it} + \gamma_7 QUALOPINION_{it} + \gamma_8 BIG4_{it} + \gamma_9 AUDITORCHANGE_{it} \\
& + \gamma_{10} AUD_IND_SPEC_{it} + \gamma_{11} INTERN_GAAP_{it} + \gamma_{12} RULE_OF_LAW_{it} \\
& + \gamma_{13} MARKETCAP_{it} + \gamma_{14} FDI_PER_GDP_{it} + \gamma_{15} GDP_GROWTH_{it} \\
& + \text{Country-Fixed Effects} + \text{Industry-Fixed Effects} \\
& + \text{Year-Fixed Effects} + \varepsilon_{it}
\end{aligned} \tag{2.4}$$

where:

LOSSAV_{it} = indicator variable that takes on the value of one if a firm's net income, divided by beginning total assets, is between 0 and 0.01;

and all other variables are as defined before.

⁶¹ We would lose all observations from firms that never report a small profit in the observed period, which reduces our sample size about 67%. Nevertheless, the inferences on the experimental variables are unchanged in this reduced sample. There are no firms that report a small profit in every year of the sample.

The level of conservatism in the Ball and Shivakumar (2005) model, our third earnings characteristic, is defined as the incremental sensitivity of accruals to negative cash flows, relative to positive cash flows. For the corresponding empirical analysis, we employ a regression of total accruals on cash flows, an indicator variable for negative cash flows, and an interaction term of both variables. The coefficient on the interaction term defines the level of conservatism. We follow Francis et al. (2013) and further interact this interaction term with our variables of interest to get an estimate of the incremental effect of each regulation on the level of conservatism.⁶² Specifically, we estimate the following regression model:

$$\begin{aligned}
TACC_{it} = & \beta_0 + \beta_1 NEGCF_{it} + \beta_2 CFO_{it} + \beta_3 NEGCF_{it} \times CFO_{it} + \sum_l \beta_l REGULATION_{itl} \\
& + \sum_m \beta_m NEGCF_{it} \times REGULATION_{itm} + \sum_n \beta_n CFO_{it} \times REGULATION_{itn} \\
& + \sum_o \beta_o NEGCF_{it} \times CFO_{it} \times REGULATION_{it o} \\
& + \sum_p \beta_p REGULATION_{itp} \times HIGH_{it} \\
& + \sum_q \beta_q NEGCF_{it} \times REGULATION_{itq} \times HIGH_{it} \\
& + \sum_r \beta_r CFO_{it} \times REGULATION_{itr} \times HIGH_{it} \\
& + \sum_s \beta_s NEGCF_{it} \times CFO_{it} \times REGULATION_{its} \times HIGH_{it} \\
& + \text{Control/Interactions} + \text{Firm-Fixed Effects} + \text{Year-Fixed Effects} + \varepsilon_{it} \quad (2.5)
\end{aligned}$$

where all variables are as defined before.

2.4.2 Sample Selection and Descriptive Statistics

We investigate the effect of audit regulations on the key characteristics of earnings based on a sample of firms from the 29 countries for which Hess and Stefani (2013) document the relevant regulatory environment. Our sample period covers the years 2002 to 2011. Financial statement data is taken from *Worldscope* and auditor data comes

⁶² We report (and interpret) only the incremental effects instead of the total effects, because we are not interested in the total level of conservatism in a country given the regulatory environment.

from the *Reuters Fundamentals* database. The firm-level data is matched with country-level data taken from the *World Bank*. Our initial sample covers all firms with a *Worldscope* ID, in total 183,591 firm-years. We delete 36,671 observations because of missing auditor information and further 12,987 observations with a missing industry classification, which is necessary for the calculation of numerous variables (e.g., discretionary accruals). We follow the prior literature and exclude financial institutions (SIC codes 6000-6999) because the estimation of discretionary accruals is not possible for these firms (24,247 observations). The estimation of discretionary accruals is problematic for firms with high growth rates; therefore, we delete firm-years with a growth rate in total assets of 100% or higher (3,167 observations). This procedure should also eliminate firms that were part of a merger. Finally, we delete all firms with a negative equity (4,123 observations) and firm-years with incomplete financial statement data (14,216 observations). The resulting final sample consists of 88,180 observations from 12,639 firms. For 5,586 of these observations, it is not possible to estimate the discretionary accruals because of the requirement of at least 10 observations in a country-industry-year. Hence, for the tests based on discretionary accruals, we use 82,594 observations from 11,983 firms. The sample selection procedure is summarized in Table 2.1.

Table 2.1: Sample selection

Initial sample	183,591
Firms with missing auditor data	(36,671)
Firms with unknown industry classification	(12,987)
Financial institutions (SIC Codes 6000-6999)	(24,247)
Firms with a growth rate > 100%	(3,167)
Firms supposed to be in default	(4,123)
Firms with incomplete financial statement data	(14,216)
Final sample	88,180
Firms with missing discretionary accruals	(5,586)
Final sample for the discretionary accruals tests	82,594

Note: This table summarizes the sample selection procedure. The initial sample covers all firm-years from the 29 countries from Hess and Stefani (2013) with a *Worldscope* ID. “Firms supposed to be in default” refers to firms with negative equity. Firms with missing discretionary accruals are firm-years from country-industry-years with less than 10 observations.

Table 2.2 presents the descriptive statistics for the country-level variables. We observe a large cross-country variation for the absolute discretionary accruals, *ABSDA*, and for the percentage of firms with small profits, *LOSSAV*, ranging from 0.030 to

0.080 and from 0.020 to 0.137 respectively. We note that firms with high values in *ABSDA* do not necessarily have also high values in *LOSSAV* and thus the two metrics measure different dimensions of earnings. The concentration ratio (CR_4) ranges from 40% to 100% and is highly correlated with the *Hirschman-Herfindahl* Index (*HHI*), which represents an alternative concentration metric that we use as a robustness check. The competition metric *MOB* ranges from 0.0534 to 0.1944 and is negatively correlated with CR_4 . All values are close to those reported in Hess and Stefani (2013). Furthermore, there is also a large variation in the country-level control variables.

Panel A in Table 2.3 reports the descriptive statistics for the firm-level variables. The mean (median) of *ABSDA* is 0.072 (0.043). The mean of *LOSSAV* is 0.070. Cash flow from operations has a mean (median) of 0.046 (0.063) and even the 25% percentile is positive. 30% of the observations report a loss in the previous period. 69% of the observations are audited by a Big 4 auditor, whereas 9% of the firm-years show an auditor change. The percentage of firm-years that present their financial statements according to *IFRS* or *U.S.-GAAP* is 49%. Panel B in Table 2.3 reports the correlation coefficients for the firm-level variables. The correlations are only moderate, so multicollinearity is not an issue.

Table 2.2: Descriptive statistics for the county-level variables

<i>country</i>	<i>n</i>	<i>ABSDA</i>	<i>LOSSAV</i>	<i>CR₄</i>	<i>HHI</i>	<i>MOB</i>	<i>RULE_OF_LAW</i>	<i>MARKET_CAP</i>	<i>FDI_PER_GDP</i>	<i>GDP_GROWTH</i>
Australia	678	0.080	0.020	0.462	0.076	0.150	1.767	1.262	0.035	0.031
Austria	39	0.030	0.047	0.746	0.187	0.075	1.848	0.219	0.028	0.025
Belgium	47	0.048	0.044	0.598	0.112	0.143	1.323	0.576	0.147	0.018
Brazil	122	0.041	0.068	0.644	0.127	0.162	-0.433	0.538	0.023	0.040
Canada	496	0.068	0.023	0.626	0.110	0.073	1.775	1.258	0.023	0.025
Czech Republic	7	NA	0.044	0.667	0.153	0.194	0.863	0.277	0.031	0.036
Denmark	44	0.053	0.049	0.773	0.185	0.157	1.918	0.618	0.009	0.016
Estonia	6	NA	0.031	1.000	0.398	0.153	1.122	0.195	0.091	0.071
Finland	37	0.042	0.032	0.938	0.279	0.157	1.959	0.973	0.021	0.029
France	346	0.039	0.062	0.574	0.091	0.083	1.451	0.757	0.023	0.017
Germany	335	0.051	0.066	0.514	0.079	0.085	1.648	0.435	0.013	0.012
Greece	125	0.043	0.123	0.691	0.179	0.178	0.782	0.544	0.007	0.023
Hungary	12	NA	0.067	0.609	0.142	0.101	0.837	0.220	0.069	0.012
Ireland	30	NA	0.041	0.902	0.256	0.095	1.735	0.538	0.064	0.044
Italy	108	0.037	0.086	0.842	0.210	0.148	0.382	0.408	0.011	0.047
Japan	2,906	0.030	0.126	0.813	0.174	0.101	1.290	0.746	0.001	0.019
Korean Republic	845	0.050	0.076	0.627	0.107	0.135	0.962	0.878	0.004	0.040
Luxembourg	9	NA	0.090	0.733	0.164	0.135	1.811	1.471	3.079	0.035
Netherlands	67	0.053	0.052	0.872	0.209	0.108	1.772	0.883	0.019	0.019
Norway	75	0.053	0.043	0.912	0.266	0.055	1.925	0.600	0.017	0.014
Poland	141	0.056	0.053	0.402	0.059	0.185	0.504	0.309	0.030	0.043
Portugal	28	NA	0.137	0.684	0.187	0.163	1.041	0.361	0.019	0.008
Slovenia	6	NA	0.132	1.000	0.355	0.152	0.952	0.239	0.017	0.035
Spain	70	0.039	0.056	0.900	0.267	0.066	1.152	0.849	0.025	0.031
Sweden	107	0.074	0.027	0.804	0.205	0.081	1.901	1.071	0.033	0.033
Switzerland	73	0.034	0.062	0.896	0.260	0.053	1.822	2.275	0.041	0.025
Turkey	102	0.050	0.046	0.597	0.119	0.122	0.087	0.306	0.021	0.069
United Kingdom	714	0.055	0.038	0.557	0.100	0.142	1.671	1.322	0.034	0.022
United States	2,224	0.045	0.034	0.665	0.124	0.092	1.585	1.287	0.015	0.025

Note: This table presents the descriptive statistics for the country-level variables. All columns present country medians across the years 2002-2011, except for *n* and *LOSSAV*, which present country means across the years 2002-2011. *NA* indicates that data is not available for this country. All variables are defined in Appendix 2.A.

Table 2.3: Descriptive statistics for the firm-level variables

Panel A: Descriptive statistics											
variable	n	mean	sd	p1	p10	p25	p50	p75	p90	p99	
ABSDA	82,594	0.072	0.086	0.001	0.007	0.019	0.043	0.089	0.169	0.437	
LOSSAV	88,180	0.070	0.255	0.000	0.000	0.000	0.000	0.000	0.000	1.000	
SIZE	88,180	19.117	2.022	14.406	16.583	17.786	19.021	20.399	21.810	24.250	
CFO	88,180	0.046	0.167	-0.738	-0.106	0.002	0.063	0.123	0.199	0.459	
LEVERAGE	88,180	0.466	0.228	0.017	0.146	0.289	0.477	0.639	0.765	0.936	
LOSS_LAG	88,180	0.304	0.460	0	0	0	0	1	1	1	
GROWTH	88,180	0.127	0.314	-0.526	-0.160	-0.033	0.076	0.208	0.449	1.504	
QUALOPINION	88,180	0.023	0.151	0	0	0	0	0	0	1	
BIG4	88,180	0.692	0.462	0	0	0	1	1	1	1	
AUDITORCHANGE	88,180	0.091	0.288	0	0	0	0	0	0	1	
AUD_IND_SPEC	88,180	0.018	0.056	0	0	0.001	0.003	0.011	0.037	0.302	
INTERN_GAAP	88,180	0.493	0.500	0	0	0	0	1	1	1	

Panel B: Correlations												
variable	1	2	3	4	5	6	7	8	9	10	11	12
1 ABSDA	1	-0.08***	-0.29***	-0.13***	-0.06***	0.20***	0.06***	0.11***	-0.14***	0.06***	-0.13***	0.10***
2 LOSSAV	-0.09***	1	0.07***	-0.07***	0.12***	0.01	-0.07***	-0.03***	0.01***	-0.01	0.03***	-0.11***
3 SIZE	-0.32***	0.06***	1	0.30***	0.32***	-0.34***	0.04***	-0.18***	0.41***	-0.10***	0.38***	0.03***
4 CFO	-0.22***	-0.01	0.35***	1	0.023***	-0.41***	0.23***	-0.16***	0.18***	-0.06***	0.12***	0.04***
5 LEVERAGE	-0.06***	0.12***	0.33***	0.09***	1	-0.07***	-0.05***	-0.04***	0.11***	-0.01***	0.11***	-0.04***
6 LOSS_LAG	0.24***	0.01*	-0.34***	-0.42***	-0.08***	1	-0.15***	0.17***	-0.16***	0.06***	-0.15***	0.09***
7 GROWTH	0.11***	-0.06***	-0.01***	0.06***	-0.07***	-0.06***	1	-0.03***	0.02***	-0.01**	0.04***	-0.05***
8 QUALOPINION	0.16***	-0.03***	-0.19***	-0.21***	-0.04***	0.17***	-0.01**	1	-0.12***	0.04***	-0.10***	0.11***
9 BIG4	-0.16***	0.01**	0.41***	0.17***	0.11***	-0.15***	-0.02***	-0.12***	1	-0.15***	0.51***	-0.06***
10 AUDITORCHANGE	0.06***	-0.01*	-0.10***	-0.05***	-0.01***	0.06***	0.01**	0.04***	-0.15***	1	-0.10***	-0.01
11 AUD_IND_SPEC	-0.04***	0.00	0.14***	0.05***	0.05***	-0.04***	0.00	-0.02***	0.10***	-0.00	1	-0.07***
12 INTERN_GAAP	0.10***	-0.10***	0.05***	-0.02***	-0.04***	0.08***	-0.01***	0.10***	-0.04***	-0.01**	-0.01*	1

Note: This table presents the descriptive statistics for the firm-level variables. In Panel B, the Spearman correlation coefficients are reported above and the Pearson correlation coefficients below the diagonal. All variables are defined in Appendix 2.A. The *, **, and *** mark significance at the 10%, 5%, and 1% levels (two-tailed tests).

2.5 Results

2.5.1 Unconditional Analysis

In a first set of tests we investigate the effect of the regulatory measures without taking into account the market structure. The corresponding regression results are reported in Table 2.4. Panel A of Table 2.4 displays the regression results regarding the earnings management metrics, and Panel B of Table 2.4 shows the regression results for our conservatism metric, asymmetric timeliness. Two results are worth noticing. First, the regulatory measures affect the earnings characteristics in different directions, i.e., one regulation might offset the effect of another regulation. Second, the positive coefficient on *NEGCF0*CF0* in Column (1) in Panel B shows a significant level of asymmetric timeliness for our sample firms, which also holds after adding the regulatory measures in Column (2). This finding is in line with the general expectation that there are other determinants of conservatism in financial reporting in addition to the regulatory measures and our control variables (see Watts 2003a, for a discussion of competing explanations for conservatism existing in financial statements).

We observe a quality-enhancing effect of *FEE_DISC*, *FEE_CAP*, and *NAS_REGULATED*, whereas *FIRM_ROT* has a negative effect on audit quality. The regulations regarding audit fees show an effect on the absolute value of discretionary accruals by restricting the negative discretionary accruals (p -values < 0.01 (0.05) for *FEE_DISC* (*FEE_CAP*)), but there is no association to the positive discretionary accruals. This quality-improving effect of fee disclosures and fee caps is in line with the findings of Chang et al. (2013). Restricting the scope of non-audit services decreases the probability of reporting a small net income (p -value < 0.01) and increases the extent of conservatism (p -value < 0.05). Firms subject to mandatory auditor rotation show lower levels of absolute, positive, and negative discretionary accruals as well as a lower degree of asymmetric timeliness (all p -values < 0.01). This result confirms prior findings of various authors (we refer to Ewelt-Knauer et al. (2012), for a detailed summary of these studies). *LIABILITY_CAP*, *JOINT_AUDITS*, and *PARTNER_ROTATION* affect only one of our earnings characteristic and therefore their effect is more ambiguous. Specifically, joint audits increase the positive discretionary accruals (p -value < 0.05), which can be seen as the most problematic effect for audit quality; liability caps and audit partner rotation decrease the level of conservatism. The significant effects are summarized in Table 2.5.

All results are also economically significant. The smallest significant effect results from mandatory auditor rotation with a coefficient of 0.007.⁶³ Relating the size of this coefficient to the mean value of discretionary accruals of 0.072 reveals an increase in the discretionary accruals due to the introduction of the mandatory audit firm rotation of 9.7%. For the median firm, the discretionary accruals would even increase about 16.3%.

Table 2.4: Regression results - unconditional analysis

Panel A: Earnings management proxies				
<i>VARIABLE</i>	(1)	(2)	(3)	(4)
	<i>ABSDA</i>	<i>DA+</i>	<i>DA-</i>	<i>LOSSAV</i>
<i>CONSTANT</i>	0.364*** (0.021)	0.293*** (0.029)	-0.362*** (0.036)	-5.040*** (0.805)
<i>LIABILITY_CAP</i>	0.003 (0.007)	0.008 (0.009)	-0.012 (0.010)	0.195 (0.338)
<i>LIABILITY_PROP</i>	-0.003 (0.006)	-0.004 (0.007)	-0.012 (0.010)	0.758 (0.468)
<i>NAS_REGULATED</i>	-0.002 (0.002)	-0.003 (0.003)	-0.005 (0.003)	-0.239** (0.103)
<i>FEE_DISC</i>	-0.008*** (0.003)	-0.005 (0.003)	0.011*** (0.004)	0.186 (0.118)
<i>FEE_CAP</i>	-0.009** (0.003)	-0.003 (0.004)	0.013** (0.005)	0.242 (0.151)
<i>JOINT_AUDITS</i>	0.005 (0.017)	0.028** (0.012)	0.013 (0.016)	-0.104 (0.631)
<i>FIRM_ROT</i>	0.007*** (0.002)	0.007*** (0.002)	-0.006*** (0.002)	0.069 (0.087)
<i>PARTNER_ROT</i>	0.002 (0.002)	0.004 (0.002)	0.001 (0.003)	-0.084 (0.092)
Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	No
Period-Fixed Effects	Yes	Yes	Yes	Yes
Country-Fixed Effects	No	No	No	Yes
Industry-Fixed Effects	No	No	No	Yes
<i>n</i>	82,594	39,576	43,018	88,180
<i>N</i>	11,983	10,812	11,213	12,639
<i>F</i> -Stat. / <i>Chi</i> 2-Stat.	40.54	67.99	36.36	2,315.00
Prob > <i>F</i> / Prob > <i>Chi</i> 2	0.00	0.00	0.00	0.00

⁶³ Note that we can directly compare the coefficients across the regulatory measures because all effects are measured with indicator variables.

Table 2.4 (continued)

Panel B: Conservatism proxies		
<i>VARIABLE</i>	(1) <i>TACC</i>	(2) <i>TACC</i>
<i>CONSTANT</i>	-0.156*** (0.033)	-0.124*** (0.033)
<i>NEGOCF*OCF</i>	0.466*** (0.017)	0.428*** (0.060)
<i>NEGOCF*OCF*LIABILITY_CAP</i>		-0.196*** (0.071)
<i>NEGOCF*OCF*LIABILITY_PROP</i>		0.023 (0.037)
<i>NEGOCF*OCF*NAS_REGULATED</i>		0.125*** (0.038)
<i>NEGOCF*OCF*FEE_DISC</i>		0.043 (0.063)
<i>NEGOCF*OCF*FEE_CAP</i>		0.047 (0.050)
<i>NEGOCF*OCF*JOINT_AUDITS</i>		-0.074 (0.075)
<i>NEGOCF*OCF*FIRM_ROT</i>		-0.219*** (0.046)
<i>NEGOCF*OCF*PARTNER_ROT</i>		-0.150*** (0.036)
Controls	Yes	Yes
Additional Interaction Terms: Regulation	Yes	Yes
Additional Interaction Terms: Controls	No	Yes
Firm-Fixed Effects	Yes	Yes
Period-Fixed Effects	Yes	Yes
<i>n</i>	88,180	88,180
<i>N</i>	12,639	12,639
<i>F</i> -Stat.	419.30	226.70
Prob > <i>F</i>	0.00	0.00

Note: This table presents results of OLS-regressions (Columns (1) to (3) of Panel A and Columns (1) to (2) of Panel B) and a Logit regression (Column (4) of Panel A) of the dependent variable indicated in the top rows. *Huber/White* standard errors are clustered at the firm-level and reported in parentheses. The estimates of the controls and fixed effects are not reported for brevity. All variables are defined in Appendix 2.A. The *, **, and *** mark significance at the 10%, 5%, and 1% levels (two-tailed *t*-tests).

Table 2.5: Summary of regression results

	unconditional	concentration		competition	
		high	low	high	low
liability caps	CONS (-)	ABSDA (-)	LOSSAV (-)		ABSDA (-) DA+ (-)
proportionate liability			LOSSAV (-)	LOSSAV(-)	LOSSAV (-)
NAS regulated	LOSSAV (+) CONS (+)	LOSSAV (+) CONS (+)	DA- (+) CONS (+)	DA- (-) CONS (+)	CONS (+)
fee disclosures	ABSDA (+) DA- (+)	LOSSAV (-)	ABSDA (+) DA+ (+) LOSSAV (+)		ABSDA (+) DA+ (+) DA- (+) LOSSAV (-)
fee caps	ABSDA (+) DA- (+)	ABSDA (+)		ABSDA(+) DA- (+) CONS (-)	ABSDA (+) DA+ (+)
joint audits	DA+ (-)		DA+ (-) LOSSAV (-)	DA- (+)	DA+ (-)
firm rotation	ABSDA (-) DA+ (-) DA- (-) CONS (-)	ABSDA (-) DA+ (-) DA- (-)	LOSSAV (-) CONS (-)	ABSDA (-) DA+ (-) CONS (-)	ABSDA (-) DA+ (-) DA- (-) CONS (-)
partner rotation	CONS (-)		DA- (-)		DA+ (-)

Note: This table presents a summary of all regression results. It displays all audit quality proxies that are significantly influenced by a regulation in a given market structure. The + (-) in parentheses represents a positive (negative) effect on audit quality. All variables are defined in Appendix 2.A.

2.5.2 Analysis conditional on the Market Structure

In the second part of our analysis, we investigate the influence of the regulatory measures conditional on the market structure of the national audit markets. Panel A of Table 2.6 reports the regression results for the earnings management metrics conditional on the audit market concentration, whereas Panel B of Table 2.6 displays the results conditional on the level of competition of the audit market. Panel C of Table 2.6 documents the estimation results for the conservatism metric conditional on the concentration (Column (2)) and the competition in the audit market (Column (3)). As in the unconditional analysis, we observe an overall positive effect of *NAS_REGULATED*, *FEE_DISC*, and *FEE_CAP* on audit quality, whereas *FIRM_ROT* negatively affects audit quality. An overview is, again, given in Table 2.5. However, one has to notice that the effects are, depending on the audit quality proxy and the regulation, only present in

audit markets with either a high or a low level of audit market concentration.⁶⁴ This finding is important information for regulators, who should also consider the market structure when evaluating the effectiveness of a planned regulation.

We next turn to a more detailed discussion of our findings. Restricting the non-audit services has a positive effect on the level of conservatism in markets with a high and a low level of concentration (p -value < 0.1 and < 0.01 , respectively) as well as in markets with a high and a low degree of competition (p -values < 0.01). We also observe a positive effect on loss avoidance if the audit market concentration is high (p -values < 0.1) and on negative discretionary accruals if audit market concentration is low (p -values < 0.05). A fee disclosure rule positively affects audit quality measured as absolute discretionary accruals, positive discretionary accruals and loss avoidance if audit market concentration is low (p -values < 0.1). If audit market competition is low, the disclosure of auditor fees positively affects audit quality measured as absolute (p -value < 0.01), positive (p -value < 0.1), and negative (p -value < 0.1) discretionary accruals. However, we note that a fee disclosure rule increases the probability of reporting a small net income if the audit market concentration (competition) is high (low). Fee caps decrease the absolute discretionary accruals in audit markets with a high level of concentration (p -value < 0.1) and in audit markets with either a high or a low degree of competition (p -values < 0.01). In addition, fee caps restrict negative discretionary accruals in highly competitive audit markets (p -value < 0.01) and positive discretionary accruals if audit market competition is low (p -value < 0.05).

