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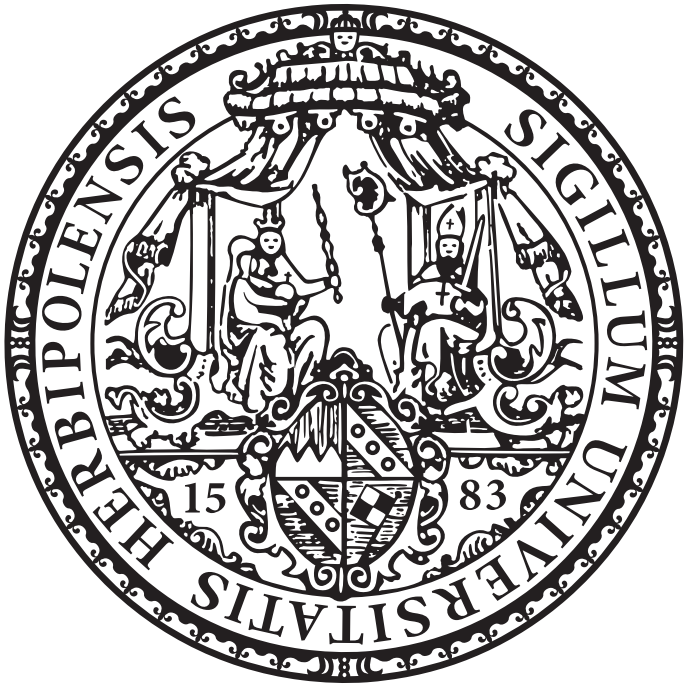
Empirical Studies on Auditing in Germany and the U.S.



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To my family, I love you.

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Zusammenfassung

Die Qualität einer Abschlussprüfung ist von besonderer Bedeutung, da sie einen wesentlichen Aspekt der Rechnungslegungsqualität und damit der Zuverlässigkeit von Jahresabschlussinformationen darstellt. Handeln Wirtschaftsprüfer nicht im Interesse von beispielsweise Aktionären oder Fremdkapitalgebern, sondern im Interesse des Unternehmensmanagements, dann könnte die Qualität einer Abschlussprüfung gemindert sein. Dies könnte wiederum die Qualität der geprüften Rechnungslegung negativ beeinflussen.

Um einer möglichen Beeinträchtigung der Qualität einer Abschlussprüfung entgegenzuwirken, intervenieren Regulatoren regelmäßig auf dem Markt für Abschlussprüfungen. Anlässe für Änderungen bestehender Regulierungen sind dabei oft spezielle Ereignisse (wie zum Beispiel Unternehmensinsolvenzen oder Wirtschaftskrisen), die Kritik an der Tätigkeit von Wirtschaftsprüfern zur Folge haben. Als ein jüngeres Ereigniss kann dabei die weltweite Finanzkrise genannt werden. Als Folge dieser stieß die Europäische Kommission eine Reform des europäischen Abschlussprüfungsmarktes von Unternehmen von öffentlichem Interesse – und damit grundlegend auch Kreditinstituten – an. Die ersten zwei Kapitel der vorliegenden Arbeit beleuchten daher zwei ausgewählte Themen, die im Zusammenhang mit dieser europäischen Reform stehen.

Kapitel 2 analysiert den Markt für Abschlussprüferleistungen von deutschen Kreditinstituten (exklusive Sparkassen und Genossenschaften). Derartige Konzentrationsanalysen würden gemäß der Reform des europäischen Abschlussprüfermarktes auch für diesen Markt erforderlich. Aussagekräftige Studien dazu liegen zuletzt für die Jahre bis 2000 vor. Die empirische Untersuchung zeigt, dass der Markt für Abschlussprüferleistungen von deutschen Kreditinstituten hoch konzentriert ist und die Tendenz zu einer duopolistischen Struktur aufweist. Marktführende Anbieter sind die KPMG AG WPG und die PricewaterhouseCoopers AG WPG. Die Ergebnisse offenbaren zudem, dass zwischen den Jahren 2006 und 2010 weder Markteintritte oder -austritte von Abschlussprüfern, noch unterschiedliches Wachstum von Wirtschaftsprüfungsgesellschaften die Marktstruktur veränderten. Die Studie zeigt auch, dass neben den Abschlussprüferhonoraren spezielle Surrogate (wie das Geschäfts-

volumen eines Kreditinstitutes) die Konzentration sehr gut abbilden. Dies ist von Interesse, da aufgrund der regulatorischen Anforderungen nicht alle Kreditinstitute ihre Abschlussprüferhonorare im Jahresabschluss offenlegen müssen und damit eine Konzentrationsanalyse mit Hilfe von Surrogaten unter Umständen erforderlich ist.

Kapitel 3 geht der Frage nach, ob die zusätzliche Aufsicht von Unternehmen von öffentlichem Interesse (zum Beispiel Enforcement-Verfahren durch die Deutsche Prüfstelle für Rechnungslegung oder anlassunabhängige Sonderuntersuchungen durch die Abschlussprüferaufsichtskommission) Abschlussprüferhonorare determiniert. Hierzu werden deutsche Kreditinstitute betrachtet (2009 bis 2011), da aufgrund besonderer regulatorischer Gegebenheiten nicht alle Kreditinstitute als Unternehmen von öffentlichem Interesse gelten. Die empirischen Ergebnisse weisen zunächst daraufhin, dass divergierende Geschäftsrisiken von Kreditinstituten Unterschiede in der Höhe der Abschlussprüferhonorare erklären können. Darüber hinaus zahlen Kreditinstitute, die als Unternehmen von öffentlichem Interesse gelten, nicht nur statistisch signifikant höhere Abschlussprüferhonorare, sondern dieser Effekt scheint auch einen ökonomisch bemerkenswerten Einfluss zu haben – einen Anstieg durchschnittlicher Abschlussprüferhonorare um 31.38%. Es gibt weiterhin einige empirische Hinweise, dass Abschlussprüfer Geschäftsrisiken von Kreditinstitute, die als Unternehmen von öffentlichem Interesse gelten, stärker in ihre Honorare einpreisen.

Auch wenn Regulierungen dazu führen, dass die tatsächliche Qualität einer Abschlussprüfung nicht gemindert ist, ist es jedoch von entscheidender Bedeutung, wie Abschlussprüfer und die Abschlussprüfung wahrgenommen werden. Dabei sind die Wahrnehmungen der Aktionäre von besonderem Interesse, da diese als primäre Adressaten von Jahresabschlussinformationen betrachtet werden können. Daher widmet sich die Arbeit in zwei weiteren Kapiteln Fragestellungen, die sich mit der Wahrnehmung der Abschlussprüfung durch die Aktionäre beschäftigen.

Kapitel 4 befasst sich mit U.S.-amerikanischen gelisteten Unternehmen (2010 bis 2013), die eine Ratifizierung des Abschlussprüfers durch Aktionäre durchführen. Im Speziellen mag es diskussionswürdig sein, ob die Pflichtveröffentlichung des Ergebnisses der Ratifizierung des Abschlussprüfers für Aktionäre eine entscheidungsnützliche Information darstellt und damit für deren Investitionsentscheidungen hilfreich sein könnte. Die Studie kann einen empirischen Zusammenhang zwischen der Höhe der Zustimmung der Aktionäre zum Abschlussprüfer und der wahrgenommenen Rechnungslegungsqualität am Tag der Gewinnbekanntmachung feststellen. Zudem

scheint es auch, dass diese empirisch gemessene Assoziation von der Ausprägung der Informationsasymmetrie zwischen dem Unternehmensmanagement und den Aktionären determiniert wird. Die Ergebnisse dieser Studie deuten in Summe darauf hin, dass die Veröffentlichung der Wahlergebnisse zur Ratifizierung von Abschlussprüfern eine entscheidungsnützliche Information für (zukünftige) Aktionäre darstellen könnte. Dies ist vor allem vor dem Hintergrund bedeutend, dass die Abstimmungsergebnisse oft nur gering variieren und diese Wahl eine Routineangelegenheit darstellt, freiwillig und nicht bindend ist.

Kapitel 5 setzt sich mit der finanziellen Abhängigkeit eines Wirtschaftsprüfers von seinen Mandanten und der von den Aktionären wahrgenommenen Qualität der Rechnungslegung auseinander. Die zugrundeliegende Theorie nimmt an, dass die zukünftig erzielbaren Quasirenten bei wirtschaftlich bedeutenden Mandanten zu einer finanziellen Abhängigkeit des Wirtschaftsprüfers führen und durch diese Beeinträchtigung der Unabhängigkeit die (wahrgenommene) Prüfungsqualität und damit die (wahrgenommene) Rechnungslegungsqualität sinken. Die Ergebnisse der empirischen Untersuchung U.S.-amerikanischer Unternehmen (2010 bis 2014) legen nahe, dass Aktionäre eine hohe wirtschaftliche Bedeutung eines Mandanten als Bedrohung für die Unabhängigkeit des Wirtschaftsprüfers und damit der Qualität der geprüften Rechnungslegung wahrnehmen. Weitere Analysen offenbaren, dass dieser empirische Effekt insbesondere für Mandanten zu beobachten ist, welche sich in einer eher schlechten finanziellen Lage befinden. Die Ergebnisse der Studie weisen somit darauf hin, dass Unternehmenscharakteristika oder das Unternehmensumfeld die Beurteilung einer möglichen Gefährdung der Unabhängigkeit des Wirtschaftsprüfers beeinflussen dürften. Darauf aufbauend könnten weitere Forschungsarbeiten zu einem breiteren Verständnis der Aktionärswahrnehmungen beitragen.

Contents

List of Figures

List of Tables

1 Introduction and Summary

> *Clearly the attitude of disrespect that many executives have today for accurate reporting is a business disgrace. And auditors [...] have done little on the positive side. Though auditors should regard the investing public as their client, they tend to kowtow instead to the managers who choose them and dole out their pay. ("Whose bread I eat, his song I sing.")*
>
> *— Warren E. Buffett, Berkshire Hathaway Inc., 1998 Annual Report*

The objective of (external) audits is to ensure that financial reports are sufficiently credible. In this context, audit quality plays a vital role because it is an integral component of financial reporting quality and, thus, of the credibility of financial reports (DeFond and Zhang 2014, 279). Therefore, if auditors do not act in the interests of shareholders, debt holders, etc., but rather in the interests of executives, audit quality and, consequently, financial reporting quality might be compromised.

To mitigate situations in which audit quality might be compromised, regulators intervene in the market from time to time—particularly in the wake of events that have increased public concerns about auditors' duties and responsibilities (cf. DeFond and Francis 2005, 8–9). This was also the case in the aftermath of the financial crisis in which the European Commission called for a reform of the European audit market (European Commission 2011, 2). Thus, the next two chapters address questions that are related to the reform of the European audit market for public-interest entities, which include, in principle, credit institutions.

Chapter 2 concerns the audit market for German credit institutions (excluding savings banks and cooperative banks), and the presented study allows conclusions to be drawn regarding recent concentration levels of this particular audit market. The last reliable (statistical) studies concerning the audit market for German credit institutions were published several years ago (Grothe 2005; Lenz 1996b; Lenz 1997; Lenz 1998). This is surprising because parts of the new regulations concerning the audit market for public-interest entities—which should also apply to credit institutions

(European Commission 2006c, 92)—in Europe would require analyses of the audit market concentration to be performed on a regular basis. Therefore, this study begins to fill this research gap, and it reveals that the audit market for German credit institutions was highly concentrated (market leadership: KPMG AG WPG and PricewaterhouseCoopers AG WPG) in 2006 and 2010. Moreover, the findings also highlight that between these years, neither a notable trend toward higher levels of concentration nor a deconcentration process was evident. Finally, it is illustrated that the regulatory requirements for publishing audit fees and the corresponding right to claim exemption (§§ 285 Sentence 1 No. 17, 314 (1) No. 9 Commercial Code) do not allow the calculation of concentration figures that cover the entire audit market for credit institutions. Thus, it will continue to be necessary to use surrogates for audit fees, and analyses reveal that the arithmetic mean of the total business volume (or total assets) of a credit institution and its square root is a very good surrogate for calculating concentration measures based on audit fees.