Taken together, further restricting the joint supply of audit and non-audit services beyond a self-review prohibition as intended by the European Commission (European Commission Memo 2013) might be beneficial under all audit market conditions from a conservatism point of view. However, it is unclear whether the aim of the regulators to increase auditor independence can be achieved, because it seems that only the less problematic negative discretionary accruals are reduced, i.e., the restriction of non-audit services increases conditional conservatism but decreases unconditional conservatism. The disclosure of auditor fees is mandatory in most countries. Our results suggest that this regulation increases audit quality in countries where audit market concentration and

⁶⁴ For each regulation, our empirical model consists of a main effect and an interaction term with *HIGHCR₄* or *HIGHMOB*. The main effect measures the effect for a market with low concentration, whereas the effect for a market with high concentration is measured by the total effect, i.e., the sum of the main effect and the incremental effect. We test the significance of the total effect with F -tests and report the corresponding p -values.

competition is low. Although the disclosure of auditor fees increases the prominence of loss avoidance in highly concentrated audit markets, we assess the implementation of this regulation as successful, because among the earnings management metrics we look at, loss avoidance is the most specific measure that applies only to a restricted set of clients. Thus, the self-disciplining role of the mandatory disclosure of auditor fees seems to be effective. Our findings support the effectiveness of the introduction of fee caps if market concentration is high. Regarding the level of competition, fee caps are favorable in audit markets with a low degree of competition, where they restrict the usage of income-increasing discretionary accruals. In highly competitive markets, fee caps restrict negative discretionary accruals (and absolute discretionary accruals), but at the cost of reducing the level of conservatism.

We find no support for the implementation of a mandatory audit firm rotation. Firms from countries with a rotation requirement show higher levels of absolute (p -value < 0.01), positive (p -value < 0.01), and negative (p -value < 0.05) discretionary accruals in highly concentrated markets as well as a higher prominence of loss avoidance (p -value < 0.01) and a lower level of conservatism (p -value < 0.05) in audit markets with low concentration. Taking into account the level of competition, mandatory auditor rotation negatively affects audit quality measured as absolute and positive discretionary accruals and the level of conservatism in audit markets with a high and a low degree of competition and negative discretionary accruals in audit markets with a low level of competition.

The remaining regulations become significant only for single audit quality metrics, and therefore it is not possible to draw a clear conclusion regarding their advantageousness. Nevertheless, the significant coefficients are all related to a decrease in audit quality and we find no evidence for a positive effect. Thus, we cannot recommend the implementation of liability caps, a proportionate liability regime, joint audits, and the mandatory partner rotation. Although it remains unclear whether these regulations are ineffective or even harm audit quality, our results suggest that the effect is more likely to be negative if the audit market concentration or competition is low, whereas in highly concentrated or competitive markets the effect is more likely to be neutral.

From the set of firm-specific control variables, we find a significant influence on our earnings characteristics from size, cash flow from operations, leverage, the loss dummy, growth, and auditor changes. All significant coefficients have the expected signs. In

addition, there is a significant influence from the country-level controls rule-of-law and market capitalization. Regarding the economic significance of the regulatory measures, we note that the effects are of the same magnitude as in the unconditional analysis.

A second interesting result from our analyses is the relation between the market structure and the direction of the regulations' effects on the different earnings characteristics. For the different discretionary accrual measures we find that a regulation that increases discretionary accruals is more likely to be effective in highly concentrated markets, whereas a regulation that restricts discretionary accruals is more likely to work in audit markets with a low degree of concentration. However, this pattern does not hold for the level of competition. For loss avoidance and conservatism, the pattern is more obscure, but we note that there are more significant coefficients in audit markets with a low level of concentration. Again, the degree of competition does not affect the advantageousness of the regulations.

The importance of the market structure becomes even more apparent if one considers the results of Hess and Stefani (2013). They show an influence of the regulatory measures on the level of market concentration.⁶⁵ For example, they document a higher audit market concentration if a mandatory auditor rotation rule is implemented. This finding might even foster the quality-decreasing effect of the mandatory auditor rotation, which is especially critical on highly concentrated markets. But they also report a decrease in the audit market concentration after the introduction of restrictions on non-audit services. This result might strengthen the positive effect of this regulation on the level of negative discretionary accruals and conservatism. Hess and Stefani (2013) do not report effects from fee disclosures and fee caps on the market concentration.

⁶⁵ Note that we reduce the possible endogeneity problem by using an indicator variable to define the market structure and not the concentration ratio itself.

Table 2.6: Regression results - conditional analysis

Panel A: Analysis conditional on the market concentration (earnings management proxies)				
VARIABLE	(1)	(2)	(3)	(4)
	ABSDA	DA+	DA-	LOSSAV
CONSTANT	0.375*** (0.022)	0.297*** (0.030)	-0.379*** (0.037)	-5.332*** (0.883)
LIABILITY_CAP	-0.002 (0.008)	0.014 (0.012)	0.015 (0.012)	0.842** (0.402)
LIABILITY_CAP_HIGHCR ₄	0.024*** (0.008)	0.006 (0.010)	-0.022 (0.013)	-0.505 (0.358)
LIABILITY_PROP	-0.004 (0.006)	-0.004 (0.007)	-0.010 (0.011)	0.791* (0.470)
LIABILITY_PROP_HIGHCR ₄				-0.410 (0.414)
NAS_REGULATED	-0.005 (0.004)	0.001 (0.006)	0.013** (0.006)	0.193 (0.195)
NAS_REGULATED_HIGHCR ₄	0.001 (0.006)	-0.004 (0.008)	-0.016* (0.009)	-0.540** (0.267)
FEE_DISC	-0.006* (0.003)	-0.008* (0.005)	-0.003 (0.006)	-0.335* (0.177)
FEE_DISC_HIGHCR ₄	0.004 (0.005)	0.003 (0.006)	0.005 (0.008)	1.093*** (0.235)
FEE_CAP	-0.004 (0.006)	-0.008 (0.008)	-0.009 (0.009)	-0.122 (0.270)
FEE_CAP_HIGHCR ₄	-0.007 (0.007)	-0.003 (0.009)	0.008 (0.011)	-0.052 (0.309)
JOINT_AUDITS	0.004 (0.017)	0.024** (0.012)	0.008 (0.017)	1.192** (0.489)
JOINT_AUDITS_HIGHCR ₄				-1.646** (0.805)
FIRM_ROT	-0.007 (0.006)	-0.007 (0.008)	0.009 (0.008)	0.782*** (0.289)
FIRM_ROT_HIGHCR ₄	0.014** (0.006)	0.015* (0.008)	-0.015* (0.008)	-0.753** (0.300)
PARTNER_ROT	0.000 (0.003)	0.006* (0.003)	0.010** (0.005)	0.081 (0.145)
PARTNER_ROT_HIGHCR ₄	0.004 (0.004)	-0.003 (0.005)	-0.013** (0.007)	-0.137 (0.205)
CONCENTRATION	-0.017 (0.011)	0.004 (0.014)	0.026 (0.017)	-0.009 (0.622)
<i>p</i> -value: Regulations with high CR ₄				
LIAB_CAP	0.049	0.173	0.710	0.506
LIAB_PROP				0.546
NAS_REGULATED	0.303	0.535	0.598	0.058
FEE_DISC	0.667	0.294	0.777	0.000
FEE_CAP	0.073	0.159	0.881	0.456
JOINT_AUDITS				0.470
FIRM_ROT	0.000	0.000	0.029	0.759
PARTNER_ROT	0.196	0.535	0.559	0.741
Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	No
Period-Fixed Effects	Yes	Yes	Yes	Yes
Country-Fixed Effects	No	No	No	Yes
Industry-Fixed Effects	No	No	No	Yes
<i>n</i>	82,594	39,576	43,018	88,180
<i>N</i>	11,983	10,812	11,213	12,639
<i>F</i> -Stat. / <i>Chi</i> ² -Stat.	33.530	55.870	29.900	2342.000
Prob > <i>F</i> / Prob > <i>Chi</i> ²	0.000	0.000	0.000	0.000

Table 2.6 (continued)

Panel B: Analysis conditional on the market competition (earnings management proxies)				
VARIABLE	(1)	(2)	(3)	(4)
	ABSDA	DA+	DA-	LOSSAV
CONSTANT	0.369*** (0.023)	0.320*** (0.030)	-0.349*** (0.037)	-4.989*** (0.842)
LIABILITY_CAP	0.014* (0.008)	0.023** (0.011)	-0.016 (0.012)	0.536 (0.391)
LIABILITY_CAP_HIGHMOB	-0.012** (0.005)	-0.014** (0.006)	0.010 (0.008)	-0.254 (0.222)
LIABILITY_PROP	0.001 (0.006)	-0.005 (0.007)	-0.016 (0.011)	0.811* (0.478)
LIABILITY_PROP_HIGHMOB	-0.007*** (0.003)	0.005 (0.003)	0.016*** (0.004)	0.095 (0.143)
NAS_REGULATED	-0.004 (0.002)	-0.002 (0.003)	-0.003 (0.004)	-0.196 (0.123)
NAS_REGULATED_HIGHMOB	0.009*** (0.003)	0.004 (0.004)	-0.006 (0.005)	0.124 (0.157)
FEE_DISC	-0.008*** (0.003)	-0.006* (0.004)	0.011** (0.004)	0.237* (0.135)
FEE_DISC_HIGHMOB	0.009* (0.005)	0.001 (0.006)	-0.012* (0.007)	-0.195 (0.280)
FEE_CAP	-0.010** (0.004)	-0.012** (0.005)	0.008 (0.007)	0.217 (0.196)
FEE_CAP_HIGHMOB	-0.005 (0.004)	0.008* (0.005)	0.016** (0.006)	0.001 (0.203)
JOINT_AUDITS	0.001 (0.017)	0.022* (0.012)	0.010 (0.017)	-0.273 (0.649)
JOINT_AUDITS_HIGHMOB	-0.018*** (0.004)	-0.006 (0.005)	0.025*** (0.006)	-0.014 (0.269)
FIRM_ROT	0.013*** (0.003)	0.011*** (0.004)	-0.011** (0.005)	-0.186 (0.160)
FIRM_ROT_HIGHMOB	-0.009*** (0.003)	-0.004 (0.003)	0.010** (0.004)	0.237* (0.140)
PARTNER_ROT	0.002 (0.002)	0.004* (0.003)	0.004 (0.004)	-0.075 (0.112)
PARTNER_ROT_HIGHMOB	-0.004 (0.004)	-0.003 (0.006)	-0.004 (0.006)	0.079 (0.259)
COMPETITION	-0.072*** (0.019)	-0.066*** (0.022)	0.077*** (0.029)	0.017 (1.008)
<i>p</i> -values: Regulations with high MOB				
LIAB_CAP	0.799	0.338	0.548	0.419
LIAB_PROP	0.344	0.996	1.000	0.062
NAS_REGULATED	0.102	0.619	0.063	0.628
FEE_DISC	0.804	0.415	0.885	0.882
FEE_CAP	0.000	0.450	0.000	0.202
JOINT_AUDITS	0.348	0.202	0.055	0.684
FIRM_ROT	0.021	0.000	0.639	0.568
PARTNER_ROT	0.612	0.731	0.955	0.986
Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	No
Period-Fixed Effects	Yes	Yes	Yes	Yes
Country-Fixed Effects	No	No	No	Yes
Industry-Fixed Effects	No	No	No	Yes
<i>n</i>	82,594	39,576	43,018	88,180
<i>N</i>	11,983	10,812	11,213	12,639
<i>F</i> -Stat. / <i>Chi</i> ² -Stat.	33.090	53.140	29.350	2347.000
Prob > <i>F</i> / Prob > <i>Chi</i> ²	0.000	0.000	0.000	0.000

Table 2.6 (continued)

Panel C: Analysis conditional on the market structure (conservatism proxy)			
VARIABLE	(1)	(2)	(3)
	TACC Baseline	TACC CR ₄	TACC MOB
CONSTANT	-0.156*** (0.033)	-0.087** (0.034)	-0.023 (0.034)
NEGOCF*OCF	0.466*** (0.017)	0.400* (0.225)	0.626*** (0.205)
NEGOCF*OCF*LIABILITY_CAP		0.031 (0.073)	-0.048 (0.122)
NEGOCF*OCF*LIABILITY_CAP_HIGH		0.175 (0.331)	-0.016 (0.134)
NEGOCF*OCF*LIABILITY_PROP		-0.030 (0.060)	-0.044 (0.047)
NEGOCF*OCF*LIABILITY_PROP_HIGH		0.085 (0.157)	-0.058 (0.070)
NEGOCF*OCF*NAS_REGULATED		0.171*** (0.052)	0.177*** (0.046)
NEGOCF*OCF*NAS_REGULATED_HIGH		-0.013 (0.105)	0.047 (0.060)
NEGOCF*OCF*FEE_DISC		-0.024 (0.069)	0.024 (0.074)
NEGOCF*OCF*FEE_DISC_HIGH		-0.071 (0.094)	-0.012 (0.128)
NEGOCF*OCF*FEE_CAP		-0.068 (0.071)	0.038 (0.089)
NEGOCF*OCF*FEE_CAP_HIGH		0.061 (0.139)	-0.212** (0.107)
NEGOCF*OCF*JOINT_AUDITS		-0.020 (0.099)	-0.079 (0.080)
NEGOCF*OCF*JOINT_AUDITS_HIGH		-0.325 (0.234)	0.106 (0.202)
NEGOCF*OCF*FIRM_ROT		-0.195** (0.082)	-0.257*** (0.089)
NEGOCF*OCF*FIRM_ROT_HIGH		0.224** (0.108)	0.094 (0.101)
NEGOCF*OCF*PARTNER_ROT		-0.026 (0.049)	-0.053 (0.043)
NEGOCF*OCF*PARTNER_ROT_HIGH		0.033 (0.096)	0.037 (0.109)
NEGOCF*OCF*MARKETST		0.340 (0.207)	0.094 (0.402)
<i>p</i> -values: Regulations with high CR ₄ / MOB			
LIAB_CAP		0.531	0.425
LIAB_PROP		0.706	0.131
NAS_REGULATED		0.084	0.000
FEE_DISC		0.317	0.918
FEE_CAP		0.950	0.009
JOINT_AUDITS		0.101	0.897
FIRM_ROT		0.708	0.011
PARTNER_ROT		0.932	0.879

Table 2.6 (continued)

VARIABLE	(1)	(2)	(3)
	Baseline	CR ₄	MOB
Controls	Yes	Yes	Yes
Additional Interaction Terms: Regulation	Yes	Yes	Yes
Additional Interaction Terms: Controls	No	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes
Period-Fixed Effects	Yes	Yes	Yes
<i>n</i>	88,180	88,180	88,180
<i>N</i>	12,639	12,639	12,639
<i>F</i> -Stat.	419.300	161.500	161.000
Prob > <i>F</i>	0.000	0.000	0.000

Note: This table presents results of OLS-regressions (Columns (1) to (3) of Panel A and Columns (1) to (2) of Panel B) and a Logit regression (Column (4) of Panel A) of the dependent variable indicated in the top rows. *Huber/White* standard errors are clustered at the firm-level and reported in parentheses. The estimates of the controls and fixed effects are not reported for brevity. *p*-values for the regulatory measures with high CR₄ (MOB) are from *F*-tests of a regulation's main effect plus the interaction effect with HIGHCR₄ (HIGHMOB). All variables are defined in Appendix 2.A. The *, **, and *** mark significance at the 10%, 5%, and 1% levels (two-tailed *t*-tests).

2.6 Robustness Checks

The differentiation between audit markets with a high and a low concentration or competition is key to our research design. Therefore, we check if our results still hold for different measures of market concentration and market competition. The *Hirschmann-Herfindahl* Index (*HHI*) is a frequently used alternative metric for market concentration (see, among others, Francis et al. 2013). It is defined as the sum of the squared market shares of every audit firm in a country-year, i.e., $HHI_{kt} = \sum_j x_{ktj}^2$, where HHI_{kt} is the *Hirschmann-Herfindahl* Index for country *k* in year *t* and x_{ktj} is the market share of auditor *j* in country *k* and year *t*. The partitioning variable *HIGHHHI* is defined as one for observations of country-years with an above median *HHI*. Panel A of Table 2.7 reports the regression results.

Most of our inferences are robust to using the *HHI* as a concentration metric. Therefore, we restrict our discussion to the results that deviate from our main analysis. The coefficient on *FEE_DISC* in the regression on negative discretionary accruals becomes significant and positive if the audit market has a low degree of concentration. Furthermore, the coefficient on *FEE_CAP* in the regression on absolute discretionary accruals becomes negative and significant in audit markets with a low level of concentration. Both results reinforce our finding about the advantageousness of these regulations. Moreover, the significant coefficients in markets with a low level of concentration are in line with our conclusion that quality-enhancing regulations are more likely to be effec-

tive in markets with a low concentration. In contrast, the *FEE_DISC* coefficient in the regression on positive discretionary accruals, which was marginally significant in markets that are weakly concentrated as measured by the *CR₄*, is no longer significant. The positive effect of the restriction of non-audit services on negative discretionary accruals vanishes and the effect on loss avoidance is now significant on weakly instead of in highly concentrated markets. Whereas the significant coefficient in our main analysis was in contrast to the pattern that regulatory measures affecting loss avoidance operate in weakly concentrated markets, the result of the robustness check is in line with this interpretation. Although there are some changes regarding the results for *LIABILITY_CAP* and *LIABILITY_PROP*, still a robust interpretation of the effectiveness of these variables is impossible because the coefficients remain non-significant in most of our regressions. Taken together, using the *Hirschman-Herfindahl* Index as a concentration metric backs up our interpretations.

Our competition measure *MOB* is based on changes in market shares of all audit firms that are continuously active in a country. However, this definition ignores all audit firms that enter the market after the base year or that cannot be observed over the whole period. To avoid these shortcomings, we follow Buijink et al. (1998) and calculate the *MOB* variable only based on the four largest audit firms in a country and define our partitioning variable accordingly as *HIGHMOB_ALT*. The regression results are presented in Panel B of Table 2.7. Our findings are robust to the modification of the competition metric *MOB*. The audit firm rotation has no longer an effect on *ABSDA* in markets with low competition, whereas the effect in highly competitive markets remains significant. For fee caps, we document a negative and marginally significant effect on *ABSDA* only for highly competitive markets. Overall, our interpretations from the main analysis are not contrasted by these results.

Table 2.7: Robustness checks - different concentration and competition metrics

Panel A: Analysis conditional on the alternative market concentration (earnings management)				
<i>VARIABLE</i>	(1)	(2)	(3)	(4)
	<i>ABSDA</i>	<i>DA+</i>	<i>DA-</i>	<i>LOSSAV</i>
<i>CONSTANT</i>	0.362*** (0.022)	0.308*** (0.031)	-0.347*** (0.037)	-5.215*** (0.834)
<i>LIABILITY_CAP</i>	0.005 (0.008)	0.010 (0.010)	-0.015 (0.011)	0.138 (0.375)
<i>LIABILITY_CAP_HIGHCR₄</i>	-0.001 (0.004)	-0.010* (0.005)	-0.007 (0.006)	-0.037 (0.186)
<i>LIABILITY_PROP</i>	-0.004 (0.006)	-0.005 (0.007)	-0.011 (0.010)	0.779* (0.468)
<i>LIABILITY_PROP_HIGHCR₄</i>				0.416 (0.422)
<i>NAS_REGULATED</i>	-0.001 (0.002)	-0.002 (0.003)	-0.005 (0.004)	-0.268** (0.124)
<i>NAS_REGULATED_HIGHCR₄</i>	-0.003 (0.005)	-0.007 (0.006)	0.005 (0.007)	0.159 (0.210)
<i>FEE_DISC</i>	-0.008*** (0.003)	-0.006 (0.004)	0.012*** (0.005)	0.170 (0.130)
<i>FEE_DISC_HIGHCR₄</i>	0.000 (0.005)	0.009 (0.007)	-0.002 (0.008)	0.102 (0.238)
<i>FEE_CAP</i>	-0.007* (0.004)	-0.005 (0.005)	0.009 (0.006)	0.062 (0.196)
<i>FEE_CAP_HIGHCR₄</i>	0.000 (0.008)	0.000 (0.009)	-0.012 (0.011)	0.242 (0.303)
<i>JOINT_AUDITS</i>	0.002 (0.017)	0.025* (0.013)	0.021 (0.016)	1.197** (0.488)
<i>JOINT_AUDITS_HIGHCR₄</i>				-1.044 (0.818)
<i>FIRM_ROT</i>	-0.008 (0.006)	-0.005 (0.008)	0.010 (0.007)	0.553** (0.276)
<i>FIRM_ROT_HIGHCR₄</i>	0.016*** (0.006)	0.012 (0.009)	-0.019** (0.008)	-0.523* (0.290)
<i>PARTNER_ROT</i>	0.000 (0.002)	0.004 (0.003)	0.007* (0.004)	0.147 (0.114)
<i>PARTNER_ROT_HIGHCR₄</i>	0.004 (0.004)	-0.002 (0.005)	-0.010 (0.007)	-0.510** (0.214)
<i>CONCENTRATION</i>	0.044 (0.044)	-0.077 (0.055)	-0.101 (0.067)	0.073 (1.870)
<i>p-value: Regulations with high HHI</i>				
<i>LIAB_CAP</i>	0.636	0.955	0.066	0.803
<i>LIAB_PROP</i>		0.526	0.286	0.061
<i>NAS_REGULATED</i>	0.326	0.117	0.989	0.568
<i>FEE_DISC</i>	0.112	0.643	0.187	0.243
<i>FEE_CAP</i>	0.327	0.519	0.743	0.244
<i>JOINT_AUDITS</i>		0.053	0.204	0.812
<i>FIRM_ROT</i>	0.000	0.001	0.001	0.743
<i>PARTNER_ROT</i>	0.233	0.670	0.579	0.052
Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	No
Period-Fixed Effects	Yes	Yes	Yes	Yes
Country-Fixed Effects	No	No	No	Yes
Industry-Fixed Effects	No	No	No	Yes
<i>n</i>	82,594	39,576	43,018	88,180
<i>N</i>	11,983	10,812	11,213	12,639
<i>F-Stat. / Chi2-Stat.</i>	33.370	56.020	29.690	2323.000
<i>Prob > F / Prob > Chi2</i>	0.000	0.000	0.000	0.000

Table 2.7 (continued)