Chapter 3 seeks to determine whether public oversight of public-interest entities (PIEs) increases audit fees specifically in the financial industry, which is already a highly regulated industry characterized by intense supervision. To answer this question, a sample of 573 German credit institutions is examined over the 2009–2011 period, as not all credit institutions were considered PIEs in Germany (until very recently). First, the results show that a credit institution's business risk is related to audit fees. In addition, the findings reveal not only that PIE credit institutions pay statistically significantly higher audit fees but also that this effect is economically substantial (representing an audit fee increase of 31.38%). Finally, there are several indications that the relationship between (other) credit institutions' business risks and audit fees is greater for PIE credit institutions. In conclusion, there is some empirical support for the hypothesis that additional public oversight of PIEs is related to audit pricing.

Even if regulatory interventions might lead to an environment in which actual audit quality is not compromised, how auditors and audit quality are perceived is nevertheless relevant. Shareholders are among the primary users of audited financial statements, and shareholders' perceptions of the credibility of those financial statements depend on their perceptions of audit-quality-related issues, such as the auditor's independence. Thus, if auditors regard shareholders as their clients, as Warren E. Buffett also posits, then they should be interested in how they and their

audits are perceived. Thus, the subsequent chapters 4 and 5 address two topics regarding shareholders' perceptions of audit quality.

Chapter 4 examines the association between the results of auditor ratification votes and perceived external financial reporting quality. As has been recently remarked by Wei et al. (2015, 128–129), far too little is known about shareholders' interests in and perceptions of the election, approval or ratification of auditors. Although auditor ratification by shareholders is normally a routine, non-binding action and the voting ratios are in the range of 95% or higher, the SEC emphasized the importance of this process by amending the disclosure requirements for such voting results in 2010 (SEC 2009; SEC 2010). This study demonstrates that the results of auditor ratification votes are associated with market reactions to earnings surprises (SEC registrants; 2010 to 2013). Moreover, there are moderate indications that this effect may be positively related to higher levels of information asymmetry between managers and shareholders, that such voting results contain incremental informational content beyond that of other publicly available audit-related information, and that the time lag between the ratification of an auditor and the earnings announcement influences the vote's importance. Finally, the study sheds additional light on an overlooked audit-related topic (e.g., Dao et al. 2012; Hermanson et al. 2009; Krishnan and Ye 2005; Sainty et al. 2002), and illustrates its relation to accounting. More importantly, the provided evidence indicates that disclosure of the results of auditor ratification votes might benefit (prospective) shareholders.

Chapter 5 addresses the question of whether and when shareholders may have a negative perception of an auditor's economic dependence on the client. The results for a Big 4 client sample in the U.S. (2010 to 2014) show that the economic importance of the client—measured at the audit office-level—is negatively associated with shareholders' perceptions of external financial reporting quality—measured in terms of the earnings response coefficient and the ex ante cost of equity capital—and, therefore, is perceived as a threat to auditor independence. Moreover, the study reveals that shareholders primarily regard independence due to client dependence as a problem for firms that are more likely to be in financially distressed conditions. Therefore, this study provides preliminary evidence that shareholders' perceptions might be conditional on client's circumstances, and it is hoped that this will encourage future research because little attention has yet been devoted to the role of a client's circumstances in affecting shareholders' perceptions of audit-related issues.

2 Concentration Analysis of the Audit Market for German Credit Institutions[1]

2.1 Introduction

In 2011, the European Commission called for new regulations concerning the audit market for public-interest entities, which should also apply to credit institutions (European Commission 2006c, 92), and a part of these regulations would require that the national "competent authorities monitor the developments in the market, particularly as regards possible limited choice of auditor and the risks that arise from high market concentration" (European Commission 2011, 20). Such market monitoring would also include the assessment of market-structure-related risks, such as high levels of concentration (European Commission 2011, 65). Thus, these proposed regulations imply that analyses of the audit market concentration would be necessary on a regular basis. Interestingly, the last reliable (statistical) studies concerning the audit market for German credit institutions were published several years ago (Grothe 2005; Lenz 1996b; Lenz 1997; Lenz 1998).[2] Considering the renewed interest in audit-market-related questions (e.g., IDW 2012a, 16; WPK 2012, 29), this study allows conclusions to be drawn regarding the recent concentration levels of this particular audit market.

This study first reveals that because of the existing German regulatory environment, it is still reasonable to use surrogates for audit fees in concentration analyses. Moreover, it can be shown that the arithmetic average of the untransformed and square-root-transformed total business volume (or total assets) of a credit institution is a very good surrogate for calculating concentration measures based on audit fees.

[1] This chapter is based on a study titled "Kreditinstitute und die Konzentration des deutschen Marktes für Abschlussprüferleistungen" (Leidner and Lenz 2013), which is co-authored by Hansrudi Lenz.

[2] The analyses of Sipple (2013) and Sipple (2014) were not included in the study of Leidner and Lenz (2013) and, therefore, are not addressed in this chapter. Both analyses were published after the original study of Leidner and Lenz (2013), and they do not offer additional insights into this topic. Moreover, the samples examined in Sipple (2013) and Sipple (2014)—which cover the years 2009 and 2010—and, thus, the concentration figures might be biased (see also Footnote 18, p. 18).