Panel B: Analysis conditional on the alternative market competition (earnings management)				
VARIABLE	(1)	(2)	(3)	(4)
	ABSDA	DA+	DA-	LOSSAV
CONSTANT	0.356*** (0.023)	0.305*** (0.030)	-0.341*** (0.037)	-5.495*** (0.815)
LIABILITY_CAP	-0.003 (0.008)	0.008 (0.010)	-0.006 (0.012)	-0.102 (0.373)
LIABILITY_CAP_HIGHMOB	0.015** (0.008)	-0.006 (0.010)	-0.014 (0.011)	0.451 (0.286)
LIABILITY_PROP	-0.002 (0.006)	-0.005 (0.007)	-0.017 (0.011)	0.912* (0.471)
LIABILITY_PROP_HIGHMOB	0.000 (0.005)	0.008 (0.007)	0.022** (0.009)	0.185 (0.291)
NAS_REGULATED	-0.004 (0.003)	-0.003 (0.003)	-0.002 (0.004)	-0.348*** (0.126)
NAS_REGULATED_HIGHMOB	0.002 (0.004)	0.002 (0.005)	0.002 (0.007)	0.412** (0.195)
FEE_DISC	-0.005 (0.003)	-0.006 (0.004)	0.008 (0.005)	0.343** (0.135)
FEE_DISC_HIGHMOB	0.003 (0.005)	0.002 (0.006)	-0.003 (0.007)	-0.333 (0.275)
FEE_CAP	-0.008** (0.004)	-0.006 (0.004)	0.010 (0.006)	0.286* (0.168)
FEE_CAP_HIGHMOB	-0.001 (0.006)	0.013 (0.008)	0.009 (0.009)	-0.219 (0.245)
JOINT_AUDITS	0.003 (0.017)	0.027** (0.013)	0.008 (0.017)	-0.693 (0.651)
JOINT_AUDITS_HIGHMOB	-0.003 (0.003)	-0.002 (0.004)	0.007 (0.005)	0.016 (0.264)
FIRM_ROT	0.002 (0.003)	0.009** (0.004)	-0.001 (0.005)	-0.191 (0.167)
FIRM_ROT_HIGHMOB	0.004 (0.003)	-0.001 (0.003)	-0.004 (0.004)	0.286** (0.145)
PARTNER_ROT	0.005** (0.002)	0.005* (0.003)	0.000 (0.004)	0.060 (0.112)
PARTNER_ROT_HIGHMOB	-0.011*** (0.004)	-0.006 (0.006)	0.003 (0.006)	-0.097 (0.247)
COMPETITION	0.062*** (0.015)	-0.025 (0.018)	-0.088*** (0.024)	0.284 (0.880)
<i>p</i> -values: Regulations with high MOB				
LIAB_CAP	0.164	0.857	0.100	0.370
LIAB_PROP	0.828	0.790	0.691	0.039
NAS_REGULATED	0.595	0.805	0.929	0.711
FEE_DISC	0.721	0.561	0.514	0.971
FEE_CAP	0.135	0.373	0.035	0.784
JOINT_AUDITS	0.995	0.072	0.428	0.336
FIRM_ROT	0.000	0.000	0.030	0.293
PARTNER_ROT	0.097	0.836	0.479	0.874
Controls	Yes	Yes	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes	No
Period-Fixed Effects	Yes	Yes	Yes	Yes
Country-Fixed Effects	No	No	No	Yes
Industry-Fixed Effects	No	No	No	Yes
<i>n</i>	82,594	39,576	43,018	88,180
<i>N</i>	11,983	10,812	11,213	12,639
<i>F</i> -Stat. / <i>Chi</i> ² -Stat.	33.100	52.850	29.460	2348.000
Prob > <i>F</i> / Prob > <i>Chi</i> ²	0.000	0.000	0.000	0.000

Table 2.7 (continued)

Panel C: Analysis conditional on the market structure (conservatism proxy)			
VARIABLE	(1)	(2)	(3)
	TACC Baseline	TACC HHI	TACC MOB_ALT
CONSTANT	-0.156*** (0.033)	-0.045 (0.035)	-0.032 (0.034)
NEGOCF*OCF	0.466*** (0.017)	0.480** (0.208)	0.584*** (0.201)
NEGOCF*OCF*LIABILITY_CAP		0.072 (0.075)	0.105 (0.084)
NEGOCF*OCF*LIABILITY_CAP_HIGH		-0.515*** (0.153)	-0.405** (0.161)
NEGOCF*OCF*LIABILITY_PROP		-0.035 (0.055)	-0.063 (0.046)
NEGOCF*OCF*LIABILITY_PROP_HIGH		0.084 (0.163)	0.054 (0.108)
NEGOCF*OCF*NAS_REGULATED		0.185*** (0.045)	0.223*** (0.043)
NEGOCF*OCF*NAS_REGULATED_HIGH		0.042 (0.102)	-0.009 (0.099)
NEGOCF*OCF*FEE_DISC		-0.045 (0.066)	-0.035 (0.074)
NEGOCF*OCF*FEE_DISC_HIGH		-0.113 (0.101)	-0.129 (0.129)
NEGOCF*OCF*FEE_CAP		-0.077 (0.066)	-0.126* (0.065)
NEGOCF*OCF*FEE_CAP_HIGH		0.004 (0.151)	0.143 (0.113)
NEGOCF*OCF*JOINT_AUDITS		0.010 (0.095)	-0.061 (0.078)
NEGOCF*OCF*JOINT_AUDITS_HIGH		-0.362 (0.245)	0.146 (0.204)
NEGOCF*OCF*FIRM_ROT		-0.164** (0.075)	-0.251** (0.099)
NEGOCF*OCF*FIRM_ROT_HIGH		0.166 (0.107)	0.105 (0.113)
NEGOCF*OCF*PARTNER_ROT		-0.055 (0.046)	-0.056 (0.044)
NEGOCF*OCF*PARTNER_ROT_HIGH		0.103 (0.106)	0.153 (0.110)
NEGOCF*OCF*MARKETST		0.705 (0.565)	0.596 (0.498)
<i>p</i> -values: Regulations with high HHI / MOB			
LIAB_CAP		0.002	0.037
LIAB_PROP		0.747	0.933
NAS_REGULATED		0.014	0.022
FEE_DISC		0.150	0.147
FEE_CAP		0.582	0.852
JOINT_AUDITS		0.117	0.686
FIRM_ROT		0.971	0.018
PARTNER_ROT		0.609	0.339

Table 2.7 (continued)

VARIABLE	(1)	(2)	(3)
	<i>Baseline</i>	<i>HHI</i>	<i>MOB_ALT</i>
Controls	Yes	Yes	Yes
Additional Interaction Terms: Regulation	Yes	Yes	Yes
Additional Interaction Terms: Controls	No	Yes	Yes
Firm-Fixed Effects	Yes	Yes	Yes
Period-Fixed Effects	Yes	Yes	Yes
<i>n</i>	88,180	88,180	88,180
<i>N</i>	12,639	12,639	12,639
<i>F</i> -Stat.	419.300	159.700	161.100
Prob > <i>F</i>	0.000	0.000	0.000

Note: This table presents results of OLS-regressions (Columns (1) to (3) of Panel A and Columns (1) to (2) of Panel B) and a Logit regression (Column (4) of Panel A) of the dependent variable indicated in the top rows. *Huber/White* standard errors are clustered at the firm-level and reported in parentheses. The estimates of the controls and fixed effects are not reported for brevity. *p*-values for the regulatory measures with high *HHI* (*MOB_ALT*) are from *F*-tests of a regulation's main effect plus the interaction effect with *HIGHHHI* (*HIGHMOB_ALT*). All variables are defined in Appendix 2.A. The *, **, and *** mark significance at the 10%, 5%, and 1% levels (two-tailed *t*-tests).

2.7 Conclusion

We analyze the effect of numerous audit regulations on the key characteristics of earnings, both unconditional and conditional on the level of concentration and competition. We use a sample of 88,180 observations from the 29 countries for which Hess and Stefani (2013) document the regulatory environment of the audit profession. Francis et al. (2013) show an association between an audit market's concentration and earnings characteristics. We go one step ahead and analyze the effectiveness of several regulatory interventions on audit quality, taking into account the countries' underlying market structures. We document that concentration as well as competition has a significant influence on the effectiveness of the regulations we analyze. In addition, we investigate the effect of several regulatory measures in a single analysis, thereby mitigating the identification problem of prior studies.

Our results provide evidence on the importance of audit market regulation for the key characteristics of earnings that are closely related to audit quality. However, regulators have to be careful with the introduction of new regulatory measures because some of the measures affect audit quality in different directions. More specifically, a restriction of non-audit services, fee disclosures, and fee caps increase audit quality, whereas the implementation of the mandatory audit firm rotation has the opposite effect. The effects of a restriction of the auditor's liability, joint audits, and mandatory audit partner rotation are more ambiguous. However, we find either neutral or negative effects on our earn-

ings quality metrics for these regulations, but no positive effects. Moreover, regulators have to consider the structure of the national audit market, because the effect of a regulation depends on the level of concentration. First, a regulation that increases discretionary accruals is more likely to work in highly concentrated markets. Second, regulatory measures that decrease the level of discretionary accruals are more likely to work in markets with low concentration, though we notice that these results are far less robust compared to the results without taking into account the market structure. We do not document a robust influence of a national audit market's competition on the effect of the regulations we investigate.

We contribute to the literature in several ways. Whereas prior research documented the importance of the institutional and regulatory environment for several earnings characteristics (Ball et al. 2003; Leuz et al. 2003; Bushman and Piotroski 2006), the most prominent regulatory measures for the audit profession have not yet been studied in a single analysis. Thus, our study allows investigating the marginal effect of a regulatory measure, taking into account the existence of other regulations. Because the literature provides competing evidence regarding some of the regulatory measures, we add to the existing literature by applying a more comprehensive research design. Furthermore, to the best of our knowledge, there is still no study addressing the effects of regulations conditional on the level of market concentration and competition. Our findings provide important practical considerations. Regulators often argue that international harmonization of the regulatory environment levels the playing field. However, our findings indicate that this is not necessarily the case. Thus, regulators not only have to make sure that a regulation has the intended consequences on the quality of audited financial statements, but also have to consider whether the regulation is going to be effective, given the underlying national market structure.

2.A Appendix

Table 2.8: Variable definition

<i>ABSDA</i>	=	absolute discretionary accruals;
<i>AUD_IND_SPEC</i>	=	auditor industry specialization, measured as the market share of an audit firm in an industry, times the industry's portfolio share of the audit firm's total fees;
<i>AUDITORCHANGE</i>	=	indicator variable that takes on the value of one if a company has a new auditor;
<i>BIG 4</i>	=	indicator variable that takes on the value of one when a company is audited by one of the big audit firms;
<i>CFO</i>	=	cash flow from operations divided by lagged total assets;
<i>CR₄</i>	=	combined market share based on the natural logarithm of the total assets audited by the four largest audit firms in a country-year;
<i>DA+</i>	=	positive discretionary accruals;
<i>DA-</i>	=	negative discretionary accruals;
<i>FDI_PER_GDP</i>	=	net inflow (new investment inflows less disinvestments) of foreign investors, scaled by a country's <i>GDP</i> ;
<i>FEE_CAP</i>	=	indicator variable that takes on the value of one when there is an upper limit for the total fees paid from a single client to the statutory auditor;
<i>FEE_DISC</i>	=	indicator variable that takes on the value of one when companies have to disclose their fees for audit and non-audit services in their financial statements;
<i>FIRM_ROT</i>	=	indicator variable that takes on the value of one when audit firm rotation is mandatory;
<i>GDP_GROWTH</i>	=	growth rate of a country's <i>GDP</i> ;
<i>GROWTH</i>	=	growth in total assets;
<i>HHI</i>	=	<i>Hirschman-Herfindahl</i> Index for a country-year, based on the natural logarithm of the total assets audited;
<i>INTERN_GAAP</i>	=	indicator variable that takes on the value of one when the firm applied either <i>IFRS</i> or <i>U.S.-GAAP</i> ;
<i>JOINT_AUDITS</i>	=	indicator variable that takes on the value of one when joint audits are mandatory;
<i>LEVERAGE</i>	=	total liabilities divided by total assets;
<i>LIABILITY_CAP</i>	=	indicator variable that takes on the value of one when there is an upper limit for an audit firm's liability;
<i>LIABILITY_PROP</i>	=	indicator variable that takes on the value of one when there is proportionate liability for audit firms;
<i>LOSSAV</i>	=	indicator variable that takes on the value of one when the company's net income is between 0 and 1% of lagged total assets;

Table 2.8 (continued)

<i>LOSS_LAG</i>	=	indicator variable that takes on the value of one when the company reports a negative net income in the previous year;
<i>MARKETCAP</i>	=	market capitalization of all companies listed on a country's stock exchanges, scaled by the country's GDP;
<i>MOB</i>	=	the mobility variable of Buijink et al. (1998), which sums up the absolute changes in the market share of continuing audit firms for a country-year;
<i>NAS_REGULATED</i>	=	indicator variable that takes on the value of one when the scope of non-audit services statutory auditors are allowed to provide to their audit clients is either restricted or forbidden;
<i>NEGCF0</i>	=	indicator variable that takes on the value of one when the company's operating cash flow is negative;
<i>PARTNER_ROT</i>	=	indicator variable that takes on the value of one when audit partner rotation is mandatory;
<i>PPE</i>	=	gross property, plant, and equipment, divided by lagged total assets;
<i>QUALOPINION</i>	=	indicator variable that takes on the value of one when the company receives a qualified audit opinion;
<i>RECEIVABLES</i>	=	account receivables, divided by lagged total assets;
<i>REVENUE</i>	=	revenue, divided by lagged total assets;
<i>RULE_OF_LAW</i>	=	"Rule of Law" variable taken from Kaufman et al. (2012);
<i>SIZE</i>	=	natural logarithm of total assets;
<i>TA</i>	=	total assets;
<i>TOTACCRUALS</i>	=	total accruals, defined as net income minus operating cash flow, divided by lagged assets;

Note: Definitions of all variables used in the study.

Table 2.9: Full results - earnings management metrics conditional on concentration (CR_4)

VARIABLE	ABSDA			DA+			DA-			LOSSAV		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)				
CONSTANT	0.374*** (0.022)	0.375*** (0.022)	0.293*** (0.030)	0.297*** (0.030)	-0.377*** (0.037)	-0.379*** (0.037)	-5.037*** (0.862)	-5.332*** (0.883)				
LIABILITY_CAP	0.002 (0.007)	-0.002 (0.008)	0.008 (0.009)	0.014 (0.012)	-0.010 (0.010)	0.015 (0.012)	0.194 (0.342)	0.842** (0.402)				
LIABILITY_CAP_HIGHCR ₄		0.024*** (0.008)		0.006 (0.010)		-0.022 (0.013)		-0.505 (0.358)				
LIABILITY_PROP	-0.004 (0.006)	-0.004 (0.006)	-0.004 (0.007)	-0.004 (0.007)	-0.011 (0.011)	-0.010 (0.011)	0.758 (0.469)	0.791* (0.470)				
LIABILITY_PROP_HIGHCR ₄								-0.410 (0.414)				
NAS_REGULATED	-0.002 (0.002)	-0.005 (0.004)	-0.003 (0.003)	0.001 (0.006)	-0.004 (0.003)	0.013** (0.006)	-0.239** (0.107)	0.193 (0.195)				
NAS_REGULATED_HIGHCR ₄		0.001 (0.006)		-0.004 (0.008)		-0.016* (0.009)		-0.540** (0.267)				
FEE_DISC	-0.007*** (0.003)	-0.006* (0.003)	-0.005 (0.003)	-0.008* (0.005)	0.010** (0.004)	-0.003 (0.006)	0.186 (0.121)	-0.335* (0.177)				
FEE_DISC_HIGHCR ₄		0.004 (0.005)		0.003 (0.006)		0.005 (0.008)		1.093*** (0.235)				
FEE_CAP	-0.009*** (0.003)	-0.004 (0.006)	-0.003 (0.004)	-0.008 (0.008)	0.014** (0.005)	-0.009 (0.009)	0.242 (0.151)	-0.122 (0.270)				
FEE_CAP_HIGHCR ₄		-0.007 (0.007)		-0.003 (0.009)		0.008 (0.011)	-0.052 (0.309)					
JOINT_AUDITS	0.006 (0.017)	0.004 (0.017)	0.028** (0.012)	0.024** (0.012)	0.012 (0.017)	0.008 (0.017)	-0.104 (0.631)	1.192** (0.489)				
JOINT_AUDITS_HIGHCR ₄								-1.646** (0.805)				
FIRM_ROT	0.006*** (0.002)	-0.007 (0.006)	0.007*** (0.002)	-0.007 (0.008)	-0.005* (0.002)	0.009 (0.008)	0.069 (0.091)	0.782*** (0.289)				
FIRM_ROT_HIGHCR ₄		0.014** (0.006)		0.015* (0.008)		-0.015* (0.008)		-0.753** (0.300)				
PARTNER_ROT	0.003 (0.002)	0.000 (0.003)	0.004 (0.002)	0.006* (0.003)	0.000 (0.003)	0.010** (0.005)	-0.084 (0.093)	0.081 (0.145)				
PARTNER_ROT_HIGHCR ₄		0.004 (0.004)		-0.003 (0.005)		-0.013** (0.007)		-0.137 (0.205)				

Table 2.9 (continued)

VARIABLE	ABSDA		DA+		DA-		LOSSAV	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>CR₄</i>	-0.022** (0.011)	-0.017 (0.011)	0.000 (0.013)	0.004 (0.014)	0.029* (0.016)	0.026 (0.017)	-0.005 (0.600)	-0.009 (0.622)
<i>SIZE</i>	-0.018*** (0.001)	-0.018*** (0.001)	-0.011*** (0.001)	-0.011*** (0.001)	0.021*** (0.002)	0.020*** (0.002)	0.092*** (0.011)	0.093*** (0.011)
<i>OCF</i>	-0.016*** (0.005)	-0.016*** (0.005)	-0.250*** (0.007)	-0.250*** (0.007)	-0.151*** (0.009)	-0.151*** (0.008)	-0.663*** (0.103)	-0.666*** (0.103)
<i>LEVERAGE</i>	0.079*** (0.004)	0.079*** (0.004)	-0.030*** (0.005)	-0.030*** (0.005)	-0.135*** (0.006)	-0.135*** (0.006)	1.535*** (0.085)	1.533*** (0.085)
<i>LOSS_LAG</i>	0.002** (0.001)	0.002** (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	0.237*** (0.038)	0.238*** (0.037)
<i>GROWTH</i>	0.025*** (0.002)	0.025*** (0.002)	0.063*** (0.002)	0.063*** (0.002)	0.008*** (0.003)	0.008*** (0.003)	-0.849*** (0.062)	-0.849*** (0.062)
<i>QUALOPINION</i>	0.010** (0.004)	0.011** (0.004)	0.002 (0.005)	0.002 (0.005)	-0.010 (0.007)	-0.010 (0.007)	-0.523*** (0.163)	-0.522*** (0.163)
<i>BIG4</i>	0.003* (0.002)	0.003* (0.002)	0.002 (0.002)	0.002 (0.002)	-0.003 (0.003)	-0.003 (0.003)	-0.159*** (0.042)	-0.157*** (0.042)
<i>AUDITORCHANGE</i>	0.003** (0.001)	0.003** (0.001)	0.002** (0.001)	0.003** (0.001)	-0.002 (0.002)	-0.002 (0.002)	-0.061 (0.050)	-0.059 (0.050)
<i>AUD_IND_SPEC</i>	0.023* (0.013)	0.024* (0.013)	0.014 (0.017)	0.014 (0.017)	-0.041** (0.021)	-0.042** (0.021)	-0.577 (0.379)	-0.574 (0.386)
<i>INTERN_GAAP</i>	-0.002 (0.002)	-0.002 (0.002)	0.003 (0.002)	0.002 (0.002)	0.003 (0.003)	0.002 (0.003)	-0.147** (0.069)	-0.209*** (0.072)
<i>RULE_OF_LAW</i>	0.018*** (0.006)	0.016** (0.006)	-0.003 (0.007)	-0.005 (0.007)	-0.029*** (0.010)	-0.026** (0.010)	-0.487 (0.315)	-0.295 (0.321)
<i>MARKETCAP</i>	-0.005* (0.003)	-0.005* (0.003)	-0.007** (0.003)	-0.007** (0.003)	0.000 (0.004)	-0.002 (0.004)	-0.028 (0.140)	-0.064 (0.142)
<i>FDI_PER_GDP</i>	0.041* (0.025)	0.041* (0.025)	0.016 (0.030)	0.015 (0.031)	-0.064 (0.040)	-0.067* (0.040)	-0.323 (0.388)	-0.213 (0.395)
<i>GDP_GROWTH</i>	0.036 (0.022)	0.036 (0.022)	0.098*** (0.027)	0.096*** (0.027)	0.028 (0.036)	0.025 (0.037)	0.074 (1.059)	-0.278 (1.087)

Table 2.9 (continued)

VARIABLE	ABSDA		DA+		DA-		LOSSAV	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>p</i> -values: Regulation with high CR ₄		0.049		0.173		0.710		0.506
LIAB_CAP		0.303		0.535		0.598		0.546
LIAB_PROP		0.667		0.294		0.777		0.058
NAS_REGULATED		0.073		0.159		0.881		0.000
FEE_DISC								0.456
FEE_CAP								0.470
JOINT_AUDITS								0.759
FIRM_ROT		0.000		0.000		0.029		0.741
PARTNER_ROT		0.196		0.535		0.559		No
Firm-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Period-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Fixed Effects	No	No	Yes	No	Yes	No	Yes	Yes
Industry-Fixed Effects	No	No	Yes	No	Yes	No	Yes	Yes
<i>n</i>	82,594	82,594	39,576	39,576	43,018	43,018	88,180	88,180
<i>N</i>	11,983	11,983	10,812	10,812	11,213	11,213	12,639	12,639
<i>F</i> -Stat. / <i>Chi</i> ² -Stat.	39.48	33.53	65.79	55.87	35.37	29.90	2316.00	2342.00
Prob > <i>F</i> / Prob > <i>Chi</i> ²	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: This table presents results of OLS-regressions (Columns (1) to (6)) and Logit-regressions (Columns (7) and (8)) of the dependent variables indicated in the top rows on the displayed variables. *Huber/White* standard errors are clustered at the firm-level and reported in parentheses. The estimates of the fixed effects are not reported for brevity. *p*-values for the regulatory measures with high CR₄ are from *F*-tests of a regulation's main effect plus the interaction effect with *HIGHCR*₄. All variables are defined in the Appendix 2.A. The *, **, and *** mark significance at the 10%, 5%, and 1% levels (two-tailed *t*-tests).