However, other commonly used surrogates could also be reasonably employed. Furthermore, it is demonstrated that the audit market for credit institutions (excluding savings banks and cooperative banks) pursuant to the Banking Act (Kreditwesengesetz, KWG) was highly concentrated in 2006 and 2010, which finding is consistent with the views of the European Commission (2011, 3). In addition, historical and theoretical arguments as well as empirical evidence suggest that a continuous concentration process has prevailed in the audit market over the past century. The recent evidence of this study, however, indicates a notable trend toward neither higher levels of concentration nor deconcentration.

The remainder of this chapter is structured as follows: The next section briefly discusses the regulatory background in Germany. The following section presents the research method applied (i.e., the concentration measures examined), a literature review, the development of a set of prognoses, a description of the data analyzed, and the empirical results. The final section of the chapter concludes the study.

2.2 Regulatory Background

2.2.1 A Note on the German Credit Institution Sector

In 2010, the German banking sector consisted of approximately 1,900 credit institutions (Deutsche Bundesbank 2010, 85–89; Hartmann-Wendels et al. 2010, 29–45), and the majority operate as universal banks. Additionally, the German banking system is characterized by its three-pillar structure, which includes private banks, savings banks and cooperative banks. Interestingly, the primary objective of savings banks and cooperative banks is not profit maximization; for instance, one aim of cooperative banks is instead to provide their members with financial support. Moreover, these credit institutions are subject to specific regulations (e.g., § 340k (2)–(3) Commercial Code, Handelsgesetzbuch, HGB). Therefore, this study focuses on the first pillar of the German banking system, i.e., private banks, as well as Landesbanks and specialist banks, and the following discussion is concerned only with such institutions.

2.2.2 Requirements Regarding Statutory Audits and the Disclosure of Audit Fees

Special requirements regarding the auditing of credit institutions have existed since the creation of the auditing profession (e.g., Grothe 2005, 13; Koch 1957, 25–29).

Currently, credit institutions are subject to statutory audits regardless of their legal form, their size, or whether they are branch offices of foreign institutions (§ 340k (1) HGB, § 53 (1) KWG).[3] The appointment of an auditor follows the general requirements of §§ 318–319b HGB (IDW 2012b, 1084). Moreover, special requirements must also be considered (e.g., § 340k (1), (4) HGB, § 28 (1), (2) KWG). For example, if the appointed auditor has no industry specialist knowledge and, thus, cannot fulfill the objective of the audit, the Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin) may request the appointment of a different auditor (§ 28 (1), (2) KWG; IDW 2006; IDW 2012b, 1085; Lenz 1996b, 314).

Disclosures concerning audit fees in Germany have been required since 2005 (i.e., for fiscal years beginning after 31st December 2004). The Accounting Law Reform Act (Bilanzrechtsreformgesetz) introduced, among others, § 285 Sentence 1 No. 17 HGB for individual financial statements and § 314 (1) No. 9 HGB for consolidated financial statements, which set out the requirements for audit fee disclosure (cf. Biener 2005).[4] The predominant objective was to establish a minimum level of information regarding audit fees that should be available to a firm's stakeholders as an indicator (e.g., the ratio of non-audit to audit fees) of the client-auditor economic bond. Moreover, the disclosed information should indirectly empower the auditor's objectivity, integrity and (perceived) independence (Deutscher Bundestag 2004, 25–26). Because the regulatory requirements for individual financial statements and those for consolidated financial statements do not considerably differ, the following discussion only briefly addresses the audit fee disclosure requirements for consolidated financial statements (Deutscher Bundestag 2004, 33). Parent companies listed on a regulated market (§ 2 (5) Securities Trading Act, Wertpapierhandelsgesetz) were required to disclose their total audit fess, and exemption rules depending on size were not in place because of the restricted legal scope of the article (§ 267 (3) Sentence 2 HGB). The total fees were required to be broken down into audit fees, audit-related fees, tax fees and other fees (§ 314 (1) No. 9 HGB). These fees consisted of both fees referring to the parent company's individual financial statement and fees concerning consolidated accounts (Zülch et al. 2010, 399). They included the total amounts paid—with the exception of Value-Added Tax and

[3] Exemptions are not possible except for branches established in Germany with a head office in another European Economic Area country (§§ 340 (1), 340l (2) HGB).

[4] See, for example, Bigus and Zimmermann (2009), Lenz et al. (2006), Zimmermann (2008) and Zülch et al. (2010) for further empirical studies.

possible claims for damages—for the parent company's auditor and its affiliated companies (§ 271 (2) HGB; not including the audit firm's networks; IDW 2005, 1233). At the same time, the amounts disclosed covered the expenditures of the parent company and its subsidiaries (§ 290 HGB, IAS 27.4, SIC-12) but not those of non-consolidated companies (e.g., § 296 HGB), associated companies or companies subject to § 313 (2) No. 4 HGB (IDW 2005, 1233–1234). Furthermore, because the invoice for an audit is typically issued after the fiscal year-end date, companies were required to disclose audit-fee-related accruals (§ 252 (1) No. 5 HGB) such that the expenditures were related to their corresponding fiscal years. By contrast, all other fees (§ 314 (1) No. 9 b–d HGB) were disclosed at the moment of the rendering of the related service (e.g., Köhler et al. 2010, 8). It could be expected that this difference would have had a negative impact on the informational value of audit fee disclosures. Eventually, if a disclosure were not made, an administrative fine (of up to 50,000 €) could have been imposed (§ 334 HGB, § 17 Act on Regulatory Offences, Gesetz über Ordnungswidrigkeiten). The disclosure requirements of §§ 285 Sentence 1 No. 17, 314 (1) No. 9 HGB changed in 2009 because of the introduction of the German Act to Modernize Accounting Law (Bilanzrechtsmodernisierungsgesetz, BilMoG). First, it should be emphasized that the BilMoG extended the scope of application of § 264 HGB to now include all credit institutions (exemptions: §§ 288, 267 (1), (2) HGB; Deutscher Bundestag 2008, 70, 85). Furthermore, subsidiaries need not disclose audit fee information if the parent company includes all of its subsidiary-related audit fees in its consolidated financial statement disclosure (§ 285 Sentence 1 No. 17 HGB; Deutscher Bundestag 2009, 88), which is in opposition to an improvement in the informational value of fee disclosures, and thus, at least "thereof" information should be provided (IDW 2010, 59–61). From the BilMoG's draft law (Deutscher Bundestag 2008, 70), it can additionally be concluded that non-audit fees of audit firm's subsidiaries should no longer be included in fee disclosures, although the IDW (2010, 59–61) recommends the disclosure of those fees. The previously noted problem concerning the time difference between the disclosures of audit fees and all other fees should have been made obsolete, because the German requirements have been similar to Article 43 (1) No. 15 of the EC Accounting Directive (as amended by Directive 2006/43/EC) since 2009. Nevertheless, this problem might persist if the corresponding accruals differ from the invoice amounts of the audit fees. In such cases, Zülch et al. (2010, 398) encourage the provision of "thereof" information in the notes if material differences (more than five percent)

are present. No other major changes were made; the reader is thus referred to the relevant legal commentary (e.g., IDW 2010, IDW 2012b, 774–777, IDW 2013).

2.3 Concentration Measures, Literature Review, Prognoses, Data and Empirical Results

2.3.1 Overview of Concentration Measures

This study focuses on the audit market and, therefore, on audit firms as defined by VO 1/2006, No. 8 (IDW, 2006). A wide range of concentration metrics exist; however, only a few are regularly used to analyze market structures (e.g., Bundeskartellamt 2012, 9, 13; OECD 2010, 202; Velte and Stiglbauer 2012, 153–154, 156–158). The three most popular concentration measures—i.e., the Concentration Ratio (CR; Means 1939), the Herfindahl-Hirschman Index (HHI; Herfindahl 1950; Herfindahl 1963; Hirschman 1945) and the Gini coefficient (G; Gini 1912)—and the exponential index (EXP; Marfels 1971b, 758) are employed in the following. A summary overview of all four measures is presented in Table 2.1.

Table 2.1: Overview of the Examined Concentration Measures

	$\mathbf{CR_m}$	**HHI**	**EXP**	**G**
		Formula		
	$\sum_{j=1}^{m} s_j$	$\sum_{i=1}^{n} s_i^2$	$\prod_{i=1}^{n} s_i^{s_i}$	$\frac{1}{n}(2\sum_{j=1}^{n}(js_j)-1)-1$
		Minimum and Maximum Values		
	$[m/n;1]$	$[1/n;1]$	$[1/n;1]$	$[0;(n-1)/n]$
		Level of Concentration		
Low	–	$HHI < 0.100$	$EXP < 0.066$	$G < 0.400$
Medium	–	$0.100 \leq HHI \leq 0.180$	$0.066 \leq EXP \leq 0.119$	$0.400 \leq G \leq 0.600$
High	$CR_2 \geq 0.500$	$HHI > 0.180$	$EXP > 0.119$	$G > 0.600$

Note: This table presents an overview of the concentration measures examined in this study. The classification of the values of the concentration measures into low, medium and high levels of concentration is based on Häni (1987, 247–264) and § 18 (6) of the Act against Restraints of Competition (Gesetz gegen Wettbewerbsbeschränkungen). However, the thresholds are not theoretically established fixed values and may differ in other studies (e.g., ESCP 2011, 18). CR_m denotes the concentration ratio (CR_2: based on the 2 largest audit firms). HHI represents the Herfindahl-Hirschman Index. EXP denotes the exponential index. G stands for the Gini coefficient. j represents the rank of x_i, sorted in descending order: $x_1 \geq x_2 \geq \ldots \geq x_n$. m denotes the number of largest audit firms considered in a sample: $m \leq n$. n is the total number of audit firms in a sample. s_i represents the market share of the i-th audit firm in a sample: $s_i = \frac{x_i}{\sum_{k=1}^{n} x_k} \forall i = 1, \ldots, n$, where $0 < s_i \leq 1$ and $\sum_{i=1}^{n} s_i = 1$; the same applies for s_j. x_i is the statistical unit (e.g., the aggregated sales of the i-th audit firm); the same applies for the index k.

Introduced by Means (1939, 281–283), the CR is one of the oldest and probably the most well-known concentration measure. For an audit market of interest with n

audit firms i ($i = 1, 2, ..., n$), the CR is defined as the sum of the market shares of the m largest audit firms (s_i). It is defined as follows (e.g., Helmenstein 1996, 43):

$$CR_m = \sum_{j=1}^{m} s_j \tag{2.1}$$

Although the thresholds are somewhat subject to debate and depend on the purpose of the analysis, according to § 18 (6) of the Act against Restraints of Competition (Gesetz gegen Wettbewerbsbeschränkungen), values of CR_2 that are greater or equal to 0.500 might indicate the existence of dominant firms. The CR is easy to calculate and intuitive to interpret. Thus, the German 'Guidance on Substantive Merger Control' document states that the CR "provide[s] important indications of the magnitude of market power [...]. An assessment of [the CR] also provides a rough proxy at the beginning of the examination as to whether a merger could be potentially problematic and whether it is likely to require further investigation." (Bundeskartellamt 2012, 9) Nevertheless, in addition to other shortcomings (e.g., Marfels 1977, 49–52), the CR provides limited information based on only the largest audit firms.

Because of this shortcoming, market concentration studies typically also employ another summary measure: the HHI (Herfindahl 1950; Herfindahl 1963; Hirschman 1945). In contrast to the CR, the HHI considers all audit firms in an audit market of interest, as follows (e.g., Paschen and Buyse 1971, 9–10):

$$HHI = \sum_{i=1}^{n} s_i^2 \,, \tag{2.2}$$

i.e., the sum of the squares of the audit firms' market shares. Values of the HHI below 0.100 imply non-concentrated markets. Values of the HHI between 0.100 and 0.180 indicate moderately concentrated markets, and HHI values above 0.180 point to highly concentrated markets (Häni 1987, 247–264).