Table 2.10: Full results - earnings management metrics conditional on competition (*MOB*)

<i>VARIABLE</i>	<i>ABSDA</i>		<i>DA+</i>		<i>DA-</i>		<i>LOSSAV</i>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>CONSTANT</i>	0.359*** (0.022)	0.369*** (0.023)	0.302*** (0.030)	0.320*** (0.030)	-0.349*** (0.036)	-0.349*** (0.037)	-5.121*** (0.812)	-4.989*** (0.842)
<i>LIABILITY_CAP</i>	0.003 (0.007)	0.014* (0.008)	0.008 (0.009)	0.023** (0.011)	-0.010 (0.010)	-0.016 (0.012)	0.184 (0.339)	0.536 (0.391)
<i>LIABILITY_CAP_HIGHMOB</i>		-0.012** (0.005)		-0.014** (0.006)		0.010 (0.008)		-0.254 (0.222)
<i>LIABILITY_PROP</i>	-0.003 (0.006)	0.001 (0.006)	-0.004 (0.007)	-0.005 (0.007)	-0.011 (0.011)	-0.016 (0.011)	0.758 (0.468)	0.811* (0.478)
<i>LIABILITY_PROP_HIGHMOB</i>		-0.007*** (0.003)		0.005 (0.003)		0.016*** (0.004)		0.095 (0.143)
<i>NAS_REGULATED</i>	-0.002 (0.002)	-0.004 (0.002)	-0.003 (0.003)	-0.002 (0.003)	-0.004 (0.003)	-0.003 (0.004)		-0.196 (0.123)
<i>NAS_REGULATED_HIGHMOB</i>		0.009*** (0.003)		0.004 (0.004)		-0.006 (0.005)		0.124 (0.157)
<i>FEE_DISC</i>	-0.007*** (0.003)	-0.008*** (0.003)	-0.006* (0.003)	-0.006* (0.004)	0.008** (0.004)	0.011** (0.004)	0.202* (0.120)	0.237* (0.135)
<i>FEE_DISC_HIGHMOB</i>		0.009* (0.005)		0.001 (0.006)		-0.012* (0.007)		-0.195 (0.280)
<i>FEE_CAP</i>	-0.008** (0.003)	-0.010** (0.004)	-0.004 (0.004)	-0.012** (0.005)	0.012** (0.005)	0.008 (0.007)	0.252* (0.151)	0.217 (0.196)
<i>FEE_CAP_HIGHMOB</i>		-0.005 (0.004)		0.008* (0.005)		0.016** (0.006)		0.001 (0.203)
<i>JOINT_AUDITS</i>	0.007 (0.017)	0.001 (0.017)	0.025** (0.012)	0.022* (0.012)	0.009 (0.016)	0.010 (0.017)	-0.082 (0.632)	-0.273 (0.649)
<i>JOINT_AUDITS_HIGHMOB</i>		-0.018*** (0.004)		-0.006 (0.005)		0.025*** (0.006)		-0.014 (0.269)
<i>FIRM_ROT</i>	0.006*** (0.002)	0.013*** (0.003)	0.009*** (0.002)	0.011*** (0.004)	-0.003 (0.002)	-0.011** (0.005)	0.059 (0.088)	-0.186 (0.160)
<i>FIRM_ROT_HIGHMOB</i>		-0.009*** (0.003)		-0.004 (0.003)		0.010** (0.004)		0.237* (0.140)
<i>PARTNER_ROT</i>	0.002 (0.002)	0.002 (0.002)	0.004 (0.002)	0.004* (0.003)	0.001 (0.003)	0.004 (0.004)	-0.082 (0.092)	-0.075 (0.112)
<i>PARTNER_ROT_HIGHMOB</i>		-0.004 (0.004)		-0.003 (0.006)		-0.004 (0.006)		0.079 (0.259)

Table 2.10 (continued)

VARIABLE	ABSDA		DA+		DA-		LOSSAV	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>MOB</i>	0.023*** (0.008)	-0.072*** (0.019)	-0.038*** (0.011)	-0.066*** (0.022)	-0.067*** (0.013)	0.077*** (0.029)	0.296 (0.502)	0.017 (1.008)
<i>SIZE</i>	-0.018*** (0.001)	-0.018*** (0.001)	-0.012*** (0.001)	-0.012*** (0.001)	0.020*** (0.002)	0.020*** (0.002)	0.092*** (0.011)	0.091*** (0.011)
<i>OCF</i>	-0.016*** (0.005)	-0.016*** (0.005)	-0.250*** (0.007)	-0.251*** (0.007)	-0.151*** (0.009)	-0.151*** (0.009)	-0.662*** (0.103)	-0.655*** (0.103)
<i>LEVERAGE</i>	0.079*** (0.004)	0.079*** (0.004)	-0.030*** (0.005)	-0.030*** (0.005)	-0.136*** (0.006)	-0.136*** (0.006)	1.536*** (0.085)	1.534*** (0.085)
<i>LOSS_LAG</i>	0.002** (0.001)	0.002** (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	0.236*** (0.038)	0.236*** (0.037)
<i>GROWTH</i>	0.025*** (0.002)	0.024*** (0.002)	0.063*** (0.002)	0.063*** (0.002)	0.008*** (0.003)	0.008*** (0.003)	-0.853*** (0.062)	-0.847*** (0.062)
<i>QUALOPINION</i>	0.010** (0.004)	0.010** (0.004)	0.001 (0.005)	0.001 (0.005)	-0.010 (0.007)	-0.010 (0.007)	-0.523*** (0.163)	-0.522*** (0.163)
<i>BIG4</i>	0.003* (0.002)	0.003* (0.002)	0.002 (0.002)	0.002 (0.002)	-0.002 (0.003)	-0.003 (0.003)	-0.159*** (0.042)	-0.159*** (0.042)
<i>AUDITORCHANGE</i>	0.002** (0.001)	0.003** (0.001)	0.003** (0.001)	0.003** (0.001)	-0.002 (0.002)	-0.002 (0.002)	-0.062 (0.050)	-0.059 (0.050)
<i>AUD_IND_SPEC</i>	0.024* (0.013)	0.023* (0.013)	0.011 (0.017)	0.010 (0.017)	-0.044** (0.021)	-0.043** (0.021)	-0.576 (0.378)	-0.558 (0.379)
<i>INTERN_GAAP</i>	-0.002 (0.002)	-0.001 (0.002)	0.002 (0.002)	0.001 (0.002)	0.003 (0.003)	0.001 (0.003)	-0.145** (0.069)	-0.147** (0.070)
<i>RULE_OF_LAW</i>	0.019*** (0.006)	0.014** (0.007)	-0.005 (0.007)	-0.017** (0.008)	-0.032*** (0.010)	-0.033*** (0.011)	-0.470 (0.313)	-0.572* (0.337)
<i>MARKETCAP</i>	-0.007*** (0.003)	-0.006** (0.003)	-0.006** (0.003)	-0.004 (0.003)	0.003 (0.004)	0.002 (0.005)	-0.024 (0.134)	-0.121 (0.149)
<i>FDI_PER_GDP</i>	0.042* (0.024)	0.051** (0.026)	0.021 (0.030)	0.045 (0.032)	-0.061 (0.039)	-0.068* (0.041)	-0.329 (0.391)	-0.306 (0.377)
<i>GDP_GROWTH</i>	0.037* (0.022)	0.074*** (0.023)	0.093*** (0.027)	0.115*** (0.027)	0.025 (0.036)	-0.017 (0.037)	0.122 (1.061)	-0.160 (1.070)

Table 2.10 (continued)

VARIABLE	ABSDA		DA+		DA-		LOSSAV	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>p</i> -value for regulation with high MOB								
LIAB_CAP		0.799		0.338		0.548		0.419
LIAB_PROP		0.344		0.996		1.000		0.062
NAS_REGULATED		0.102		0.619		0.063		0.628
FEE_DISC		0.804		0.415		0.885		0.882
FEE_CAP		0.000		0.450		0.000		0.202
JOINT_AUDITS		0.348		0.202		0.055		0.684
FIRM_ROT		0.021		0.000		0.639		0.568
PARTNER_ROT		0.612		0.731		0.955		0.986
Firm-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Period-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Fixed Effects	No	No	No	No	No	No	Yes	Yes
Industry-Fixed Effects	No	No	No	No	No	No	Yes	Yes
<i>n</i>	82,594	82,594	39,576	39,576	43,018	43,018	88,180	88,180
<i>N</i>	11,983	11,983	10,812	10,812	11,213	11,213	12,639	12,639
<i>F</i> -Stat. / <i>Chi</i> 2-Stat.	39.85	33.22	65.84	52.80	35.93	29.48	2322.00	2345.00
Prob > <i>F</i> / Prob > <i>Chi</i> 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: This table presents results of OLS-regressions (Columns (1) to (6)) and Logit-regressions (Columns (7) and (8)) of the dependent variables indicated in the top rows on the displayed variables. *Huber/White* standard errors are clustered at the firm-level and reported in parentheses. The estimates of the fixed effects are not reported for brevity. *p*-values for the regulatory measures with high MOB are from *F*-tests of a regulation's main effect plus the interaction effect with *HIGHMOB*. All variables are defined in the Appendix 2.A. The *, **, and the *** mark significance at the 10%, 5%, and 1% levels (two-tailed *t*-tests).

Table 2.11: Full results - asymmetric timeliness conditional on CR_4 and MOB

VARIABLE	Baseline	CR_4		MOB	
	(1)	(2)	(3)	(4)	(5)
CONSTANT	-0.156*** (0.033)	-0.086** (0.034)	-0.087** (0.034)	-0.022 (0.034)	-0.023 (0.034)
NEGCF0	0.029*** (0.002)	-0.063*** (0.024)	-0.061** (0.026)	-0.032 (0.022)	-0.035 (0.023)
NEGCF0*CFO	0.466*** (0.017)	0.364* (0.207)	0.400* (0.225)	0.566*** (0.200)	0.626*** (0.205)
LIABILITY_CAP		-0.033*** (0.007)	-0.010 (0.009)	-0.036*** (0.007)	-0.016 (0.010)
LIABILITY_CAP_HIGH			0.004 (0.013)		-0.019** (0.008)
LIABILITY_PROP		0.013 (0.009)	0.015 (0.009)	0.012 (0.008)	0.012 (0.009)
LIABILITY_PROP_HIGH					0.012*** (0.004)
NAS_REGULATED		0.005 (0.003)	0.021*** (0.006)	0.006* (0.003)	0.000 (0.004)
NAS_REGULATED_HIGH			-0.014* (0.008)		0.012** (0.005)
FEE_DISC		-0.003 (0.004)	-0.020*** (0.005)	-0.004 (0.004)	0.006 (0.005)
FEE_DISC_HIGH			0.019*** (0.007)		-0.028*** (0.008)
FEE_CAP		0.015*** (0.005)	-0.001 (0.007)	0.010** (0.004)	-0.003 (0.007)
FEE_CAP_HIGH			-0.004 (0.010)		0.022*** (0.007)
JOINT_AUDITS		0.014 (0.013)	-0.022 (0.018)	0.007 (0.012)	0.003 (0.013)
JOINT_AUDITS_HIGH					0.023*** (0.006)
FIRM_ROT		-0.006** (0.003)	-0.002 (0.009)	-0.005** (0.002)	-0.007 (0.005)
FIRM_ROT_HIGH			0.001 (0.009)		0.004 (0.004)
PARTNER_ROT		0.000 (0.003)	0.011** (0.005)	0.000 (0.003)	0.005 (0.004)
PARTNER_ROT_HIGH			-0.014** (0.007)		0.004 (0.007)
MARKETST		0.076*** (0.014)	0.075*** (0.016)	-0.092*** (0.014)	-0.004 (0.027)
NEGCF0*LIABILITY_CAP		0.012* (0.007)	0.009 (0.008)	0.008 (0.007)	-0.033** (0.017)
NEGCF0*LIABILITY_CAP_HIGH			0.018 (0.023)		0.043** (0.018)
NEGCF0*LIABILITY_PROP		0.007 (0.006)	-0.004 (0.009)	0.000 (0.005)	0.000 (0.006)
NEGCF0*LIABILITY_PROP_HIGH			0.000 (0.020)		-0.008 (0.009)
NEGCF0*NAS_REGULATED		0.016*** (0.005)	0.020*** (0.008)	0.019*** (0.005)	0.028*** (0.007)
NEGCF0*NAS_REGULATED_HIGH			-0.022 (0.014)		-0.021** (0.009)
NEGCF0*FEE_DISC		0.010 (0.008)	0.016* (0.009)	0.011 (0.007)	0.004 (0.010)
NEGCF0*FEE_DISC_HIGH			-0.012 (0.012)		0.01 (0.016)

Table 2.11 (continued)

VARIABLE	Baseline	CR ₄		MOB	
	(1)	(2)	(3)	(4)	(5)
NEGCF0*FEE_CAP		-0.004 (0.006)	-0.014 (0.009)	-0.011* (0.006)	0.015 (0.013)
NEGCF0*FEE_CAP_HIGH			0.002 (0.017)		-0.026* (0.015)
NEGCF0*JOINT_AUDITS		0.007 (0.008)	-0.006 (0.012)	-0.004 (0.008)	-0.007 (0.008)
NEGCF0*JOINT_AUDITS_HIGH			0.001 (0.044)		0.013 (0.017)
NEGCF0*FIRM_ROT		-0.003 (0.005)	-0.019* (0.011)	-0.007 (0.004)	-0.009 (0.008)
NEGCF0*FIRM_ROT_HIGH			0.023* (0.012)		0.006 (0.009)
NEGCF0*PARTNER_ROT		-0.013** (0.005)	-0.014* (0.007)	-0.012** (0.005)	-0.017** (0.007)
NEGCF0*PARTNER_ROT_HIGH			0.012 (0.013)		0.006 (0.014)
NEGCF0*CONCENTRATION		0.043** (0.018)	0.051* (0.027)	-0.051* (0.027)	-0.038 (0.048)
CFO*LIABILITY_CAP		0.001 (0.038)	-0.019 (0.040)	-0.004 (0.037)	-0.071 (0.068)
CFO*LIABILITY_CAP_HIGH			0.134 (0.111)		0.092 (0.073)
CFO*LIABILITY_PROP		0.112*** (0.026)	0.069* (0.037)	0.125*** (0.024)	0.121*** (0.027)
CFO*LIABILITY_PROP_HIGH			-0.129 (0.083)		0.000 (0.033)
CFO*NAS_REGULATED		-0.011 (0.023)	-0.003 (0.031)	-0.022 (0.022)	-0.006 (0.027)
CFO*NAS_REGULATED_HIGH			-0.091* (0.053)		-0.020 (0.036)
CFO*FEE_DISC		0.045 (0.032)	0.067* (0.037)	0.034 (0.032)	-0.004 (0.038)
CFO*FEE_DISC_HIGH			-0.054 (0.050)		0.097 (0.061)
CFO*FEE_CAP		-0.008 (0.029)	-0.048 (0.038)	0.016 (0.026)	0.044 (0.052)
CFO*FEE_CAP_HIGH			0.066 (0.081)		-0.038 (0.056)
CFO*JOINT_AUDITS		-0.043 (0.046)	-0.111* (0.057)	-0.038 (0.044)	-0.022 (0.047)
CFO*JOINT_AUDITS_HIGH			0.263* (0.146)		-0.091 (0.061)
CFO*FIRM_ROT		0.029 (0.022)	-0.013 (0.045)	0.043** (0.021)	0.094*** (0.035)
CFO*FIRM_ROT_HIGH			-0.008 (0.048)		-0.067* (0.035)
CFO*PARTNER_ROT		-0.021 (0.022)	-0.008 (0.030)	-0.010 (0.022)	-0.017 (0.025)
CFO*PARTNER_ROT_HIGH			0.023 (0.047)		-0.059 (0.053)
CFO*CONCENTRATION		-0.118 (0.085)	0.017 (0.113)	-0.291** (0.118)	-0.382* (0.197)
NEGCF0*CFO*LIABILITY_CAP		0.030 (0.071)	0.031 (0.073)	0.013 (0.071)	-0.048 (0.122)
NEGCF0*CFO*LIABILITY_CAP_HIGH			0.175 (0.331)		-0.016 (0.134)

Table 2.11 (continued)

VARIABLE	Baseline	CR ₄		MOB	
	(1)	(2)	(3)	(4)	(5)
<i>NEGOCF*OCF*LIABILITY_PROP</i>		-0.008 (0.045)	-0.030 (0.060)	-0.059 (0.041)	-0.044 (0.047)
<i>NEGCFO*CFO*LIABILITY_PROP_HIGH</i>			0.085 (0.157)		-0.058 (0.070)
<i>NEGCFO*CFO*NAS_REGULATED</i>		0.169*** (0.038)	0.171*** (0.052)	0.206*** (0.038)	0.177*** (0.046)
<i>NEGCFO*CFO*NAS_REGULATED_HIGH</i>			-0.013 (0.105)		0.047 (0.060)
<i>NEGCFO*CFO*FEE_DISC</i>		-0.048 (0.063)	-0.024 (0.069)	-0.033 (0.063)	0.024 (0.074)
<i>NEGCFO*CFO*FEE_DISC_HIGH</i>			-0.071 (0.094)		-0.012 (0.128)
<i>NEGCFO*CFO*FEE_CAP</i>		-0.037 (0.052)	-0.068 (0.071)	-0.103** (0.049)	0.038 (0.089)
<i>NEGCFO*CFO*FEE_CAP_HIGH</i>			0.061 (0.139)		-0.212** (0.107)
<i>NEGCFO*CFO*JOINT_AUDITS</i>		-0.018 (0.081)	-0.020 (0.099)	-0.065 (0.077)	-0.079 (0.080)
<i>NEGCFO*CFO*JOINT_AUDITS_HIGH</i>			-0.325 (0.234)		0.106 (0.202)
<i>NEGCFO*CFO*FIRM_ROT</i>		-0.112** (0.051)	-0.195** (0.082)	-0.149*** (0.051)	-0.257*** (0.089)
<i>NEGCFO*CFO*FIRM_ROT_HIGH</i>			0.224** (0.108)		0.094 (0.101)
<i>NEGCFO*CFO*PARTNER_ROT</i>		-0.029 (0.038)	-0.026 (0.049)	-0.044 (0.039)	-0.053 (0.043)
<i>NEGCFO*CFO*PARTNER_ROT_HIGH</i>			0.033 (0.096)		0.037 (0.109)
<i>NEGCFO*CFO*CONCENTRATION</i>		0.382*** (0.143)	0.340 (0.207)	0.218 (0.278)	0.094 (0.402)
<i>SIZE</i>	0.013*** (0.002)	0.005*** (0.002)	0.005*** (0.002)	0.005*** (0.002)	0.006*** (0.002)
<i>LEVERAGE</i>	-0.184*** (0.006)	-0.153*** (0.007)	-0.154*** (0.007)	-0.155*** (0.007)	-0.156*** (0.007)
<i>LOSS_LAG</i>	-0.015*** (0.001)	-0.010*** (0.002)	-0.010*** (0.002)	-0.009*** (0.002)	-0.009*** (0.002)
<i>GROWTH</i>	0.666*** (0.002)	0.101*** (0.004)	0.101*** (0.004)	0.102*** (0.004)	0.103*** (0.004)
<i>QUAL_OPINION</i>	-0.011* (0.006)	-0.011 (0.010)	-0.011 (0.010)	-0.011 (0.010)	-0.011 (0.010)
<i>BIG4</i>	-0.003 (0.002)	0.000 (0.002)	0.000 (0.002)	0.000 (0.002)	0.000 (0.002)
<i>AUDITORCHANGE</i>	-0.001 (0.001)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
<i>AUD_IND_SPEC</i>	0.006 (0.013)	0.000 (0.015)	0.005 (0.016)	-0.002 (0.015)	-0.003 (0.015)
<i>INTERN_GAAP</i>	0.011*** (0.002)	0.006** (0.003)	0.006** (0.003)	0.005** (0.003)	0.004 (0.003)
<i>RULE_OF_LAW</i>	-0.026*** (0.006)	-0.024*** (0.007)	-0.024*** (0.007)	-0.025*** (0.007)	-0.038*** (0.008)
<i>MARKETCAP</i>	0.007** (0.003)	0.011*** (0.004)	0.010** (0.004)	0.015*** (0.004)	0.018*** (0.004)
<i>FDI_PER_GDP</i>	-0.001 (0.007)	-0.010 (0.011)	-0.010 (0.011)	-0.015 (0.011)	-0.017 (0.010)
<i>GDP_GROWTH</i>	0.077*** (0.026)	-0.017 (0.031)	-0.016 (0.031)	-0.024 (0.031)	-0.038 (0.032)

Table 2.11 (continued)

VARIABLE	Baseline	CR ₄		MOB	
	(1)	(2)	(3)	(4)	(5)
NEGCF0*SIZE		0.003*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
NEGCF0*LEVERAGE		-0.040*** (0.008)	-0.040*** (0.008)	-0.039*** (0.008)	-0.038*** (0.008)
NEGCF0*LOSS_LAG		-0.004 (0.003)	-0.005 (0.003)	-0.004 (0.003)	-0.004 (0.003)
NEGCF0*GROWTH		0.002 (0.006)	0.002 (0.006)	0.001 (0.006)	0.001 (0.006)
NEGCF0*QUAL_OPINION		-0.009 (0.013)	-0.009 (0.013)	-0.010 (0.013)	-0.010 (0.013)
NEGCF0*BIG4		-0.008** (0.003)	-0.009*** (0.003)	-0.007** (0.003)	-0.007** (0.003)
NEGCF0*AUDITORCHANGE		-0.008* (0.005)	-0.008* (0.005)	-0.008* (0.005)	-0.008* (0.005)
NEGCF0*AUD_IND_SPEC		0.018 (0.025)	0.017 (0.025)	0.016 (0.025)	0.011 (0.024)
NEGCF0*INTERN_GAAP		0.005 (0.004)	0.003 (0.005)	0.007 (0.004)	0.007 (0.004)
NEGCF0*RULE_OF_LAW		-0.007 (0.005)	-0.007 (0.006)	-0.007 (0.005)	-0.003 (0.006)
NEGCF0*MARKETCAP		-0.005 (0.006)	-0.007 (0.006)	-0.006 (0.006)	-0.007 (0.006)
NEGCF0*FDI_PER_GDP		0.001 (0.007)	-0.001 (0.007)	0.003 (0.006)	-0.001 (0.006)
NEGCF0*GDP_GROWTH		0.105** (0.050)	0.101** (0.050)	0.0886* (0.051)	0.081 (0.052)
CFO*SIZE		-0.026*** (0.005)	-0.026*** (0.005)	-0.026*** (0.005)	-0.025*** (0.005)
CFO*LEVERAGE		-0.402*** (0.040)	-0.392*** (0.040)	-0.401*** (0.040)	-0.400*** (0.040)
CFO*LOSS_LAG		0.043** (0.019)	0.042** (0.019)	0.041** (0.019)	0.041** (0.019)
CFO*GROWTH		-0.116*** (0.022)	-0.118*** (0.022)	-0.121*** (0.022)	-0.124*** (0.022)
CFO*QUAL_OPINION		0.086 (0.086)	0.082 (0.085)	0.082 (0.085)	0.080 (0.085)
CFO*AUDITORCHANGE		-0.022 (0.019)	-0.024 (0.019)	-0.020 (0.019)	-0.020 (0.019)
CFO*AUD_IND_SPEC		0.050 (0.136)	-0.005 (0.138)	0.026 (0.133)	0.028 (0.134)
CFO*INTERN_GAAP		0.037** (0.018)	0.021 (0.020)	0.041** (0.019)	0.040** (0.019)
CFO*RULE_OF_LAW		0.071*** (0.024)	0.068*** (0.026)	0.067*** (0.024)	0.092*** (0.030)
CFO*MARKETCAP		-0.029 (0.024)	-0.047* (0.025)	-0.029 (0.024)	-0.029 (0.025)
CFO*FDI_PER_GDP		0.013 (0.041)	0.012 (0.041)	0.027 (0.041)	0.014 (0.040)
CFO*GDP_GROWTH		0.673*** (0.207)	0.572*** (0.208)	0.732*** (0.212)	0.740*** (0.216)
NEGCF0*CFO*SIZE		-0.043*** (0.010)	-0.042*** (0.010)	-0.041*** (0.010)	-0.043*** (0.010)
NEGCF0*CFO*LEVERAGE		0.329*** (0.059)	0.320*** (0.059)	0.333*** (0.059)	0.331*** (0.059)
NEGCF0*CFO*LOSS_LAG		0.161*** (0.038)	0.150*** (0.038)	0.162*** (0.038)	0.158*** (0.038)

Table 2.11 (continued)

VARIABLE	Baseline	CR ₄		MOB	
	(1)	(2)	(3)	(4)	(5)
NEGCF0*CFO*GROWTH		0.361*** (0.028)	0.365*** (0.028)	0.367*** (0.028)	0.373*** (0.028)
NEGCF0*CFO*QUAL_OPINION		-0.101 (0.093)	-0.097 (0.092)	-0.102 (0.092)	-0.096 (0.092)
NEGCF0*CFO*BIG4		0.029 (0.025)	0.027 (0.025)	0.035 (0.025)	0.036 (0.025)
NEGCF0*CFO*AUDITORCHANGE		-0.020 (0.032)	-0.016 (0.032)	-0.022 (0.032)	-0.023 (0.032)
NEGCF0*CFO*AUD_IND_SPEC		-0.017 (0.285)	0.101 (0.294)	0.005 (0.285)	0.021 (0.277)
NEGCF0*CFO*INTERN_GAAP		0.001 (0.031)	0.010 (0.033)	0.004 (0.032)	0.021 (0.033)
NEGCF0*CFO*RULE_OF_LAW		-0.066 (0.047)	-0.085* (0.050)	-0.062 (0.047)	-0.101* (0.055)
NEGCF0*CFO*MARKETCAP		0.099** (0.039)	0.106*** (0.040)	0.094** (0.040)	0.089** (0.040)
NEGCF0*CFO*FDI_PER_GDP		-0.217*** (0.052)	-0.230*** (0.052)	-0.236*** (0.052)	-0.236*** (0.052)
NEGCF0*CFO*GDP_GROWTH		0.088 (0.449)	0.194 (0.447)	-0.129 (0.447)	-0.104 (0.456)
Regulation with high CR ₄ /MOB					
LIAB_CAP			0.531		0.425
LIAB_PROP			0.706		0.131
NAS_REGULATED			0.084		0.000
FEE_DISC			0.317		0.918
FEE_CAP			0.950		0.009
JOINT_AUDITS			0.101		0.897
FIRM_ROT			0.708		0.011
PARTNER_ROT			0.932		0.879
Firm-Fixed Effects	Yes	Yes	Yes	Yes	Yes
Period-Fixed Effects	Yes	Yes	Yes	Yes	Yes
<i>n</i>	88,180	88,180	88,180	88,180	88,180
<i>N</i>	12,639	12,639	12,639	12,639	12,639
<i>F</i> -Stat.	419.30	200.80	161.50	207.20	161.00
Prob > <i>F</i>	0.00	0.00	0.00	0.00	0.00

Note: This table presents OLS-regression results of total accruals on the displayed variables. *Huber/White* standard errors are clustered at the firm-level and reported in parentheses. The estimates of fixed effects are not reported for brevity. *p*-values for the regulatory measures with high CR₄ (MOB) are from *F*-tests of a regulation's main effect plus the interaction effect with HIGHCR₄ (HIGHMOB). All variables are defined in the Appendix 2.A. The *, **, and the *** mark significance at the 10%, 5%, and 1% levels (two-tailed *t*-tests).

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Chapter 3:
**The Effect of the Appointment of Former Audit
Firm Employees to the Board of Directors on the
Quality of the Financial Reporting**

3.1 Introduction

Among firms, the appointment of former audit firm employees (i.e., audit experts⁶⁶) to the board of directors is a common, long-established practice that has been the subject of critical discussion for decades.⁶⁷ The debate has centered around the special case in which an audit firm employee becomes a member of the board of a client firm where he or she had actively been involved in the audit process – so-called “revolving-door” hires. Regulators fear that potential conflicts of interest could impair the independence of the auditor and thus reduce audit quality. Following the prominent accounting scandals at the beginning of the millennium (e.g. *FlowTex* (2000, Germany), *Enron-Andersen* (2001, U.S.), *Worldcom* (2002, U.S.), *Parmalat* (2003, Italy)), many countries have imposed restrictions on such appointments, among other regulations.⁶⁸

The previous literature has primarily focused on these special revolving-door cases and the associated potential impairment of audit quality. However, such appointments have represented only a fraction of all appointments of audit experts, even before the restrictions came into effect.⁶⁹ We therefore focus on the appointments of audit experts from any audit firm, irrespective of the recent audits at the particular firm,⁷⁰ a subject

⁶⁶ Note that former audit firm employees are often denoted as “financial experts”, which is consistent with the definition of a financial expert given in Section 407 (b) of the Sarbanes-Oxley Act (SOX) of 2002. A financial expert is a person with “(1) an understanding of generally accepted accounting principles and financial statements; (2) experience in (A) the preparation or auditing of financial statements of generally comparable issuers; and (B) the application of such principles in connection with the accounting for estimates, accruals, and reserves; (3) experience with internal accounting controls, and (4) an understanding of audit committee functions”. The Act associates this knowledge with individuals having “education and experience as a public accountant or auditor or a principal financial officer, controller, or principal accounting officer of an issuer, or from a position involving the performance of similar functions”.

⁶⁷ Matthews et al. (1997) provide the first detailed analysis for the U.K.; Imhoff Jr. (1978) refers to critical reports from the U.S. Congress starting in 1976.

⁶⁸ In parallel with the tighter audit regulations, regulators also introduced hiring restrictions for former audit firm employees. In the U.S., Section 407 of the Sarbanes-Oxley Act directed the issue to the SEC, which introduced a “cooling-off period” on revolving-door appointments of three years, a restriction that came into effect in 2004. Furthermore, Section 101 (e2) specifies that only two members of the board can be Certified Public Accountants (CPAs). With Art. 42(3) of the Statutory Audit Directive of 2006 (European Parliament and European Council 2006a), the European Union also introduced a cooling-off period of two years for key audit partners seeking to join their former clients. In the U.K., a cooling-off period of two years is prescribed in the Ethical Standard 2 of the Auditing Practices Board (APB) (Auditing Practices Board 2010), which has been in place since 2002 (Basioudis 2007).

⁶⁹ For the U.S., in the period prior to the introduction of hiring restrictions, Geiger et al. (2008) report a share of 17% revolving-door hires among all hires of accounting officers with an audit industry background.

⁷⁰ Our sample does not include revolving-door hires with recent involvement in the firm’s audits (see Section 3.4). However, it does include some experts whose previous position was at the incumbent audit firm, an issue we address in Section 3.7.

that has thus far attracted little research attention. Additionally, we consider the time period after the stricter regulations for the audit profession went into effect.

The intuitive reason for the appointment of an audit expert as a company director is the individual's accounting expertise and audit industry background (e.g. Basioudis 2007; Naiker and Sharma 2009). However, the general effects on financial reporting resulting from the addition of such expertise to the board are still not well understood (Basioudis 2007; Krishnan and Visvanathan 2008; Dhaliwal et al. 2010), and the relatively limited empirical findings are mixed (e.g. Geiger et al. 2005; Geiger and North 2006). In addition, the stock market shows no significant reaction to appointments of independent audit experts (Geiger et al. 2008). However, appointing former audit firm employees to boards is a common ongoing practice. What can be expected from such appointments is therefore of interest to all addressees of financial statements, as it is still unclear *whether* and *how* the quality of a firm's financial reporting benefits from the presence of audit experts on the board.

In this study, we analyze how accounting expertise from former audit firm employees serving on company boards affects audit effort and reporting quality. More specifically, we analyze the changes in audit fees and discretionary accruals following the appointment of an audit expert to the board of a publicly listed company in the U.K. between 2002 and 2009. We use audit fees as a proxy for the audit effort (Davis et al. 1993; O'Keefe et al. 1994; Bell et al. 2001; Bédard and Johnstone 2010), and discretionary accruals as a measure of the financial reporting quality (Dechow et al. 2010). In contrast to prior studies, we consider both of these factors in order to gain a better understanding of the observed changes resulting from the appointment of an audit expert.

We measure the variation in audit fees and discretionary accruals *within* firms over time in a panel regression framework that controls for general differences between individual firms and for common determinants. This setup ensures the clean statistical identification of changes in audit fees and discretionary accruals that result from the audit experts' appointments.

In contrast to cross-sectional studies, our setup requires information on the hiring dates of audit experts. We use publicly available data on employment histories to construct a novel panel dataset that allows us to track audit firm employees who move to company boards with little or no time gap between their positions. Earlier research on

audit expertise and its influence on reporting quality has often identified former audit firm employees by considering the training firms where they received their accounting qualifications. More recent positions are often ignored in this literature because “*historical employment data is typically not available*” (Naiker and Sharma 2009, 584). This method can imply extended time gaps between company affiliations, even though the common view is that the shorter the gap, the stronger the link to the audit profession (e.g. Dowdell and Krishnan 2003; Basioudis 2007; Lennox and Park 2007; Naiker and Sharma 2009).

We contribute to the existing literature in several ways. Our study is the first empirical analysis of the relationship between audit fees, earnings management, and the presence of former audit firm employees on company boards under the recent restrictions on the audit profession. We provide the first detailed analysis of the general appointment effect for audit experts on financial reporting quality and its development over several periods. We show that after the appointment of an audit expert, audit fees increase while discretionary accruals decrease. These findings are consistent with the view that the appointment of an audit expert is associated with an increase in audit effort and financial reporting quality. Whereas the audit fee increase is observable in the initial years of the expert’s engagement, we find a permanently lowered level of discretionary accruals after the appointment. These two effects are predominantly observable for audit experts who serve as executive directors and for companies with weak corporate governance structures and small boards.

The remainder of the paper is organized as follows. Section 3.2 reviews the literature on accounting expertise in boards of directors. In Section 3.3, we develop our hypotheses; our data is presented in Section 3.4. We introduce the empirical methodology used to test our hypotheses in Section 3.5. Section 3.6 describes our main results, and Section 3.7 provides several robustness checks. Section 3.8 concludes.

3.2 Related Literature

Thus far, only few studies have investigated the appointment of audit experts to company boards or the existing level of audit expertise on boards and the related effects on the quality of the audit process and the financial reporting.

For example, Geiger et al. (2005) analyze changes in discretionary accruals in association with the appointment of new financial reporting executives by U.S. firms, find-

ing that the accruals are stable and do not significantly change following the appointment of former audit firm employees. The authors' main focus is on the revolving-door case, and they only consider former audit firm employees who were at the manager or partner level in the audit firm. However, they also consider various control samples (namely, executives from audit firms other than the company's incumbent audit firm, executives from non-audit firms, and firms that did not hire any new financial reporting executives at all) and find the same result. In contrast, Geiger and North (2006), who do not primarily focus on former audit firm employees, find that there is (similar to the more established finding for Chief Executive Officers) a significant increase in discretionary accruals before the appointment of a new Chief Financial Officer (CFO), followed by a significant reduction thereafter. However, in line with Geiger et al. (2005), they also report no significant difference between the discretionary accruals of companies that appointment a new CFO from the current audit firm (revolving-door) compared to appointments of individuals from other audit firms or from non-audit firms.

To the best of our knowledge, the only paper that analyzes the specific relationship between audit experts on the board of directors and audit fees is Basioudis (2007). In a cross-sectional analysis, he compares the audit fees paid by companies in the U.K. in 1996/1997. In his sample, which comprises only companies with at least one director who was a qualified chartered accountant, he distinguishes between boards with former audit firm employees who received their qualifications at the incumbent audit firm and those with former audit employees who received their qualifications elsewhere. However, he does not consider any other positions held by the experts. Basioudis (2007) reports that companies with executive directors who were trained at the incumbent audit firm pay significantly lower audit fees than companies with former audit firm employees who were either trained at a different audit firm or who served only as non-executive directors. He explains these findings by the reduced engagement risk for the audit firm in such cases. In contrast, Carcello et al. (2002), who use a different definition of board expertise,⁷¹ find that higher board expertise is positively related to audit fees. They interpret their findings as evidence for a "higher-quality audit service" demand from boards with more expertise.

⁷¹ They define board expertise as "*the average number of outside directorships held in other corporations by non-management directors*" (Carcello et al. 2002, 372).

Another strand of the literature on the influence of expertise on financial reporting is based on expertise in the audit committee. Using U.S. data from 1991 to 1999, Abbott et al. (2004) analyze the association between financial expertise in the audit committee and the occurrence of restatements or fraud. Without distinguishing between accounting and non-accounting expertise,⁷² they report that firms with an audit committee that includes at least one financial expert have a lower probability of restatements or fraud. However, more recent studies have differentiated between expert types, finding that accounting financial expertise is the main driver of this effect. More specifically, for U.S. data from 2000 to 2002, Krishnan and Visvanathan (2008) find that only accounting expertise has a significant positive effect on conservatism. In line with these results, for post-SOX U.S. data, Dhaliwal et al. (2010) also report that only accounting expertise significantly increases accrual quality. However, they also show that a combination of accounting and non-accounting experts has the most beneficial impact on a firm's reporting quality.

Naiker and Sharma (2009) go one step further, investigating the relationship between former audit firm partners on the audit committee and internal controls. Analyzing U.S. companies that reported internal control deficiencies (ICDs) in 2004 – that is, internal control weaknesses that must be disclosed under SOX 404 – the authors find that the presence of audit experts on the audit committees is inversely related to ICDs. This holds for experts who were partners at the company's incumbent audit firm, at one of the company's former audit firms, or at some other audit firm. The authors conclude that the knowledge of these experts helps the firms to establish better internal controls. In addition, they report that the presence of former audit firm employees from the current or previous audit firm is negatively related to performance-adjusted discretionary accruals. This effect is significantly weaker when the appointment occurs with a time gap of three or more years after the expert leaves the audit firm; former audit firm employees from other audit firms with no relation to the company show no significant effect. The results of Naiker and Sharma (2009) are in line with the more general finding of Krishnan (2005), who (without differentiating between accounting and non-

⁷² In contrast to most of the research on expertise on boards, studies that have investigated expertise on audit committees consider not only "accounting financial expertise" (e.g. former audit firm employees) but also "non-accounting financial expertise" (e.g. supervisory financial experts) (Cohen et al. 2014). The SOX definition of financial expertise follows the recommendation of the Blue Ribbon Committee's report - Improving the Effectiveness of Corporate Audit Committees from 1999, which is also included in Section 407 (b) of the Sarbanes-Oxley Act of 2002.

accounting experts) shows that expertise in the audit committee is negatively associated with internal control problems.

Only a few studies have analyzed the effect of audit committee expertise on audit fees. Abbott et al. (2003a), who use data from the U.S. in the pre-SOX era and do not differentiate between accounting and non-accounting experts, find that firms with expertise on the audit committee pay higher audit fees. They interpret these results as evidence of an increased demand for audit coverage. Similarly, Hoitash and Hoitash (2009) find a positive effect for the presence of accounting and non-accounting experts on audit fees in the U.S., also in the post-SOX era.

3.3 Hypotheses

In our analysis, we focus on changes in audit fees and discretionary accruals over a short time period before and after the appointment of an audit expert. Here, audit fees serve as a proxy for the audit firm's effort.⁷³ In line with prior literature, we regard a higher level of audit fees as an indicator for a higher level of assurance (Abbott et al. 2003b; Francis 2004; Knechel and Willekens 2006; Hoitash and Hoitash 2009). Discretionary accruals indicate the quality of a financial statement, as they reflect the part of the accruals that cannot be explained by the company's fundamental performance and can therefore be interpreted as earnings management (Dechow et al. 2010). In addition, discretionary accruals are the most prominent proxy for audit quality, where lower levels of discretionary accruals indicate a higher audit quality.⁷⁴

An individual who has recent employment experience with an audit firm adds accounting expertise to the board. Most of the existing empirical studies have found that companies with more expertise on the board or the audit committee pay higher audit fees in the cross-section (e.g. Carcello et al. 2002; Abbott et al. 2003a; Goodwin-Stewart and Kent 2006). The common explanation for this is that greater expertise creates a higher demand for audit quality. However, a former audit firm employee who seeks to improve a company's accounting system might demand not only greater external audit effort but also increases internal efforts to establish better reporting mechanisms and internal controls. In line with this interpretation, Naiker and Sharma (2009)

⁷³ Studies that include both auditor hours worked and audit fees have shown that audit fees can generally be used as a proxy for the audit firm's effort (e.g. Davis et al. 1993; O'Keefe et al. 1994; Bell et al. 2001; Bédard and Johnstone 2010).

⁷⁴ See Geiger and North (2006) for a detailed discussion.

and Krishnan (2005) show that the knowledge and experience of former audit firm employees can help firms to establish better internal controls.

The empirical evidence on whether these two efforts are generally complementary with respect to audit fees (i.e., both increase audit fees) or are instead substitutive is mixed. Felix Jr. et al. (2001) find that internal audit effort, such as investing in the availability of internal auditing, internal audit quality, and the coordination between internal and external auditors, can reduce audit fees. Similarly, Davidson and Gist (1996) find that investments in audit planning reduce audit fees. In contrast, more recent studies find that internal and external audit efforts are complementary (e.g. Goodwin-Stewart and Kent 2006; Hay et al. 2008). Griffin and Lont (2007) do not rely on cross-sectional differences; instead, the authors analyze the temporal development of audit fees following SOX. They attribute a significant part of the observed increase in audit fees to enforced internal control improvements. Griffin and Lont (2007, 187) conclude that these improvements “*simply required auditors to apply more time and resources to examine and evaluate a costlier accounting and disclosure system*”. However, parts of the observed fee increase might also be the result of additional changes in the regulatory environment included in SOX (see Ghosh and Pawlewicz (2009) for a more detailed discussion).

When the appointment of an audit expert leads to changes in the firm’s internal reporting mechanisms, the external auditor must adapt to the changes and ensure their accuracy. In accordance with the recent empirical evidence, we conclude that the internal and external audit efforts are complementary, at least in the short run. Therefore, under the assumption that more total effort will be exerted to improve accounting accuracy following the appointment of an audit expert, we expect that the audit fees will be higher. In addition, a higher demand for audit services would also result in higher audit fees. Consequently, our first hypothesis is:

H1a: When a firm appoints an audit expert to the board, the firm’s audit fees will increase.

From the company’s perspective, the appointment of an audit expert to obtain accounting expertise in an attempt to improve its financial reporting system is rational if the expected positive relationship between an expert appointment, audit effort, and accounting accuracy holds. A board that has agreed to appoint an audit expert should also

support the resulting higher audit effort thereafter. Under this scenario, such an appointment might result from an attractive job offer to an audit expert by a company seeking to improve its reporting quality.⁷⁵ Caramanis and Lennox (2008) confirm the positive relationship between audit effort and audit quality. To the extent that audit fees serve as a proxy for audit effort, the audit fees should also be positively related to the audit quality.

However, the empirical evidence on the general relationship between audit fees and audit quality is ambiguous (see the discussion in Larcker and Richardson 2004), since an increase in audit fees can also result from factors other than improvements in the accounting system that must be approved by the auditor. For example, the audit expert might discover more serious internal control problems that had gone undetected in previous audits. The audit firm would respond to the higher level of information risk by exerting more effort or by demanding a risk premium; in both cases, the company's audit fees would also increase, according to both the audit risk model and the empirical evidence (e.g. Hogan and Wilkins 2008). In addition, the audit expert might simply be willing to accept higher audit fees. This may be the case when a former audit firm employee wants to benefit his or her former employer due to social or emotional ties, without demanding anything in return for the audit client. Herda and Lavelle (2011) label such behavior "post-employment citizenship", explaining it through theories of social exchange. Moreover, the audit expert could also offer a more lucrative deal to the statutory audit firm in order to make it more economically dependent on the client and thus more reluctant to punish aggressive accounting (i.e., "economic dependence"). Frankel et al. (2002, 72) point out that "*although recent concerns about auditor independence have focused on the provision of nonaudit services to audit clients, it is possible that audit fees create similar bonding or reputational incentives*". Hoitash et al. (2007) provide some empirical evidence in support of this concern.

When the proposed increase in audit fees is also associated with an increase in the reporting quality, we should observe lower levels of discretionary accruals following the appointment of an audit expert. The alternative explanations for a fee increase either provide no reason for a change in discretionary accruals (e.g. higher control risk or so-

⁷⁵ Other theories explaining the presence and consequences of audit experts on boards have involved more complex hiring procedures and relationships. For example, the engagement risk theory developed by Basioudis (2007) assumes that audit firms actively outpace employees to client firms. Herda and Lavelle (2011) explore former employees' commitment to their previous employers, a connection that may persist even when the experts are serving as directors of other companies.

cial ties) or would be associated with an increase in discretionary accruals (e.g. economic dependence). Therefore, our hypothesis regarding discretionary accruals in accordance with our stated audit fee hypothesis is:

H1b: When a firm appoints an audit expert to the board, the firm's discretionary accruals will decrease.

If there is a higher demand for audit services from the newly appointed audit expert, the audit fees observed in the period with the expert on the board will be higher. If, however, the audit expert manages to establish better internal controls, the quality and availability of internal auditing will increase. This will most likely dampen the related increase in audit fees over time (Felix Jr. et al. 2001). Resources for internal auditing could be freed up or invested in audit planning and coordination with the external auditor with a similar effect on the audit fees (Davidson and Gist 1996; Felix Jr. et al. 2001). Over time, the company's audit firm will approve the changes in internal structures and will adapt its regular controlling procedures. Additionally, the audit firm will adapt to the new board's demand for external audit services. The external audit firm would also learn about the former audit firm employee's expertise and motivation. Earlier research has found that auditors have greater confidence in information received from clients when the client signals accounting competence (e.g. Beaulieu 2001). Therefore, under our assumption of increased audit effort due to changes in the financial reporting, we would expect higher audit fees, especially in the in the first few years of the audit expert's employment.

H2a: The audit fee increase following the appointment of an audit expert to the board will be pronounced at the beginning of the expert's engagement but will become weaker over time.

A higher audit effort that is induced by improvements in the accounting system should permanently reduce the level of earnings management. In contrast to the short-term increase in audit fees at the beginning of the audit expert's engagement, the decrease in discretionary accruals should be long-lasting:

H2b: The level of discretionary accruals will be lower in all periods following the appointment of an audit expert to the board.

Prior literature has shown that individual board members in executive positions have a greater impact on company actions than those in a non-executive position (e.g.

Basioudis 2007; Law 2010). In addition, Goodwin-Stewart and Kent (2006) find that the positive link between audit fees and audit expertise on the board is stronger when the board's independence is limited. Several other empirical studies have also documented a relationship between corporate governance and the audit procedure, whereby a strong corporate governance is associated with higher internal control efforts (e.g. Larcker and Richardson 2004), higher audit fees (e.g. Carcello et al. 2002; Abbott et al. 2003a), a lower probability of internal control problems (e.g. Krishnan 2005), lower earnings management (e.g. Dechow et al. 1996; Carcello et al. 2006), and a lower probability of financial statement fraud (e.g. Beasley 1996).

Therefore, the effect of the appointment of an audit expert on audit fees and reporting quality should depend on the audit expert's influence on the board. Our hypotheses are:

H3a: The audit fees will increase when the appointed audit expert has a strong influence on the board.

H3b: The discretionary accruals will decrease when the appointed audit expert has a strong influence on the board.

3.4 Sampling

We constructed our dataset in several steps by combining information from the *Reuters Fundamentals* database (*RF*), Datastream, and the *Financial Service Authority (FSA) Register*.⁷⁶ The initial sample consisted of all publicly listed firms with their headquarters in the U.K. available in *RF* (in July 2010) between 2002 and 2009 (1,942 firms). We then excluded all firms without a *ThomsonReuters* identification code (32 firms) and all financial institutions (SIC classification equals 6; 580 firms), as it is common practice in the audit literature (e.g. Whisenant et al. 2003). For the remaining 1,330 firms, we collected financial statement data and information about the audit firm from *RF* and retrieved additional capital market information from Datastream. *RF* also provides information on board members, allowing us to obtain a list of 18,848 board members including names, position descriptions, tenures, and ages.⁷⁷

⁷⁶ Further details on the construction of our dataset are given in Appendix 3.A.

⁷⁷ *Reuters Fundamentals* does not provide a download function for this information and blocks the usual parsing via html. We therefore employed an algorithm with graphical parsing to retrieve the data.

The information on audit firm employment came from mandatory filings by the audit firms with the *FSA*.⁷⁸ The *FSA* requires firms that engage in certain regulated activities to report information on their employees. This information, which is available in the *Financial Services Register*,⁷⁹ includes the names of current and former audit firm employees, together with the start and end dates of their employment. We retrieved information on the current and former employees of the 11 largest audit firms in the United Kingdom (measured by client share), which had audited 81% of the companies in our dataset in 2009. For each audit firm employee, we extracted a complete history of filed jobs at any *FSA* regulated firm and sorted the jobs chronologically. In order to minimize the elapsed time between the end of employment at the audit firm and the start of service on the board, we focused on audit experts whose last position was at one of the 11 audit firms considered. Our earliest auditor job filing was in December 2001, which is also the general start date of the register; our observation period ended in April 2010. There were 3,875 individual audit firm employees registered over this period, 2,582 of whom ended their last audit firm affiliation before the end of our final sample period (end of 2009).

We then ran a name-match algorithm that compared the names of all 18,848 board members from *RF* to the names of the 2,582 former auditors; 1,547 potential matches were identified. We manually checked the potential matches by comparing all available information from *RF* (such as title, start and end dates of positions, age, education,⁸⁰ and biographical information) to ensure that the board member was indeed the audit expert from the *FSA* data.⁸¹ We detected 110 (8.3%) firms in our sample with an identified audit expert on the board and 1,220 (91.7%) firms without an expert in our observed time period.

⁷⁸ This *FSA* data has also been used in Gerritzen et al. (2014).

⁷⁹ <http://www.fsa.gov.uk/register/home.do> (accessed 5th May 2014).

⁸⁰ The information on the education of the board members labeled only 85 of our 110 identified former auditors as qualified accountants and did not provide any useful information for the others.