Apart from the CR and HHI, many other absolute concentration measures exist (e.g., Horvath 1970; Linda 1976; Schmalensee 1977); however, these are often mathematical modifications of the HHI. Thus, only one further absolute concentration measure is considered in this study, namely, EXP, which is related to the entropy (e.g., Marfels 1971c, 74–75). EXP is defined as follows:

$$EXP = \prod_{i=1}^{n} s_i^{s_i} \tag{2.3}$$

EXP is employed in this study because it allows for disaggregation. Therefore, it permits one to analyze, for instance, how mergers influence the concentration level

of a certain market (e.g., Marfels 1971a, 487; Marfels 1971c, 76). If EXP values below 0.066 are observed, such findings indicate low levels of market concentration. Values between 0.066 and 0.119 suggest medium concentration levels, and EXP values greater 0.119 signify highly concentrated markets (Häni 1987, 247–264).

In addition to the absolute concentration measures of the CR, the HHI, and EXP, a measure of inequality is introduced.[5] G is regarded as an inequality metric (Gini 1912), and mathematically, it is based on the Lorenz curve (Lorenz 1905; Piesch 1975, 21–112). G is equal to the area between the Lorenz curve and the line of equality (the line at 45°) divided by the area under the line at 45°. It can be mathematically represented as follows (e.g., Ceriani and Verme 2012, 423):

$$G = \frac{1}{n}(2\sum_{j=1}^{n}(js_j) - 1) - 1 \tag{2.4}$$

A market is assumed to be moderately (relatively) concentrated if G is between 0.400 and 0.600. Values of G below 0.400 imply low levels of inequality, and G values above 0.600 indicate that high levels of inequality are present (Häni 1987, 247–264).

Ultimately, it could be of interest to analyze the concentrations at different points in time. This study considers the percentage change in a given concentration measure (CM), which can be formulated as follows:

$$\Delta CM_{it_1t_2} = \frac{CM_{it_2}}{CM_{it_1}} - 1 \tag{2.5}$$

2.3.2 Literature Review

The European Commission has regularly criticized highly concentrated audit markets (e.g., European Commission 2011, 3, 20, 65). Nevertheless, high levels of concentration has been observed for many years (e.g., Grothe 2005, 67–73; Möller and Höllbacher 2009, 657; Velte and Stiglbauer 2012, 153–154, 156–158).

Concerning related research in Germany, Schruff (1973, 67–79, 89–99) could be regarded as the spiritus rector. His study included 2,341 annual financial statements for the 1967/1968 fiscal year, and it revealed that the German audit market was markedly concentrated (with a $G_{1968/1969}$ value of 0.860). After his study, approximately 30 additional analyses have been published, which, taken together, also

[5] It might be arguable whether an inequality metric is a meaningful measure to consider when questions regarding the concentration of businesses are to be answered (Paschen and Buyse 1971, 2).

demonstrate that the German audit market has remained highly concentrated and that concentration levels have steadily increased (e.g., Albach 1976; ESCP 2011; Fischkin 2012; Köhler et al. 2010; Marten and Schultze 1998; Möller and Höllbacher 2009; Quick et al. 1998; Sattler 2011; Wild and Scheithauer 2012).

However, the majority of these studies exclude the audit markets for credit institutions and insurance companies; instead, they focus solely on audit markets for industrial companies. This is justified by two factors: First, the financial sector is subject to stronger regulation than other industries (e.g., König 1976, 318; Lenz 1996b, 313–314, 316–317). In addition to regulations formulated specifically for such firms, e.g., the KWG or the Investment Code (Kapitalanlagegesetzbuch), Book 3 of the HGB demands more stringent requirements for financial firms. Second, the financial statements of credit institutions and insurance companies are systematically different from those of industrial companies. This fact in particular has led many authors to exclude financial firms from their investigations because they expect calculations of the concentration levels to yield biased results (e.g., Bigus and Zimmermann 2008, 163; König 1976, 319). Indeed, this reasoning was justified in view of the fact that until 2004, it was necessary to use surrogates for audit fees—e.g., a client's total assets—to calculate concentration measures because audit fee data became publicly available only for fiscal years starting after 31st December 2004 (§§ 285 Sentence 1 No. 17, 314 (1) No. 9 HGB). By the same token, however, for studies after this date, this concern might no longer be an issue.

Nevertheless, a few studies (Bigus and Zimmermann 2008, 168; Ernsting 1997, 60–66; Gloßner 1998, 217; Grothe 2005, 270–275; König 1976, 318; Küting et al. 2003, 318; Lenz 1996b, 315; Lenz 1997, 9; Lenz 1998, 9–10; Lenz and Ostrowski 1999, 298–399; Petersen and Zwirner 2007, 1741; Strickmann 2000, 250) have examined the concentration levels of the audit market for German credit institutions. However, most of the investigated samples have consisted of fewer than 100 credit institutions. Thus, the results offer limited informational value. Only three studies (Grothe 2005, 270–275; Lenz 1996b, 315; Lenz 1997, 9; Lenz 1998, 9–10) have examined this audit market in a convincing way. Table 2.2, p. 12, shows a selection of the results from those studies, which document a highly concentrated market (in terms of absolute concentration) and a slight trend of concentration (CR_2, HHI) between the years of 1990 and 2000, if, for instance, the untransformed total assets are considered and biases from the different sample sizes are neglected.

Table 2.2: Selection of Studies Examining the Concentration of the Audit Market for German Credit Institutions

Fiscal Year	CR_2	**HHI**	**G**	**Study**	**Sample**
1990	0.4973 (NOC) 0.7824 (TA) 0.6563 ($\sqrt{TA}$)	–	–	Lenz (1996b)	178 credit institutions (German legal form "Aktiengesellschaft")
1994	0.4725 (NOC) 0.7891 (TA) 0.6513 ($\sqrt{TA}$)	0.1370 (NOC) 0.3494 (TA) 0.2376 ($\sqrt{TA}$)	0.7752 (NOC) 0.9366 (TA) 0.8868 ($\sqrt{TA}$)	Lenz (1997) and Lenz (1998)	430 credit institutions
1996	0.5620 (NOC) 0.8240 (TA) 0.6970 ($\sqrt{TA}$)	0.1840 (NOC) 0.3620 (TA) 0.2640 ($\sqrt{TA}$)	0.7310 (NOC) 0.8900 (TA) 0.8300 ($\sqrt{TA}$)	Grothe (2005)	225 credit institutions
1998	0.5930 (NOC) 0.8520 (TA) 0.7260 ($\sqrt{TA}$)	0.2030 (NOC) 0.3830 (TA) 0.2850 ($\sqrt{TA}$)	0.7490 (NOC) 0.8900 (TA) 0.8390 ($\sqrt{TA}$)	Grothe (2005)	225 credit institutions
2000	0.6020 (NOC) 0.8520 (TA) 0.7290 ($\sqrt{TA}$)	0.2100 (NOC) 0.3850 (TA) 0.2880 ($\sqrt{TA}$)	0.7360 (NOC) 0.8760 (TA) 0.8210 ($\sqrt{TA}$)	Grothe (2005)	225 credit institutions

Note: This table presents a selection of the results of the following concentration studies: Lenz (1996b), Lenz (1997), Lenz (1998), and Grothe (2005). CR_2 denotes the concentration ratio (based on the 2 largest audit firms). HHI represents the Herfindahl-Hirschman Index. EXP denotes the exponential index. G stands for the Gini coefficient. NOC represents the number of clients. TA stands for total assets.

2.3.3 Prognoses

The current high concentration levels of the audit market for German credit institutions might be explained in terms of three (interrelated) lines of reasoning: historical circumstances combined with the effects of reputation and specialization, the regulatory environment, and the market structure of credit institutions in Germany.

First, historical circumstances combined with the effects of reputation and specialization might determine the concentration of this audit market as follows: The audit market for credit institutions is dominated by KPMG AG WPG (KPMG) and PricewaterhouseCoopers AG WPG (PWC). Both audit firms are historically based on subsidiaries founded by credit institutions (e.g., IDW 1956, 22; Schuld 1965, 11–51)—the Deutsch-Amerikanische Treuhand-Gesellschaft (KPMG) and the Treuhand-Vereinigung-Aktiengesellschaft (PWC).[6] Given that those audit firms were originally owned by credit institutions, it could be assumed that historical reputation effects might lead to the preferred appointment of KPMG and PWC as

[6] It should be emphasized that this discussion refers to the *German* legal entities of KPMG and PWC.

auditors by other credit institutions (e.g., Hogan and Jeter 1999, 12; Palmrose 1986, 104–105; Strickmann 2000, 299–300; Weber et al. 2008, 970). Such reasoning is also supported by the results of London Economics (2006, 36), which show that an audit firm's reputation is the most important competition factor in the audit industry. Moreover, a relationship might exist between the (historically conditioned) reputations of KPMG and PWC and their development to become market-leading specialists for audits of credit institutions. For instance, Marten (1995, 711, 717) reveals that for some industries—such as the financial industry—status as a specialist holds a certain significance in auditor appointment. In addition, specialists are presumed to provide higher audit quality (e.g., Dunn and Mayhew 2004, 55; Francis 2004, 354–355; Francis 2011, 137; Taylor 2000, 708), and higher (perceived) audit quality results, ceteris paribus (c.p.), in higher demand for an audit firm (e.g., DeFond 1992, 16; Francis and Wilson 1988, 663–664; Solomon et al. 1999, 192). In addition, KPMG and PWC are among the oldest audit firms in Germany (e.g., Ludewig 1955, 133), and mergers and acquisitions have strengthened their positions in the market (e.g., Strickmann 2000, 296–297), which, simultaneously, has enabled both firms to take advantage of economies of scale and synergies. If one assumes that the audit market of interest is characterized by price inelasticity of demand, price competition and a constant market volume, then economies of scale lead to increasing optimal audit firm sizes, a decreasing number of audit firms, and, finally, higher levels of market concentration (e.g., Banker et al. 2003, 257, 274; Bigus and Zimmermann 2009, 1296, 1299; Eichenseher and Danos 1981, 486; Köhler et al. 2010, 20, 22–23; Shockley and Holt 1983, 548, 556, 560; Wild 2010, 523–524).

Second, the effects of the regulatory environment can be summarized as follows: The financial industry is one of the most highly regulated industries worldwide (e.g., Hummler 2008).[7] This also has an impact on the auditing of those firms because, amongst others, the scope of such an audit is extended (IDW 2012b, 929–1193). Furthermore, the importance of industry-specific knowledge is emphasized if, for instance, the categorization of financial instruments, the valuation of various positions in a credit institution's balance sheet and its disclosure are to be audited (VO 1/2006, No. 84, 85; IDW 2006). These factors, in turn, might determine the concentration of the audit market as follows: The extended (legal) requirements on audits of credit institutions considerably increase market-entry barriers for new

[7] See, for example, Benston (1985, 53–62) and Dunn and Mayhew (2004, 37–40) for an explanation of why auditors and other stakeholders might be interested in regulation.

competitors, thereby contributing to higher concentration levels.[8] To offer audits of credit institutions, (continuing) investment in specialist knowledge is required of audit firms. In this context, economies of scale become increasingly relevant (e.g., Danos and Eichenseher 1982, 612–613; Eichenseher and Danos 1981, 486–487; Hogan and Jeter 1999, 8); as mentioned previously, this might lead to an increase in the optimal size of audit firms and higher levels of market concentration. Furthermore, the regulatory environment necessitates greater interaction between the auditor, the management board, the supervisory board and government authorities. The presence of a smaller number of suppliers on the audit market decreases cooperation costs, which also promotes a concentrated market structure (e.g., Lenz 1998, 15–16).