⁸¹ The information on committee membership is incomplete. But our focus is on board expertise because the board can affect the audit committee's effectiveness (Bédard and Gendron 2010). In addition, Carcello et al. (2002) show that the reported significant effects of the audit committee characteristics vanish when board characteristics are taken into account.

Table 3.1: Sample selection

		Column (I)			Column (II)			Column (III)		
		after dropping missing auditor data			after dropping further missing data for audit fee regressions			after dropping further missing data for discretionary accruals regressions		
<i>year</i>		<i>with expert</i>	<i>w/o expert</i>	<i>all</i>	<i>with expert</i>	<i>w/o expert</i>	<i>all</i>	<i>with expert</i>	<i>w/o expert</i>	<i>all</i>
firm-years	2002	39	202	241	-	-	-	-	-	-
	2003	46	225	271	39	184	223	36	147	183
	2004	52	262	314	45	199	244	40	149	189
	2005	57	249	306	48	194	242	38	146	184
	2006	71	353	424	60	279	339	42	189	231
	2007	90	733	823	81	629	710	60	414	474
	2008	104	1,023	1,127	100	883	983	77	592	669
	2009	106	1,063	1,169	101	900	1,001	76	598	674
	sum	565	4,110	4,675	474	3,268	3,742	369	2,235	2,064
	<i>before expert appointment</i>	175			126			109		
<i>after expert appointment</i>	390			348			260			
firms	109	1,124	1,233	104	938	1,042	79	617	696	

Note: The table reports the numbers of firms and firm-years included in our sample in each year. The construction of the sample is described in Section 3.4. Column (I) shows the sample remaining after dropping only observations with missing information on the auditor and audit fees. Column (II) shows the sample remaining after dropping observations with further missing information needed for the multivariate analysis of audit fees and Column (III) shows the sample remaining after dropping observations with missing information needed for the discretionary accruals models. The columns *with expert* (*w/o expert*) refer to observations from firms in which we did (did not) observe the appointment of a former audit firm employee to the board in our observation period.

For the multivariate analyses, we dropped all observations with missing information on the audit firm (audit firm name, audit fees, non-audit fees) and other relevant details. Column (I) in Table 3.1 shows the resulting sample. From the increase in the number of firm-year observations for firms that appointed an audit expert (109 firms), a relatively even distribution of appointments over time is visible. The same observation can be made for the termination dates of the experts' audit firm affiliations in the *FSA* data, which indicates that such career moves are not concentrated around special events (e.g. financial crises, regulatory actions), but instead seem to be common practice.

Column (II) in Table 3.1 presents our final sample for the audit fee regressions, again separated into firms with and without an audit expert on the board. The overall sample consists of 3,742 firm-year observations from 1,042 firms. For the remaining 104 firms that had appointed an audit expert, we observe 474 firm-years, of which 126 firm-years

were before the appointment and 348 were thereafter. Column (III) in Table 3.1 shows the number of observations for the discretionary accruals regressions, after further 1,678 firm-year observations were dropped due to missing data. Note that the final sample period is from 2003 to 2009, since information from the previous year is required for the construction of some control variables (e.g. audit firm change).

Our unique panel dataset offers two important perspectives. First, most of the empirical work on former audit firm employees has considered audit firm affiliations in connection with the initial accounting training firm, where there may be a gap of several decades between such an affiliation and the relevant non-audit firm position; in contrast, our sample only tracks near-term career changes. In fact, the median time gap between the audit firm exit and the appointment to the board was only one year.^{82, 83} Second, the time-series dimension of the dataset allows us to analyze the changes in audit fees and discretionary accruals over time; that is, we can distinguish the periods before and after the audit expert joins the board, rather than considering only cross-sectional differences.

A relevant limitation of our dataset is the small number of firms that appointed an audit expert to their board during our observation period, which restricts the statistical possibility of a comparative analysis of certain subsets of firms with audit experts or certain characteristics of audit experts. Furthermore, although the sample relies on mandatory filings, it is not complete in the sense that it tracks every appointment of a former audit firm employee. Boards could still appoint audit experts that we did not capture (e.g. due to missing or incomplete biographical information in *RF*) or former audit firm employees from smaller audit firms or from audit firms outside the United Kingdom that are not subject to *FSA* filing requirements. In addition, we do not know the former position of the audit expert in the audit firms. We will address these limitations throughout the paper. However, in most cases, they would dilute an existing increase in audit fees and decrease in discretionary accruals, working against their statistical identification.

⁸² Note that because we work with annual data, we treat all precise start/end dates during a year alike; thus, an audit firm exit in December and a board entry in the following January would be assigned a gap value of 1 year.

⁸³ Given that a cooling-off period of at least two years for revolving-door auditors was obligatory during our sample period, it is unlikely that our sample includes former audit firm employees that switched to an ex-client for whom they were recently involved in the auditing process. However, the dataset contains both audit experts with no connection to the incumbent audit firm (76.9 %) and experts whose most recent position was at the incumbent audit firm (23.1%); we control for possible influences in a robustness check in Section 3.7.

3.5 Methodology

3.5.1 Audit Fee Regression Model

In order to identify the audit expert's effect on audit fees, we use a multivariate approach and estimate an established structural audit fee model. Similar to previous studies that have analyzed the role of former audit firm employees, our approach relies on the classical production theory-motivated linear regression model for audit fees proposed by (Simunic 1980, 1984). As our literature survey has shown, the previous research has been predominantly based on cross-sectional regressions, which identify differences *between* firms (e.g. Basioudis 2007). In contrast, we take the time dimension into account and use a panel regression model, instead measuring the variation in audit fees *within* firms over time.

A *Hausman* test yields a large test statistic (196.211) and clearly rejects the null hypothesis of a non-systematic difference in coefficients (p -value 0.000). Consequently, we apply a fixed effects model, where firm-fixed effects capture all time-invariant firm characteristics that could potentially influence audit fees, such as industry and location within the United Kingdom (e.g. Basioudis 2007). However, this limits our statistical ability to analyze how time-invariant characteristics affect the role of the audit experts with regard to audit fees, and we must therefore resort to interaction terms. Omitted static variables are not an issue for consistency, and the fixed effects rule out a selection bias with respect to special (time-invariant) firm characteristics that might influence the appointment of an audit expert. In a fixed effects panel model, a selection bias is only a problem when the selection is related to the idiosyncratic error u_{it} , which is unlikely in short panels.

We selected the audit fee determinants according to the meta-analysis of Hay et al. (2006b), who summarize the audit fee literature until 2003, as well as from relevant subsequent audit fee studies (Larcker and Richardson 2004; Basioudis 2007; Choi et al. 2008; Ghosh and Pawlewicz 2009). For the firm size, we use the natural logarithm of the firm's total assets (*lnta*) and total current assets (*lntca*). In line with prior literature (e.g. Simunic 1980; Craswell et al. 1995; Ghosh and Lustgarten 2006), we expect both variables to be positively related to the audit fees.⁸⁴

⁸⁴ It is more common in the audit fee literature to use the accounts receivables together with the total inventory rather than the total current assets; however, this would require us to additionally drop a

We approximate the client's risk with an indicator variable for a loss in the fiscal year (*loss*), the leverage ratio (*levratio*), the current ratio (*curratio*), the return-on-assets (*roa*), and the Tobin's Q (*tobin*). While we expect a negative influence of the current ratio and the return-on-assets on audit fees due to the lower audit risk, we expect positive signs for the loss indicator and the leverage ratio, as they are positively related to audit risk (e.g. Simunic 1980; Seetharaman et al. 2002; Ashbaugh et al. 2003). However, the relationship between the Tobin's Q and audit fees is unclear. On the one hand, a higher value indicates better growth expectations (Daske et al. 2008) and should, ceteris paribus, decrease the auditor's risk and lead to lower fees. On the other hand, the Tobin's Q is related to the firm's performance and diversification, which increases the complexity and thus audit fees (Lang and Stulz 1994; Ashbaugh et al. 2003). The Tobin's Q is similar to the more commonly used market-to-book ratio (Daske et al. 2008), but the descriptive statistics show that there is a weakly significant difference in the Tobin's Q between firms with and without the appointment of an audit expert. Therefore, we use the Tobin's Q in our regressions to control for this difference, but we exchange the two variables in a robustness check in Section 3.7.

To reflect the client's complexity, we use an indicator variable for the *International Financial Reporting Standards IFRS* (*ifrs*) as the client's accounting standard, where the baseline is the national reporting standard of the United Kingdom. Although the national reporting standard is similar to the *IFRS* with respect to its legal origin, we follow Kim et al. (2012), who show that firms that use *IFRS* as the accounting standard generally pay higher fees than firms that apply a local one. Furthermore, we include the absolute value of the accruals (*acc*) as calculated in Barth et al. (2008). We expect that higher accruals will induce higher audit fees because more effort will be needed to validate the information (e.g. Antle et al. 2006).

To control for audit firm engagement attributes, we include the natural logarithm of the non-audit fees (*lnnaf*). The direction of the influence of non-audit fees on audit fees, however, is unclear. For example, Simunic (1984) argues that the influence depends on the price elasticity of the demand for audit services, whereas Wu (2006) asserts that the influence of non-audit fees on audit fees depends on the competition in the audit market. Therefore, either a positive or a negative influence is possible. The empirical evidence

large number of firm-year observations (758) due to missing information on total inventory. Since total assets and total current assets are highly correlated, we only use the accounts receivables in a robustness check in Section 3.7 to rule out misleading results due to multicollinearity.

also shows mixed results (see the literature reviews of Beattie and Fearnley 2002; Hay et al. 2006b; Schneider et al. 2006). Hence, there is no clear prediction for the sign of this coefficient. We also include an indicator for the first year of the audit firm's engagement (*initial*) and follow the low-balling hypothesis of DeAngelo (1981), which has been confirmed by the frequently reported lower audit fees in the initial years of an auditors engagement (e.g. Baber et al. 1987; Ettredge and Greenberg 1990; Craswell and Francis 1999; Whisenant et al. 2003). Therefore, we expect a negative sign for the first year indicator. We include further indicators for an audit firm from the Big 4 group (*big4*) (*Deloitte & Touche*, *Ernst & Young*, *PricewaterhouseCoopers*, and *KPMG*) and a fiscal year-end in the busy season (*busy*). In line with prior studies, we expect both of these to obtain positive coefficients because of the reported premium for the potentially higher audit quality of Big 4 audit firms and the generally higher workload during the busy season (e.g. DeFond et al. 2000; Choi et al. 2008). Furthermore, we include the reporting lag in days (*lag*), i.e. the time between the fiscal year-end and the publication of the annual report. A higher reporting lag might be associated with disagreements between the audit firm and the board or more effort needed due to complex structures or weak corporate governance mechanisms (Hashim and Rahman 2011) and thus will lead to higher audit fees (Whisenant et al. 2003).

To control for any period-specific influences that might affect the audit fees of all firms, such as changes in the regulatory or market environment, we include time-fixed effects as well. The resulting fixed effects model takes the form

$$\begin{aligned}
 \ln(af)_{it} = & \alpha_i + \alpha_t + \sum_{k=1}^K \beta_k \cdot expvars_{kit} + \gamma_1 \cdot lnta_{it} + \gamma_2 \cdot lntca_{it} \\
 & + \gamma_3 \cdot loss_{it} + \gamma_4 \cdot levratio_{it} + \gamma_5 \cdot curratio_{it} + \gamma_6 \cdot roa_{it} \\
 & + \gamma_7 \cdot ifrs_{it} + \gamma_8 \cdot tobin_{it} + \gamma_9 \cdot acc_{it} + \gamma_{10} \cdot lnna_{it} \\
 & + \gamma_{11} \cdot initial_{it} + \gamma_{12} \cdot big4_{it} + \gamma_{13} \cdot busy_{it} + \gamma_{14} \cdot lag_{it} + u_{it}, \quad (3.1)
 \end{aligned}$$

Where i indicates the firm, t the period, and the α_i and α_t are the firm and time-fixed effects. The K experimental variables (*expvars*) test our hypotheses and we explain them in detail together with the results. The model can be estimated using ordinary least squares (OLS), and we employ panel robust standard errors to address potentially remaining autocorrelation and heteroscedasticity in the error term u_{it} throughout.

A definition of all variables is given in Table 3.2, and descriptive statistics for the entire sample are presented in Table 3.3. Table 3.9 in Appendix 3.A provides separate descriptive statistics for firms with and without an audit expert in our sample period, together with statistical tests for differences in the determinants. The tests show that there are only minor differences, which rules out the possibility that our results are driven by client-related risks that are not captured by the audit fee model. Furthermore, we found no differences with respect to the number of audit firm changes, even though prior research has documented a relationship between former audit firm employees and auditor changes (Lennox 2005; Lennox and Park 2007).⁸⁵ In addition to the advantages of a fixed effect model described above, the small differences further indicate that a selection bias with respect to the firms' observed characteristics is unlikely.

Table 3.2: Variable description

Dependent variables

$\ln(af)$ = natural logarithm of audit fees;

$dacc$ = discretionary accruals;

Main experimental variable

$audexp$ = dummy variable, equal to 1 when an audit expert is on the board;

Other experimental variables

$audexp_{\tau}$ = dummy variables, equal to 1 when an audit expert is on the board and is in the τ 's year of engagement, with $\tau = 1, 2, 3, 4, 5^+$; i.e., fifth and later years of engagement are collected in $audexp_{5^+}$;

$execu$ = dummy variable, equal to 1 when an audit expert is on the board
($nonexecu$) who is a (non-) executive director;

$largefirm$ = dummy variable, equal to 1 when an audit expert is on the board
($smallfirm$) and the firm size is above (below) the median;

$largeboard$ = dummy variable, equal to 1 when an audit expert is on the board
($smallboard$) and the board size is above (below) the median;

$highindep$ = dummy variable, equal to 1 when an audit expert is on the board
($lowindep$) and the share of independent directors on the board is above (below) the median;

$highinsideown$ = dummy variable, equal to 1 when an audit expert is on the board
($lowinsideown$) and the inside ownership in the firm as measured by the percentage of closely held shares is above (below) the median;

⁸⁵ We observe 21 audit firm changes in the 348 firm-years with former audit firm employees on the board (6.03%) and 201 audit firm changes in the 3,268 firm-years without (6.15%). Hence, audit firm changes are not differently distributed ($Chi2$ p -value 0.524) among companies with and without former audit firm employees. Our sample is too small to analyze whether the selection of a particular audit firm in cases of a change is related to the previous employment of the former audit firm employee on the board.

Table 3.2 (continued)

Controls

<i>lnta</i>	= natural logarithm of total assets at year-end;
<i>lntca</i>	= natural logarithm of total current assets at year-end;
<i>loss</i>	= dummy variable equal to 1 when net income is negative;
<i>levratio</i>	= total liabilities divided by total assets, both at year-end;
<i>curratio</i>	= total current assets divided by total current liabilities at year-end;
<i>roa</i>	= net income divided by year-end total assets;
<i>ifrs</i>	= dummy variable equal to 1 when the accounting standard is <i>IFRS</i> ;
<i>tobin</i>	= total assets minus book value of equity plus market value of equity divided by total assets, all at year-end;
<i>acc</i>	= absolute value of net income before extraordinary items minus cash flow from operating activities divided by year-end total assets;
<i>lnnaf</i>	= natural logarithm of non-audit fees;
<i>initial</i>	= dummy variable equal to 1 if auditor is in the first year of engagement;
<i>big4</i>	= dummy variable equal to 1 when the statutory audit firm is a Big 4 audit firm;
<i>busy</i>	= dummy variable equal to 1 when the fiscal year-end is between November and March;
<i>lag</i>	= days between fiscal year-end and announcement date of annual report;
<i>year_t</i>	= dummy variable equal to 1 when the year is equal to <i>t</i> ;
<i>cta</i>	= percentage change in total assets over the year;
<i>cfo</i>	= cash flow from operations divided by total assets at year-end;
<i>lloss</i>	= dummy variable equal to 1 when a company reported a negative net income in previous year;

Note: The table gives descriptions of all variables used in the regression analysis. All variables are firm-year observations. The time index (*t*) and the firm index (*i*) are omitted for simplicity.

Table 3.3: Descriptive statistics

<i>variable</i>	<i>mean</i>	<i>sd</i>	<i>median</i>	<i>p1</i>	<i>p99</i>
<i>ln(af)</i>	4.726	1.483	4.605	1.792	8.700
<i>audexp</i>	0.093	0.290	0	0	1
<i>lnta</i>	11.289	2.301	11.292	6.269	17.031
<i>lntca</i>	10.340	2.258	10.396	5.052	15.809
<i>loss</i>	0.351	0.477	0	0	1
<i>levratio</i>	0.496	0.274	0.496	0.015	1.315
<i>curratio</i>	3.423	16.931	1.416	0.230	36.310
<i>roa</i>	-0.036	0.272	0.033	-1.144	0.348
<i>ifrs</i>	0.770	0.421	1	0	1
<i>tobin</i>	1.895	1.990	1.399	0.420	9.051
<i>acc</i>	0.105	0.161	0.060	0.001	0.787
<i>lnnaf</i>	4.038	2.190	4.227	0	8.700
<i>initial</i>	0.063	0.242	0	0	1
<i>big4</i>	0.597	0.491	1	0	1
<i>busy</i>	0.710	0.454	1	0	1
<i>lag</i>	87.632	38.066	77	29	183
<i>dacc</i>	-0.011	0.129	-0.006	-0.576	0.362
<i>cfo</i>	0.055	0.182	0.078	-0.742	0.352
<i>cta</i>	0.251	2.234	0.065	-0.487	3.069
<i>lloss</i>	0.253	0.435	0	0	1

Note: The table reports descriptive statistics for the variables used in the regression analysis. The underlying sample consist of 3,742 (2,604) firm-year observations for variables used in the audit fee (discretionary accruals) regressions from 1,042 (696) firms (with and without an audit expert appointment), as explained in Section 3.4. Brief descriptions of the variables are given in Table 3.2.

In the selection of the control variables, we must take into account the fact that there is a wide variety in the cited audit fee studies with respect to the underlying sample periods and regression model specifications, i.e. single-year cross-sections (e.g. Lee (1996) with a single equation model, or Whisenant et al. (2003) with two-stage estimation) and pooled cross-sections from multiple years (e.g. Asthana et al. (2009) within a single equation analysis, or Hay et al. (2006a) with two-stage estimation). Therefore, some of the reported coefficient estimates might differ (for a discussion see Hay et al. 2006b).

In addition, Hay et al. (2006b) describe endogeneity as one of the major problems in audit fee studies. Especially in cross-sectional models, non-audit fees (Whisenant et al. 2003; Antle et al. 2006) or accruals (Antle et al. 2006) might be endogenous. Endogeneity can also result from omitted variables (Nikolaev and van Lent 2005). The fixed effects in our model capture the unobserved heterogeneity among firms and the

exogeneity of the regressors is only an issue in the time dimension. Since our multivariate analysis relies on the assumption of a correctly specified audit fee model, we will address potential model misspecifications in several robustness checks in Section 3.7. To rule out any endogeneity of the non-audit fees and the accruals, we employ a test for fixed effect panel regressions, as described in Davidson and MacKinnon (1993, 237 f.). The null hypothesis is that the tested determinates are not endogenous. For the non-audit fees (p -value 0.694) and the accruals (p -value 0.113), the hypotheses cannot be rejected, which indicates that our single-equation model is appropriate. We additionally supplement our findings with univariate tests.⁸⁶

3.5.2 Discretionary Accruals Regression Model

To test our hypothesis that a change in audit fees is associated with improvements in financial reporting or internal controls, we investigate the influence of the newly appointed audit experts on discretionary accruals. Discretionary accruals are the most prominent measure for earnings management: They reflect the part of the accruals that cannot be explained by the firm's fundamental performance and can therefore be interpreted as opportunistic earnings manipulation (Dechow et al. 2010). In line with this interpretation, higher levels of discretionary accruals are generally seen as an indicator for lower reporting quality (Dechow et al. 2010). However, in analytical models, earnings management can reflect aspects of the manager's communication with the market, and therefore higher discretionary accruals could also be positively related to reporting quality (e.g. Ewert and Wagenhofer 2011). We follow the interpretation of the empirical studies and assume that lower levels of discretionary accruals indicate a higher reporting quality.

We calculate the discretionary accruals (*dacc*) according to the modified Jones Model. The discretionary accruals are the residuals from a regression of the normal accruals on a function of sales growth, growth in credit sales, and property, plant, and equipment for each year and industry with at least 10 observations. This is in line with Geiger and

⁸⁶ To univariately test for differences in the audit fees before and after the hiring of an audit expert, we use a paired t -test from the class of parametric tests and the nonparametric *Wilcoxon* signed rank test. We apply the tests for differences in the audit fees and discretionary accruals to a sample that includes all possible firms with an audit expert that permit at least one observation before and one after the expert appointment to the board. We additionally require that there is no audit firm change during the observation period, because prior research has found that audit fees might decrease after an audit firm change (e.g. Simon and Francis 1988; Ettredge and Greenberg 1990; Turpen 1990; Craswell and Francis 1999) and audit quality might be lower (see Ewelt-Knauer et al. 2012, for an overview of various empirical studies).

North (2006) and Geiger et al. (2008), who also focus on within-firm differences in earnings management in association with the appointment of new personnel.⁸⁷

To test our hypotheses related to discretionary accruals, we use the same fixed effect panel regression framework specified in Equation (3.1).⁸⁸ It measures the *within-firm* variation in the discretionary accruals, which now serve as the left-hand side variable. As common determinants, the regression model includes the firm characteristics and audit firm attributes proposed by Dechow et al. (2010). More specifically, we include firm size (*lnta*), performance (*cfo*, *lloss*, *roa*), debt (*levratio*), growth (*cta*), and the accounting standard (*ifrs*) as firm characteristics. To account for audit firm attributes, we include the size of the audit firm (*big4*) and an indicator for the first engagement year (*initial*) of the audit firm. To control for any period-specific influences, we also include time-fixed effects. Definitions of all variables are given in Table 3.2, and descriptive statistics for the entire sample are presented in Table 3.3. Again, we supplement our findings with univariate tests. The formal regression equation for our analysis is

$$\begin{aligned}
 dacc_{it} = & \alpha_i + \alpha_t + \sum_{k=1}^K \beta_k \cdot expvars_{kit} + \gamma_1 \cdot lnta_{it} + \gamma_2 \cdot cfo_{it} \\
 & + \gamma_3 \cdot loss_{it} + \gamma_4 \cdot roa_{it} + \gamma_5 \cdot levratio_{it} + \gamma_6 \cdot cta_{it} \\
 & + \gamma_7 \cdot ifrs_{it} + \gamma_8 \cdot big4_{it} + \gamma_9 \cdot initial_{it} + u_{it}.
 \end{aligned} \tag{3.2}$$

⁸⁷ See Geiger and North (2006) for a discussion of the methodology. For the model specification, we follow Geiger et al. (2008), who additionally include property, plant, and equipment (unlike Geiger and North 2006). To avoid the exclusion of a large number of observations, the industry classification is used as in Barth et al. (1998) due to the limitations of the data available for each industry class.

⁸⁸ The model specification tests (*Hausman* and exogeneity of coefficients) confirm the accuracy of the model.

3.6 Results

3.6.1 Audit Fees and Discretionary Accruals following an Audit Expert Appointment

Our main experimental variable to test our hypotheses (*H1a*, *H1b*) is an indicator that takes a value of one when a former audit firm employee (i.e., an audit expert) is on the board (*audexp*).

Audit Fees

The results of the corresponding audit fee regression are given in Column (I) of Table 3.4. The coefficient of our variable of main interest (*audexp*) is positive (0.096) and significant at the 5% level. Hence, the result indicates that audit fees increase after the appointment of an audit expert. This finding confirms our main hypothesis (*H1a*) that after the appointment of an audit expert, a firm's audit fees will increase. No previous study has featured a comparable setup, so our finding provides novel empirical evidence on the role of audit experts on company boards in the period of stricter regulations on the audit profession. The univariate tests also show significantly higher fees after the appointment of an audit expert to the board (*p*-values paired two-sided *t*-test: 0.011; signed rank test: 0.000; see Table 3.10 in Appendix 3.A).

The coefficient estimates of the control variables in the audit fee model predominantly show the expected signs. In line with prior research, the coefficient estimates for the total assets, the loss indicator, the Big 4 audit firm indicator, and the indicator for the fiscal year-end in the busy season are positive and significant. Higher accruals also significantly increase audit fees. As expected, a higher current ratio and higher return-on-assets significantly decrease audit fees, as well as the first year of an audit firm's engagement. However, the significant negative coefficient of the total current assets deviates from our prediction. The coefficients of the leverage ratio, the *IFRS* indicator, and the reporting lag are not significant. With regard to the non-audit fees, for which we could not derive a clear theoretical prediction, we obtain a negative and highly significant coefficient. Hay et al. (2006b) report positive estimates for most of the earlier audit fee studies based on single-year cross-sectional or pooled cross-sectional models. Subsequent studies using such models generally confirm this finding (e.g. Antle et al. 2006; Hay et al. 2006a; Asthana et al. 2009). However, Krishnan and Yu (2011) also use a panel regression model and find a negative and significant coefficient, which is in line

with our result. The unreported coefficients of the time-fixed effects do not indicate any time trend that could have influenced the results.

Table 3.4: Panel regressions for audit fees

<i>variable</i>	Hypothesis 1a			Hypothesis 2a			Hypothesis 3a								
	Column (I)			Column (II)			Column (III)			Column (IV)			Column (V)		
	<i>coeff</i>	<i>sign</i>	<i>t-stat</i>	<i>coeff</i>	<i>sign</i>	<i>t-stat</i>	<i>coeff</i>	<i>sign</i>	<i>t-stat</i>	<i>coeff</i>	<i>sign</i>	<i>t-stat</i>	<i>coeff</i>	<i>sign</i>	<i>t-stat</i>
<i>audexp</i>	0.096	**	(2.00)	-			-			-			-		
<i>audexp₁</i>	-			0.163	**	(1.99)	-			-			-		
<i>audexp₂</i>	-			0.209	***	(2.77)	-			-			-		
<i>audexp₃</i>	-			0.101		(1.38)	-			-			-		
<i>audexp₄</i>	-			0.069		(0.93)	-			-			-		
<i>audexp₅₊</i>	-			-0.058		(-0.72)	-			-			-		
<i>execu</i>	-			-			0.135	**	(2.14)	-			-		
<i>nonexecu</i>	-			-			0.047		(0.66)	-			-		
<i>highindep</i>	-			-			-			0.045		(0.73)	-		
<i>lowindep</i>	-			-			-			0.171	**	(2.40)	-		
<i>largeboard</i>	-			-			-			-			0.021		(0.32)
<i>smallboard</i>	-			-			-			-			0.180	***	(2.70)
<i>lnta</i>	0.501	***	(17.15)	0.501	***	(17.12)	0.502	***	(17.16)	0.500	***	(16.96)	0.503	***	(17.08)
<i>lntca</i>	-0.054	**	(-2.20)	-0.054	**	(-2.21)	-0.053	**	(-2.20)	-0.055	**	(-2.27)	-0.057	**	(-2.35)
<i>loss</i>	0.062	***	(2.77)	0.063	***	(2.79)	0.062	***	(2.75)	0.066	***	(2.89)	0.067	***	(2.93)
<i>levratio</i>	0.030		(0.53)	0.031		(0.56)	0.028		(0.50)	0.026		(0.46)	0.022		(0.39)
<i>curratio</i>	-0.001	**	(-2.44)	-0.001	**	(-2.42)	-0.001	**	(-2.44)	-0.001	**	(-2.36)	-0.001	**	(-2.36)
<i>roa</i>	-0.111	***	(-2.57)	-0.110	**	(-2.55)	-0.111	***	(-2.57)	-0.103	**	(-2.36)	-0.102	**	(-2.35)
<i>ifrs</i>	0.050		(1.49)	0.054		(1.60)	0.049		(1.48)	0.064	*	(1.90)	0.062	*	(1.84)
<i>tobin</i>	0.007		(1.28)	0.007		(1.23)	0.007		(1.25)	0.009	*	(1.71)	0.009	*	(1.70)
<i>acc</i>	0.175	***	(3.24)	0.176	***	(3.26)	0.174	***	(3.23)	0.179	***	(3.31)	0.178	***	(3.28)
<i>lnmaf</i>	-0.038	***	(-5.89)	-0.038	***	(-5.92)	-0.038	***	(-5.89)	-0.039	***	(-5.97)	-0.039	***	(-5.97)
<i>initial</i>	-0.070	**	(-2.43)	-0.070	**	(-2.44)	-0.070	**	(-2.41)	-0.074	**	(-2.51)	-0.075	**	(-2.55)
<i>big4</i>	0.251	***	(4.80)	0.248	***	(4.73)	0.249	***	(4.76)	0.248	***	(4.64)	0.246	***	(4.61)
<i>busy</i>	0.155	**	(2.56)	0.150	**	(2.47)	0.155	**	(2.56)	0.159	***	(2.61)	0.151	**	(2.48)
<i>lag</i>	-0.001		(-1.63)	-0.001		(-1.52)	-0.001		(-1.64)	-0.001		(-1.60)	-0.001		(-1.62)
<i>n</i>	3,742			3,742			3,742			3,628			3,628		
<i>N</i>	1,042			1,042			1,042			1,010			1,010		
<i>R</i> ²	0.765			0.765			0.765			0.766			0.765		

Note: The table reports estimation results from panel regressions of the log audit fees on a set of audit fee determinants and experimental variables. The regressions include (not tabulated) firm-fixed effects and time-fixed effects with the base year of 2003. The regressions and the included variables are described in Section 3.5, and brief descriptions of the variables are given in Table 3.2. The *t*-statistics from panel robust standard errors are given in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Discretionary Accruals

Column (I) in Table 3.5 presents our results from the discretionary accruals regression. The coefficient estimate for our *audexp* variable is negative (-0.018) and significant at the 10% level. The observed decrease in discretionary accruals confirms our hypothesis (*H1b*) that the appointment of an audit expert is associated with an increase in the reporting quality. In line with these findings, the univariate tests also show a significant decrease in the discretionary accruals (*p*-values paired two-sided *t*-test: 0.050; signed rank test: 0.025; see Table 3.10 in Appendix 3.A).

Earlier research that has analyzed earnings management in the presence of former audit firm employees has mainly focused on the revolving-door case, with mixed results. The setup most similar to ours is Geiger et al. (2005), who do not find changes in discretionary accruals following the appointment of former audit firm managers and partners to company boards, irrespective of the audit firm that had previously employed them. Hence, they do not find any “*possible public accounting general knowledge effect*” (Geiger et al. 2005, 9). However, the authors analyzed this relationship before the hiring restrictions went into effect and considered only high-ranking audit firm employees. As a more general result, Geiger et al. (2005) also find that newly appointed board members without a recent audit industry background have no significant influence on the discretionary accruals. Thus, there is no evidence that changes in discretionary accruals are driven by a general hiring effect rather than by the accounting expertise of former audit firm employees.

For the control variables, we find a significant negative influence on discretionary accruals for the cash flow from operations (*cfo*) and the leverage ratio (*levratio*) and a significant positive influence for the lagged loss (*lloss*), the return-on-assets (*roa*), the change in total assets (*cta*), and the first year of the audit firm’s engagement (*initial*). All significant coefficients show the expected signs. Again, the unreported coefficients of the time-fixed effects do not indicate any time trend.

Table 3.5: Panel regressions for discretionary accruals

variable	Hypothesis 1b			Hypothesis 2b			Hypothesis 3b								
	Column (I)			Column (II)			Column (III)			Column (IV)			Column (V)		
	coeff	sign	t-stat	coeff	sign	t-stat	coeff	sign	t-stat	coeff	sign	t-stat	coeff	sign	t-stat
<i>audexp</i>	-0.018	*	(-1.73)	-			-			-			-		
<i>audexp₁</i>	-			-0.027	**	(-2.08)	-			-			-		
<i>audexp₂</i>	-			0.004		(0.28)	-			-			-		
<i>audexp₃</i>	-			-0.029	*	(-1.92)	-			-			-		
<i>audexp₄</i>	-			-0.027		(-1.55)	-			-			-		
<i>audexp₅₊</i>	-			-0.026		(-1.42)	-			-			-		
<i>execu</i>	-			-			-0.027	**	(-1.96)	-			-		
<i>nonexecu</i>	-			-			-0.007		(-0.49)	-			-		
<i>highindep</i>	-			-			-			-0.012		(-0.76)	-		
<i>lowindep</i>	-			-			-			-0.024	*	(-1.77)	-		
<i>largeboard</i>	-			-			-			-			-0.008		(-0.60)
<i>smallboard</i>	-			-			-			-			-0.033	**	(-2.11)
<i>lnta</i>	-0.001		(-0.09)	-0.001		(-0.10)	-0.001		(-0.15)	-0.001		(-0.10)	-0.001		(-0.08)
<i>cfo</i>	-0.684	***	(-39.8)	-0.682	***	(-39.6)	-0.684	***	(-39.8)	-0.675	***	(-38.4)	-0.675	***	(-38.5)
<i>lloss</i>	0.013	**	(2.29)	0.012	**	(2.17)	0.013	**	(2.28)	0.012	**	(2.04)	0.011	**	(2.03)
<i>roa</i>	0.644	***	(53.4)	0.642	***	(53.2)	0.644	***	(53.4)	0.640	***	(52.4)	0.640	***	(52.5)
<i>levratio</i>	-0.035	**	(-2.39)	-0.035	**	(-2.41)	-0.035	**	(-2.36)	-0.032	**	(-2.17)	-0.031	**	(-2.07)
<i>cta</i>	0.002	**	(2.22)	0.002	**	(2.23)	0.002	**	(2.22)	0.002	**	(2.24)	0.002	**	(2.24)
<i>ifrs</i>	-0.001		(-0.13)	-0.002		(-0.24)	-0.001		(-0.15)	-0.001		(-0.16)	-0.001		(-0.16)
<i>big4</i>	-0.003		(-0.23)	-0.003		(-0.24)	-0.003		(-0.21)	-0.002		(-0.17)	-0.001		(-0.10)
<i>initial</i>	0.017	**	(2.25)	0.017	**	(2.24)	0.017	**	(2.23)	0.017	**	(2.18)	0.017	**	(2.19)
<i>n</i>	2,604			2,604			2,604			2,526			2,526		
<i>N</i>	696			696			696			676			676		
<i>R²</i>	0.609			0.609			0.608			0.609			0.608		

Note: The table reports estimation results from panel regressions of the discretionary accruals on a set of determinants and experimental variables. The regressions include (not tabulated) firm-fixed effects and time-fixed effects with the base year of 2003. The regressions and the included variables are described in Section 3.5, and brief descriptions of the variables are given in Table 3.2. The *t*-statistics from panel robust standard errors are given in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

3.6.2 Dynamics of Audit Fees and Discretionary Accruals

In order to investigate changes in audit fees and discretionary accruals following the appointment of an audit expert to the board, we refine our analysis and consider the exact year of the appointment. For the statistical identification, we incorporate five indicator variables into the regression that are equal to one when the audit expert is in the τ 's year of engagement ($audexp_{\tau}$, with $\tau = 1, 2, 3, 4, 5^+$). We collect the fifth and later years of engagement in one variable due to the decreasing number of observations for later years.⁸⁹

Audit Fees

The results of the audit fee regression are given in Column (II) of Table 3.4. The coefficient of $audexp_1$ shows the effect for a time gap of zero, i.e. in the starting year of the engagement. This coefficient is positive (0.163) and significant at the 5% level, indicating that former audit firm employees have a positive effect on audit fees, even in their first engagement year. The coefficient for the second engagement year ($audexp_2$) obtains the largest estimate (0.209) and is highly significant.⁹⁰ Note that we treat all starting dates in a year alike; consequently, $audexp_2$ denotes the first full year in which the audit expert serves on the board,⁹¹ explaining the maximum impact here. As the tenure progresses, the positive effect on audit fees becomes weaker. The coefficients, albeit still positive for all but five or more years of tenure, are steadily decreasing and are no longer significantly different from zero. The univariate tests show higher fees in the first three (four) engagement periods in comparison to one year (two years) before the audit expert is part of the board (see Table 3.11 in Appendix 3.A). The coefficients of the control variables are in line with our main regression. Overall, the results confirm our hypothesis that the increase in audit fees is greatest during the first years of an audit expert's engagement (*H2a*). Furthermore, the results highlight that the time dimension should not be ignored when analyzing the influence of former audit firm employees on accounting procedures.

⁸⁹ For a three-year gap ($audexp_4$), we have 43 non-zero firm-year observations, but this number drops to only 29 for a four-year gap and even lower numbers for longer gaps.

⁹⁰ However, tests for differences in the coefficients show that they are not significantly different from each other.

⁹¹ Unless the starting date is 1st January.

Discretionary Accruals

Column (II) in Table 3.5 presents the results of the analysis of changes in the discretionary accruals over time. Most of the $audexp_t$ coefficients show the expected negative sign. Moreover, based on standard two-sided tests, $audexp_1$ and $audexp_3$ are significant. The unreported one-sided tests show that all other negative coefficients of the $audexp$ indicators are also significant. With respect to the size of the coefficients, there is no apparent or statistical difference in the negative coefficients. Only the coefficient of $audexp_2$ is positive, but it is not significant by any test. These results are in line with our hypothesis ($H2b$) that an audit expert has a lasting effect on a firm's reporting quality.⁹² The coefficients of the control variables are in line with our main regression.

3.6.3 Influence of the Audit Expert

We use three proxies to test our hypotheses ($H3a$, $H3b$) that changes in audit fees and discretionary accruals depend on the influence of the audit expert in the board. In the analysis, we run one regression for each proxy.

Our first proxy for the influence is the position of the audit expert on the board; we differentiate between executive and non-executive positions. Of the 104 observed firms with an audit expert on the board, 55 (45) of these experts have a (non-)executive function. For the analysis, we include two dummy variables indicating the executive ($execu$) or non-executive ($nonexecu$) position.

In addition, we use the share of independent board members (as a measure of corporate governance) to proxy for the influence of the audit expert.⁹³ The share of independent board members is the most widely accepted measure of corporate governance (e.g. Larcker and Richardson 2004). We include two dummy variables, $highindep$ and $lowindep$, which indicate whether there is an audit expert on the board and if so, whether the company has an above/below median⁹⁴ value for the governance proxy.⁹⁵ A low

⁹² Unreported univariate tests partially confirm the results; however, due to the low number of observations, these tests are not reliable.

⁹³ For the governance proxies, we use the number of board members at the end of our observed period.

⁹⁴ Here, we use the median of all firms in our sample. For each separation dummy, we tested whether it was distributed differently across firms with and without audit experts. We found no significant group differences for any of our separation dummies.

⁹⁵ Note that this is statistically identical to keeping the $audexp$ variable and adding an interaction term, e.g. $audexp$ times a strong governance indicator. The coefficient of $audexp$ would then show the effect for weak governance firms, and the interaction term would capture the difference in the effect. To obtain this standard interpretation for interaction terms, both "main" effects must be included. Here, one main effect (strong governance firm indicator) is static and is therefore integrated into the firm-fixed

share of independent members indicates a lower level of corporate governance and more possible influence or potential for improvements on the part of the audit expert.

Finally, we consider the board size, as measured by the number of board members, a variable that captures various aspects of the firm. The size of the board is related to the size of the firm, where larger firms generally have larger boards.⁹⁶ Apart from the naturally higher workload, the existing level of external audit effort should be relatively higher in larger firms due to the higher reputational risks for the audit firm (e.g. Hoitash et al. 2007). Moreover, Geiger et al. (2008, 63) argue that for a small company, “*the internal control system (...) may be less sophisticated than that of a large company*”. An already high audit effort and good internal controls might constrain potential improvements on the part of the audit expert. The size of the board is also related to the complexity of the firm; we expect that the extent and the pace at which a newly appointed audit expert can change accounting procedures will be more limited in a complex environment. In addition, the influence of a single board member on a large board should be more limited *per se* than on a small board. Overall, we expect more potential influence over smaller boards. In the regression, we include the two indicators *largeboard* and *smallboard* to indicate whether there is an audit expert on the board and whether the company has an above/below median board size.

Audit Fees

Columns (III), (IV), and (V) in Table 3.4 show the audit fee regression results for the position on the board (III), the share of independent board members (IV), and the board size (VI), respectively. In Column (III), the coefficient of the executive indicator (*execu*) is positive (0.135) and significant at the 5% level. The coefficient of the non-executive indicator (*nonexecu*) is also positive (0.047) but is not significant (*p*-value 0.507). Hence, we obtain a significant fee increase for executive audit experts but not for non-executive experts. The regression result in Column (IV) of Table 3.4 shows that when the percentage of independent board members is low (*lowindep*), audit experts have a positive (0.171) and significant (5% level) effect on audit fees. In firms with a high fraction of independent members (*highindep*), the estimated coefficient is still positive (0.045) but not significant (*p*-value 0.468). Column (V) in Table 3.4 shows the

effect. While its estimated coefficient is not observable, the interpretation of the other two components of the interaction expression does not change.

⁹⁶ The *Spearman* rank correlation between mean total assets and board size is 0.67.

coefficients for our last proxy, the size of the board. We observe a highly significant positive (0.180) effect for audit experts in firms with a small board size (*smallboard*); for large boards (*largeboard*), the coefficient is also positive (0.021) but not significant. The univariate tests confirm the regression results (see Table 3.12 in Appendix 3.A), and the coefficients of the control variables are in line with our main regression. Overall, the findings confirm our hypothesis (*H3a*) that the effect of a former audit firm employee on audit fees is higher when the audit expert has more influence.

Discretionary Accruals

Columns (III), (IV), and (V) in Table 3.5 present the corresponding results for the discretionary accruals regressions. Again, we observe significant effects for executive position, a low percentage of independent board members, and small boards, but not for the opposite groups. In particular, the coefficient of the executive indicator (*execu*) is negative (-0.027) and significant at the 5% level. Audit experts also have a significant (10% level) negative (-0.024) effect on discretionary accruals when board independence is low (*lowindep*), and a significant (10% level) negative (-0.024) effect on boards with a small number of members (*smallboard*). Hence, the results confirm our hypothesis (*H3b*), that the effect of the audit expert on discretionary accruals also depends on the influence of the expert.⁹⁷ The results for the control variables are in line with our main regression; the univariate comparisons show the same results. However, due to the splitting of the sample into two groups, the number of observations in these tests is rather low, and the differences are not significant on a conventional level (see Table 3.12 in Appendix 3.A).

3.7 Robustness Checks

Audit Firm Selection Bias

As described above, we observed audit experts only from the largest 11 audit firms; we must ensure that our key results are not driven by a selection bias with respect to the audit firms. From the 938 (617) firms without an audit expert in our audit fee (discretionary accruals) sample, we therefore exclude 148 (72) companies with an audit firm for which we do not have employee information from the *FSA* database. With our new

⁹⁷ Unreported results show that our findings also hold when we use the percentage of closely held shares as a governance measure, where high insider ownership indicates weaker governance (high share coefficient -0.035; *p*-value 0.020, low share coefficient -0.003; *p*-value 0.820).

sample consisting only of audit firms for which we also had data from the *FSA*, we can rule out misleading results due to the audit firm selection.

Table 3.6: Panel regressions for audit fees with alternative sample specifications

<i>variable</i>	Column (I)			Column (II)		
	<i>coeff</i>	<i>sign</i>	<i>t-stat</i>	<i>coeff</i>	<i>sign</i>	<i>t-stat</i>
<i>audexp</i>	0.096	**	(1.98)	0.109	**	(2.06)
<i>lnta</i>	0.522	***	(16.31)	0.487	***	(16.33)
<i>lntca</i>	-0.057	**	(-2.08)	-0.055	**	(-2.23)
<i>loss</i>	0.062	**	(2.54)	0.067	***	(2.92)
<i>levratio</i>	-0.004		(-0.06)	0.012		(0.21)
<i>curratio</i>	-0.001	***	(-2.66)	-0.001	**	(-2.36)
<i>roa</i>	-0.087	*	(-1.81)	-0.093	**	(-2.15)
<i>ifrs</i>	0.044		(1.22)	0.045		(1.35)
<i>tobin</i>	0.008		(1.34)	0.009		(1.61)
<i>acc</i>	0.202	***	(3.45)	0.151	***	(2.79)
<i>lnnaf</i>	-0.042	***	(-6.17)	-0.038	***	(-5.90)
<i>initial</i>	-0.086	***	(-2.60)	-0.060	**	(-2.05)
<i>big4</i>	0.279	***	(4.68)	0.210	***	(3.79)
<i>busy</i>	0.149	**	(2.36)	0.169	***	(2.75)
<i>lag</i>	-0.001		(-0.70)	0.000		(-1.33)
<i>n</i>	3,292			3,648		
<i>N</i>	894			1,023		
<i>R</i> ²	0.731			0.760		

Note: The table reports estimation results from panel regressions of the log audit fees on a set of audit fee determinants and an experimental variable. The regressions include (not tabulated) firm-fixed effects and time-fixed effects with the base year of 2003. The regressions and the included variables are described in Section 3.7 and brief descriptions of the variables are given in Table 3.2. In comparison to the sample summarized in Column (II) of Table 3.1, for the regression in Column (I) we have dropped additional 128 firms without an audit expert because they employed an audit firm for which we did not obtain employee information from the *FSA*. In comparison to the sample summarized in Column (II) of Table 3.1, for the regression in Column (II) we have dropped additional 19 firms because the recent audit firm of the audit expert was the incumbent audit firm. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table 3.7: Panel regressions for discretionary accruals with alternative sample specifications

<i>variable</i>	Column (I)			Column (II)		
	<i>coeff</i>	<i>sign</i>	<i>t-stat</i>	<i>coeff</i>	<i>sign</i>	<i>t-stat</i>
<i>audexp</i>	-0.017	*	(-1.70)	-0.020	*	(-1.93)
<i>lnta</i>	0.001		(0.22)	0.001		(0.21)
<i>cfo</i>	-0.703	***	(-38.70)	-0.672	***	(-38.70)
<i>lloss</i>	0.017	***	(3.05)	0.012	**	(2.19)
<i>roa</i>	0.636	***	(50.80)	0.635	***	(52.10)
<i>levratio</i>	-0.043	***	(-2.83)	-0.031	**	(-2.06)
<i>cta</i>	0.002	**	(2.13)	0.002	**	(2.34)
<i>ifrs</i>	-0.004		(-0.48)	-0.001		(-0.14)
<i>big4</i>	0.002		(0.13)	-0.003		(-0.17)
<i>initial</i>	0.027	***	(3.31)	0.018	**	(2.35)
<i>n</i>	2,389			2,529		
<i>N</i>	624			681		
<i>R</i> ²	0.598			0.605		

Note: The table reports estimation results from panel regressions of the discretionary accruals on a set of determinants and an experimental variable. The regressions include (not tabulated) firm-fixed effects and time-fixed effects with the base year of 2003. The regressions and the included variables are described in Section 3.7, and brief descriptions of the variables are given in Table 3.2. In comparison to the sample summarized in Column (III) of Table 3.1, for the regression in Column (I) we have dropped additional 72 firms without an audit expert because they employed an audit firm for which we did not obtain employee information from the *FSA*. In comparison to the sample summarized in Column (III) of Table 3.1, for the regression in Column (II) we have dropped additional 15 firms because the recent audit firm of the audit expert was the incumbent audit firm. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Column (I) in Table 3.6 for audit fees and Column (I) in Table 3.7 for discretionary accruals show the corresponding results. They do not significantly deviate from our main regression results. The coefficient of our experimental variable *audexp* in the audit fee regression is positive (0.096) and significant (*p*-value 0.048), similar to our main results. Also for the discretionary accruals regression, the *audexp* coefficient is similar to our main regression (-0.017; *p*-value: 0.089). The control variables are also comparable. Therefore, the inclusion of audit firms lacking information from the *FSA* did not influence our results.

Recent Audit Firm of the Expert

Among the 104 audit expert appointments considered, there were 24 cases (23.1%) in which the former employer of the audit expert was the incumbent audit firm at the time of the appointment. This ratio is in line with data presented by Geiger et al. (2008,

65).⁹⁸ If there was a strong link between the audit expert and the incumbent audit firm, the reporting mechanisms and related control procedures that the audit expert might suggest to a company would be more similar to the routines of the former employer than to those of other audit firms (e.g. Geiger et al. 2008). Moreover, the individual's detailed knowledge about the external audit firm's requirements and testing procedures (e.g. Geiger et al. 2005) would allow them to improve audit planning and reduce the audit costs (e.g. Davidson and Gist 1996). Hence, the observed effect on audit fees might be weaker in comparison to audit experts from other audit firms. This would be in line with the conclusions of Basioudis (2007), who reports that companies that employ executive directors who obtained their accounting qualifications at the incumbent audit firm pay relatively less audit fees than companies employing other chartered accountant directors. Basioudis (2007) relates this to a reduction of the audit firm's risk. However, it is also possible that a former audit firm employee might seek to benefit his or her former employer due to social or emotional ties (Herda and Lavelle 2011). In this case, the fees could increase even more in comparison to companies appointing audit experts from unconnected firms. An audit fee increase from economic bonding is also more likely in such a case, as the evidence presented by Ye et al. (2011) suggests.

To rule out any influence of the 24 cases in which the former employer of the audit expert was the incumbent audit firm on our results, we exclude these cases in a robustness check for the audit fee and the discretionary accruals regression. Column (II) in Table 3.6 for the audit fees and Column (II) in Table 3.7 for the discretionary accruals show the results when the variable *audexp* does not include cases in which the most recent employer was the incumbent audit firm.

The coefficient of our experimental variable *audexp* has the same sign and significance level and is slightly larger (smaller) in the regression on audit fees (discretionary accruals); the control variables are also comparable to our main regressions. Therefore, our results are not biased due to audit experts' connections to the incumbent audit firms. We refrain from a detailed analysis of these experts because of the low number of observations.

⁹⁸ Out of 1,141 hires of accounting and finance officers who had previously worked for an audit firm, the authors observed 193 (16.9%) who were previously employed by the incumbent audit firm.

Alternative Model Specification

In the audit fee literature, a wide variety of control variables have been used in audit fee regression models. To ensure that our results do not depend on the particular specification of our audit fee model, we repeat our main regression with alternative audit fee determinants suggested by prior literature, as explained in detail in Section 3.5. First, to rule out related multicollinearity problems, we use the accounts receivables (*lnacrec*) instead of the total current assets (*tca*) (see Column (I) in Table 3.8). In a second variation, we exclude the accruals from our model, as they have rarely been used in prior literature (see Column (II) in Table 3.8). In a third robustness check, we replace the Tobin's Q (*tobin*) with the market-to-book ratio (*mbr*), which is also commonly used in audit fee studies (see Column (III) in Table 3.8).

Table 3.8: Panel regressions for audit fees with alternative model specifications

variable	Column (I)			Column (II)			Column (III)		
	coeff	sign	t-stat	coeff	sign	t-stat	coeff	sign	t-stat
<i>audexp</i>	0.093	*	(1.90)	0.100	**	(2.10)	0.094	**	(1.97)
<i>lnta</i>	0.455	***	(18.88)	0.484	***	(16.81)	0.494	***	(17.27)
<i>lntca</i>	-			-0.046	*	(-1.91)	-0.051	**	(-2.10)
<i>lnacrec</i>	0.028	***	(3.00)	-			-		
<i>loss</i>	0.070	***	(3.02)	0.068	***	(3.00)	0.062	***	(2.74)
<i>levratio</i>	-0.004		(-0.07)	0.031		(0.56)	0.036		(0.64)
<i>curratio</i>	-0.001	**	(-2.29)	-0.001	**	(-2.42)	-0.001	**	(-2.45)
<i>roa</i>	-0.075		(-1.64)	-0.144	***	(-3.42)	-0.113	***	(-2.62)
<i>ifrs</i>	0.056		(1.63)	0.053		(1.58)	0.048		(1.45)
<i>tobin</i>	0.006		(1.01)	0.007		(1.23)	-		
<i>mbr</i>	-			-			0.001		(1.47)
<i>acc</i>	0.203	***	(3.54)	-			0.174	***	(3.23)
<i>lnnaf</i>	-0.043	***	(-6.43)	-0.037	***	(-5.71)	-0.038	***	(-5.88)
<i>initial</i>	-0.054	*	(-1.80)	-0.071	**	(-2.45)	-0.069	**	(-2.40)
<i>big4</i>	0.258	***	(4.82)	0.255	***	(4.86)	0.250	***	(4.77)
<i>busy</i>	0.162	***	(2.60)	0.142	**	(2.35)	0.158	***	(2.61)
<i>lag</i>	0.000		(-0.75)	-0.001		(-1.48)	-0.001	*	(-1.72)
<i>n</i>	3,564			3,742			3,742		
<i>N</i>	1,000			1,042			1,042		
<i>R</i> ²	0.777			0.765			0.765		

Note: The table reports estimation results from panel regressions of the log audit fees on a set of audit fee determinants and experimental variables. The regressions include (not tabulated) firm-fixed effects and time-fixed effects with the base year of 2003. The regressions and the included variables are described in Section 3.7. Brief descriptions of the main variables are given in Table 3.2. In comparison to the sample summarized in Column (II) of Table 3.1, we have dropped additional 42 firms due to incomplete information on the accounts receivables (Column (I)). The *t*-statistics from panel robust standard errors are given in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

The results presented in Table 3.8 are similar to our primary results. The coefficient estimates and associated t -statistics for our main experimental variable *audexp* are stable and vary only slightly from one model specification to another. Furthermore, the audit fee determinants show no differences with respect to the signs of the estimated coefficients and only minor changes in their significance levels.

Other Reasons for Changes in the Discretionary Accruals

Geiger and North (2006) find evidence of a significant increase in discretionary accruals before the appointment of a new CFO, followed by a significant reduction thereafter. Moreover, with accrual accounting, it is possible to shift earnings into other periods, although this effect is not sustainable. Higher earnings resulting from a high level of accruals in the past might possibly yield to lower levels of accruals in future periods. Hence, the observed decrease in discretionary accruals could simply result from the reverting of accruals rather than from any deliberate reporting activities after the appointment of an audit expert.

To address these concerns, we include an additional variable that indicates the year before the appointment of the audit expert. In unreported results, the estimated coefficient for this indicator variable is clearly not significant (p -value 0.306); the coefficient of the variable *audexp* remains negative (-0.025) and significant at the 5% level. Thus, the observed decrease in discretionary accruals is indeed a result of the presence of the audit expert.

3.8 Conclusion

This study is the first empirical work that analyzes changes in audit fees and discretionary accruals resulting from the appointment of a former audit firm employee to the board of directors. In order to examine the effect of accounting expertise, we used data from the United Kingdom after several restrictions on the audit profession went into effect. The results indicate that the appointment of an audit expert improves the quality of a firm's financial reporting. More specifically, we find that after an audit expert becomes a member of the board, audit fees increase while discretionary accruals simultaneously decrease.

We observe higher audit fees in the first years of the expert's engagement. We relate this fee increase to improvements in the firm's financial reporting that must be audited,

i.e. higher audit fees proxy for higher audit effort and are associated with higher reporting quality. Because a fee increase could also be the result of internal control problems or the audit firm's demand for a risk premium, we additionally analyze the discretionary accruals as a measure of reporting quality. Our results show that the observed fee increase is indeed associated with a permanent decrease in the discretionary accruals. Both effects are driven by the presence of audit experts who have a strong influence on the board. Our results are robust with respect to the choice of the control variables and various sample selections.

We show that firms' stakeholders and other addressees of financial reports can expect greater audit effort and improved audit quality after the appointment of a former audit firm employee to the board. Our comprehensive empirical evidence is consistent with a rational ongoing appointment practice but stands in contrast to some earlier findings on the effect of audit expert appointments on earnings management (e.g. Geiger et al. 2005).

In addition, our results raise questions about the perception of audit expert appointments by financial markets. Geiger et al. (2008) find that the market positively values the direct appointment of an audit expert from the incumbent audit firm, but shows no significant reaction to appointments of other audit experts.⁹⁹ If this positive reaction is not solely attributable to positive signaling about the firms' future prospects, but is at least partially based on the expectation of an improved financial reporting, the market should reconsider its evaluation of audit experts. In addition, our findings add to the understanding of the relationship between board oversight and the audit process. Furthermore, the results highlight the need to consider the time dimension when analyzing the influence of audit experts on financial reporting.

There are several remaining questions calling for future research. When larger datasets become available, the effects of audit experts over longer time horizons can be considered. In addition, the analysis of the factors that drive the decision to appoint former audit firm employees could provide further insights into the practice. Moreover, considering longer employment histories would allow the investigation of various pre-

⁹⁹ Geiger et al. (2008) analyze cumulative abnormal stock returns for U.S. firms surrounding the announcement dates of the appointments of former audit firm employees directly from Big 5 audit firms (before 2003, the Big 4 plus *Arthur Andersen*) as senior accounting and finance officers. The market positively values direct hires from the incumbent audit firm, but shows no significant reaction to hires of former employees of other Big 5 firms or appointments of individuals with no audit industry background.

vious career steps in relation to experts' influence. Examining the exits of audit experts from company boards and following their subsequent career paths could provide new evidence on the motivation and expectations of these individuals when they take up such a position.

3.A Appendix

Financial Service Authority Register and Audit Firm Selection

The guidelines published by the *Financial Service Authority (FSA)* on filing requirements are very general and do not include any details on the specifications for audit firms. Unfortunately, the *FSA* does not respond to research questions. The requirement to file information on employees seems to be triggered when a firm carries out certain regulated activities, most of which are in the area of finance. However, the total number of audit firm employees in the register is rather large (3,875), suggesting that a significant number of employees in sectors other than auditing (e.g. consulting) are included. To ensure the accuracy of the *FSA* information, we checked the biographical and other information (e.g. education) provided in *Reuters Fundamentals (RF)* for all matches.¹⁰⁰

To identify the audit firms in the *FSA Register*, we started with the names of the 15 largest audit firms by client share in 2009, which we calculated using the audit firm information in *RF*. Using the register's search function, we found that *Arthur Andersen*, which was largely incorporated into *Deloitte & Touche* in Summer 2002, never filed. In addition, those auditors that are organized in networks rather than as standalone firms (e.g. *Nexia*) did not file as separate entities. Hence, we were left with the 11 largest audit firms that appeared in the register. Since what seems to be one audit firm can actually consist of several *FSA*-registered firms, we set the name search function to "partial" and carefully searched for all major name parts of our identified audit firms. We included all of the identified filers that appeared to belong to the same audit firm (e.g. *PKF (UK) LLP* and *PKF ACCOUNTANTS* exist as separately filing firms), and we treated all filed jobs as jobs within one firm to ensure that we did not lose matches from separate filings. The incorporation of *Arthur Andersen* into *Deloitte & Touche* (2002) and the acquisition of *RSM Robson Rhodes* by *Grant Thornton* (2007) were dealt with using the common firm continuance assumption.

¹⁰⁰ For the name-match algorithm, we started by stripping out all titles and nicknames from the names in *RF*, which then mostly consisted of only two words (first name and family name). The names in the *FSA Register* appeared to be the individuals' full legal names. Although they did not contain any titles or nicknames, they largely consisted of three words, including a second given name. First, we required the family names to match. Furthermore, we required every given name from *RF* to be included among the given names from the *FSA*. Here, initials and full names were treated equally, and the order of the given names did not matter. Because a manual check followed anyway, this ensured that we did not exclude any potential matches due to abbreviations or differential ordering of given names.

The job records also contained information on the position within the filing firm (“CF Code”). Although previous research has found that the rank in an audit firm plays an important role (e.g. Basioudis 2007; Law 2010), the provided information was inconclusive and could not be relied upon.¹⁰¹

Overall, the *FSA Register* includes a few jobs with start dates as early as February 1972, but the total number of job filings at all regulated firms explodes in December 2001 (start dates); this appears to be when a widespread filing requirement went into effect. Accordingly, our earliest audit job start and end dates were both in December 2001, and we used this as the start date for our *FSA* data.

Differences among Firms With and Without an Audit Expert

Table 3.9 does not indicate any obvious differences between firms that appointed an audit expert during our observation period and firms without such an appointment. However, it should be noted that the descriptive statistics for the firms with an audit expert in the observation period include observations before and after the appointment of the expert to the board. A comparison of observations from firms without an expert and firms with an expert but only before the appointment of the expert shows only minor differences between the two groups. We conducted *t*-tests on mean differences for each variable for the two pooled samples. In this comparison, firms that would appoint an audit expert in the future were significantly smaller with respect to total assets (*p*-value 0.063) and total current assets (*p*-value 0.049) and (related to size) less frequently employed an audit firm from the Big 4 group (*p*-value 0.019); they also had slightly lower audit fees (*p*-value 0.053) and lower reporting lags (*p*-value 0.095). Furthermore, we observed significant differences with regard to the share of firms with their fiscal year-end in the busy season (lower for firms that would appoint an audit expert, with *p*-value 0.014), Tobin’s *Q* (higher for firms that would hire an audit expert, with *p*-value 0.093), and, due to differential time periods, *IFRS* share (lower for firms that would appoint an audit expert, *p*-value 0.000). However, there were no differences with respect to firm characteristics related to client risk (leverage ratio, current ratio, return-on-assets, and accruals). Apart from the characteristics related to size, no pattern was discernible in the differences.

¹⁰¹ E.g. *PricewaterhouseCoopers* classifies all employees under the same CF Code.

Table 3.9: Descriptive statistics – divided sample

variable	Column (I): only firms without an audit expert on the board					Column (II): only firms that appointed an audit expert				
	mean	sd	median	p1	p99	mean	sd	median	p1	p99
<i>audexp</i>	-	-	-	-	-	0.734	0.442	1	0	1
<i>ln(af)</i>	4.739	1.507	4.605	1.792	8.748	4.639	1.301	4.580	1.792	7.741
<i>lna</i>	11.302	2.329	11.312	6.192	17.081	11.198	2.095	11.208	7.224	15.825
<i>lnca</i>	10.355	2.301	10.435	4.988	15.855	10.236	1.937	10.169	6.321	14.445
<i>loss</i>	0.346	0.476	0	0	1	0.388	0.488	0	0	1
<i>levratio</i>	0.493	0.277	0.491	0.012	1.315	0.519	0.258	0.519	0.032	1.258
<i>curratio</i>	3.602	18.062	1.429	0.213	39.359	2.187	3.498	1.321	0.258	22.263
<i>roa</i>	-0.033	0.275	0.035	-1.175	0.348	-0.054	0.251	0.024	-1.062	0.360
<i>ifrs</i>	0.784	0.411	1	0	1	0.671	0.470	1	0	1
<i>tobin</i>	1.904	1.993	1.41	0.419	8.699	1.833	1.973	1.299	0.420	10.26
<i>acc</i>	0.103	0.160	0.060	0.001	0.783	0.116	0.167	0.064	0.002	0.814
<i>lnnaf</i>	4.043	2.215	4.248	0	8.703	3.999	2.016	4.103	0	8.319
<i>initial</i>	0.062	0.240	0	0	1	0.070	0.255	0	0	1
<i>big4</i>	0.605	0.489	1	0	1	0.542	0.499	1	0	1
<i>busy</i>	0.720	0.449	1	0	1	0.643	0.479	1	0	1
<i>lag</i>	88.223	38.955	77	29	185	83.551	30.986	77	0	181
<i>dacc</i>	-0.009	0.125	-0.006	-0.518	0.377	-0.025	0.154	-0.010	-0.642	0.346
<i>cfo</i>	0.058	0.183	0.081	-0.742	0.352	0.035	0.175	0.060	-0.777	0.360
<i>cta</i>	0.254	2.361	0.067	-0.481	2.576	0.232	1.217	0.058	-0.548	3.915
<i>lloss</i>	0.244	0.430	0	0	1	0.304	0.46	0	0	1

Note: The table reports descriptive statistics for the variables included in the main regressions introduced in Section 3.5. The underlying sample was divided into 3,268 (2,235) firm-year observations from 938 (617) firms without an audit expert used in the audit fee (discretionary accruals) regression, and 474 (369) firm-year observations from 104 (79) firms that appointed an audit expert in our observation. The sample is explained in Section 3.4. Brief descriptions of the variables are given in Table 3.2.

Univariate Analysis

Table 3.10: Univariate analysis of audit fees and discretionary accruals

		audit fees	discretionary accruals
firms (pairs)		50	45
firm-years before the appointment		139	114
firm-years after the appointment		181	158
paired <i>t</i> -test	two-sided	0.011 **	0.050 **
	one-sided	0.005 ***	0.025 **
signed rank test		0.000 ***	0.025 **

Note: The table reports results (*p*-values) from a univariate analysis of the audit fees and discretionary accruals. We used paired difference tests to compare the audit fees and discretionary accruals of the same firm without the former audit firm employee on the board to periods with the expert. The tests and the underlying samples are described in Section 3.5. The numbers show the *p*-values and ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table 3.11: Univariate analysis of audit fee dynamics

Panel A: One year before the appointment vs. years after the appointment						
		<i>t-1 to t</i>	<i>t-1 to t+1</i>	<i>t-1 to t+2</i>	<i>t-1 to t+3</i>	<i>t-1 to t+4</i>
firms (pairs)		49	39	29	20	9
paired <i>t</i> -test	two-sided	0.226	0.100 *	0.078 *	0.097 *	0.729
	one-sided	0.113	0.050 **	0.039 **	0.048 **	0.364
signed rank test		0.000 ***	0.001 ***	0.049 **	0.161	0.952

Panel B: Two years before the appointment vs. years after the appointment						
		<i>t-2 to t</i>	<i>t-2 to t+1</i>	<i>t-2 to t+2</i>	<i>t-2 to t+3</i>	<i>t-2 to t+4</i>
firms (pairs)		36	30	22	17	8
paired <i>t</i> -test	two-sided	0.081 *	0.000 ***	0.022 **	0.053 *	0.250
	one-sided	0.040 **	0.000 ***	0.011 **	0.026 **	0.125
signed rank test		0.000 ***	0.000 ***	0.012 **	0.079 *	0.292

Note: The table reports results (*p*-values) from a univariate analysis of the audit fees. We used paired difference tests to compare the audit fees of the same firm from one year (Panel A) and two years (Panel B) before the appointment of an audit expert to the years with the expert on the board. The tests and the underlying samples are described in Section 3.5. The numbers show the *p*-values and ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table 3.12: Univariate analysis of audit fees and discretionary accruals for expert influence

		Column (I)			Column (II)			Column (III)		
		execu	non-execu	small board	large board	non-indep. board	indep. board			
firms (pairs)		29	21	28	22	23	27			
paired <i>t</i> -test	two-sided	0.072 *	0.012 **	0.003 ***	0.056 *	0.014 **	0.021 **			
	one-sided	0.036 **	0.006 ***	0.001 ***	0.028 **	0.007 ***	0.011 **			
signed rank test		0.001 ***	0.001 ***	0.000 ***	0.006 ***	0.001 ***	0.002 ***			

		Column (I)			Column (II)			Column (III)		
		execu	non-execu	small board	large board	non-indep. board	indep. board			
firms (pairs)		25	20	24	21	19	26			
paired <i>t</i> -test	two-sided	0.066 *	0.221	0.040 **	0.294	0.122	0.252			
	one-sided	0.033 **	0.110	0.020 **	0.147	0.061 *	0.126			
signed rank test		0.116	0.121	0.063 *	0.204	0.126	0.137			

Note: The table reports the results (*p*-values) from a univariate analysis of audit fees (Panel A) and discretionary accruals (Panel B). We used paired difference tests to compare the audit fees of the same firm without the former audit firm employee on the board to periods with the expert. The tests and the underlying samples are described in Section 3.5. The numbers show the *p*-values and ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

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Danksagung

An dieser Stelle möchte ich allen Personen danken, die mich bei der Erstellung dieser Arbeit in den letzten Jahren begleitet und unterstützt haben.

Mein Dank gilt meiner Betreuerin, Frau Prof. Dr. Ulrike Stefani, die mir stets mit guten Ratschlägen zur Seite stand und mir die akademische Welt näher gebracht hat. Auch möchte ich mich für die gute und erfolgreiche Zusammenarbeit bei unseren gemeinsamen Beiträgen bedanken. Ich habe mich bei ihr am Lehrstuhl stets sehr wohl gefühlt und werde immer gerne an diese Zeit zurückdenken.

Ich möchte mich ebenfalls bei Herrn Prof. Dr. Jens Jackwerth bedanken, der sich bereit erklärt hat, als Zweitgutachter dieser Arbeit zu fungieren.

Mein Dank gilt auch meinen Koautoren Ulf Mohrmann und Achim Mattes für die gute Zusammenarbeit bei unseren gemeinsamen Beiträgen sowie dem stetigen Gedankenaustausch während der Arbeit.

Des Weiteren möchte ich mich bei Dr. Christopher Bleibtreu bedanken, der zusammen mit mir am Lehrstuhl gearbeitet hat und immer gute Hinweise parat hatte. Ebenso beim weiteren Lehrstuhlteam, Elvira Grübel, Thomas Hattenbach und allen wissenschaftlichen Hilfskräften, für die Unterstützung.

Vielen Dank auch an alle weiteren Kollegen, die zusammen mit mir am Fachbereich Wirtschaftswissenschaften gearbeitet haben.

Ein ganz besonderer Dank gilt meiner gesamten Familie, insbesondere meiner Mutter Beate, meinem Vater Hartmut und meinem Bruder Oliver, die mich ohne Kompromisse stets in jedem Bereich unterstützt haben. Das Selbe gilt für meine Großeltern, bei denen ich mich leider nicht mehr in angemessener Weise bedanken kann. Ohne Euch wäre dies alles nicht möglich gewesen.

Ganz besonders herzlich möchte ich mich bei meiner Lebensgefährtin Marina bedanken, die mich seit langem begleitet und mir immer zur Seite steht.

Abgrenzung

Kapitel 1, *Audit Market Regulation and Supplier Concentration around the World: Empirical Evidence*, ist eine gemeinsame Arbeit mit Frau Prof. Dr. Ulrike Stefani (Universität Konstanz). Die ursprüngliche Idee der Arbeit stammt von Frau Prof. Dr. Ulrike Stefani. Die Datensammlung, die gesamten statistischen Analysen sowie die Beschreibung der Regulierungsvorschläge entstammen meiner Hand. Die weiteren Teile der Arbeit wurden von Frau Prof. Stefani geschrieben. Die Überarbeitung erfolgte gemeinsam.

Kapitel 2, *Audit Market Regulation and Earnings Characteristics: Cross-Country Evidence on the Role of Audit Market Structure*, entstammt einer gemeinsamen Arbeit mit Frau Prof. Dr. Ulrike Stefani (Universität Konstanz) und Herrn Ulf Mohrmann (Universität Konstanz). Die Idee zu der Arbeit ist in gemeinsamen Gesprächen entstanden. Alle länderspezifischen Daten wurden von mir beigesteuert, alle unternehmensspezifischen Daten von Herr Mohrmann. Die erste Version des Kapitels *Background* entstammt meiner Hand. Die Kapitel *Introduction* und *Conclusion* sind zu gleichen Teilen von Herrn Mohrmann und mir verfasst worden. Die weiteren Kapitel wurden in ihrer ersten Version von Herrn Mohrmann verfasst. Die Überarbeitung erfolgte gemeinsam durch alle drei Autoren.

Kapitel 3, *The Effect of the Appointment of Former Audit Firm Employees to the Board of Directors on the Quality of the Financial Reporting*, ist eine gemeinsame Arbeit mit Herrn Achim Mattes (Universität Konstanz). Sowohl die Datensammlung, die statistischen Analysen als auch die Ausarbeitung des Textes erfolgte zu gleichen Teilen.

Wangen bei Dübendorf, 07. Mai 2014

(Benjamin Heß)