Third, the market structure of credit institutions in Germany might affect the concentration of the related audit market. The market structure of the clients, i.e., German credit institutions, is necessarily a relevant factor (e.g., Eichenseher and Danos 1981, 487; Schaen and Maijoor 1997, 160). Audits can typically be regarded as following a 1-client-1-supplier relationship, which means that an audit is performed by only one auditor (with the exception of joint audits).[9] By contrast, mergers and acquisitions typically involve multiple legal, accounting, auditing and consulting firms—i.e., a 1-client-N-supplier relationship. Thus, the concentration of an audit market is closely related to the market structure of the clients. The German financial industry has tended to be highly concentrated (e.g., Breitmeyer 2002, 19–35; European Central Bank 2010, 36; Monopolkommission 1977, 191–244), which might, in part, explain the high concentration levels of the corresponding audit market.

It can be concluded that the high concentration levels of the current audit market for German credit institutions might be partially explained by the historically conditioned reputations of KPMG and PWC. Moreover, the demand for specialists might lead to the appointment of only a few large audit firms. Furthermore, under the assumptions of price inelasticity of demand, price competition and constant market volume, high levels of concentration will tend to occur because of the importance of economies of scale: larger audit firms will have lower average audit costs,

[8] Thus, changing an auditor becomes more difficult, if not impossible, because of the limited supply substitution (Buijink et al. 1996, 117).

[9] Joint audits are not of great importance in this audit market, as revealed by the marginal demand for them; see also section 2.3.4, p. 16.

which will result in higher levels of concentration (e.g., Banker et al. 2003, 261–262; London Economics 2006, 38–39).

Based on these lines of reasoning, three prognoses can be stated. First, it is assumed that the drivers of market concentration have not changed since the most recent studies. Thus, the audit market for credit institutions is expected to be highly concentrated, and the first prognosis is as follows:

P1: *The audit market for German credit institutions was highly concentrated in 2006 and 2010.*

Second, a review of the literature reveals that the empirical evidence suggests that the audit market is characterized by the duopolistic dominance of KPMG and PWC. Therefore, the following can be expected:

P2: *The audit market for German credit institutions was dominated by KPMG and PWC in 2006 and 2010.*

Third, an ongoing trend of concentration has been observed over the past century, and the reasoning presented in this section suggests that the audit market's level of concentration might have further increased. Therefore, the final prognosis reads as follows:

P3: *The level of concentration of the audit market for German credit institutions increased between 2006 and 2010.*

2.3.4 Data

The sample consists of German credit institutions (excluding savings and cooperative banks) pursuant to the KWG.[10] The bank-specific data were obtained from Bankscope, Bureau van Dijk, and all audit-related data (e.g., audit firms, audit fees) were manually collected by analyzing the corresponding publications of financial reports in the German Company Register.[11] The sample covers the years of 2006 and 2010.[12]

The initial Bankscope sample consists of data for 310 credit institutions in 2006 and 305 in 2010.[13] This sample decreases by two credit institutions in 2006 and five credit institutions in 2010 because these institutions did not publish financial reports in the German Company Register. Moreover, two credit institutions in 2006 and one credit institution in 2010 were not required to publish financial reports in the German Company Register because they exercised their right to exemption (§ 264 (3) No. 1 HGB). Furthermore, six joint audits occurred in 2006 and two in 2010. In these cases, to calculate the market shares based on surrogates (e.g., the total assets of the credit institutions), the surrogates for each credit institution of interest are divided equally between the two auditors of the corresponding joint audit (cf. Lenz 1997, 9). In total, the final sample (2006 and 2010) includes 613 firm-years.

In 2006, 261 of the 312 credit institutions prepared their financial statements in accordance with the HGB instead of the International Financial Reporting Standards (IFRS).[14] Four years later, this proportion marginally decreased to 83.39%. Only a

[10] Asset management companies (Kapitalanlagegesellschaften) and self-managed investment stock corporations (Investmentaktiengesellschaften) are also excluded from the sample because of significant regulatory changes concerning those undertakings that took effect in 2007 (cf. Act Amending the German Investment Act, Investmentänderungsgesetz).

[11] Because of difficulties in the interpretation of German clauses and to ensure a high degree of comparability among the audit fees of different credit institutions, the reported audit fees have been partially adjusted. The audit fees included in the analysis do not involve fees for (international) networks of audit firms. If necessary, the fees have been reduced by the Value-Added Tax. In addition, it should be noted that after 2008, the audit fees published by KPMG are not fully comparable to the published fees of other German auditors (Wild and Scheithauer 2012, 188). For further problems related to the disclosure of audit fees, see Kirsch et al. (2013).

[12] Although audit fees have been published since 2005, the majority of financial reports in the German Company Register have only been available since 2006. Thus, the year 2006 was chosen instead of 2005.

[13] The 2010 sub-sample, for instance, comprises approximately 82.21% of all authorized credit institutions, as published by Deutsche Bundesbank (2012, 104) (excluding savings and cooperative banks).

[14] In the following statistics, the clients of joint audit engagements are included twice.

few of those credit institutions presented consolidated financial statements (25 credit institutions in 2006 and 23 in 2010). The sample includes, in total, 73 (2006) and 71 (2010) consolidated financial statements. Note that when a credit institution was required to publish both financial statements and consolidated financial statements, the audits of both types of statements are interpreted as a single audit engagement (Lenz 1996a, 273–274).[15]

The previously described concentration measures are calculated using the audit fees (AF), total fees (TF) and number of audit clients (NOC). In addition, the untransformed total assets (TA) of each client and the square root of the TA are also typically used (e.g., Lenz 1997, 11; Velte and Stiglbauer 2012, 153–154). Moreover, a credit institution's total business volume (TBV) is regularly employed in the calculations performed in studies examining the market concentration of credit institutions (e.g., Monopolkommission 1977, 200). The TBV includes, in addition to the TA, further off-balance-sheet items such as credit risk exposures resulting from the utilization of irrevocable loan commitments.[16] Thus, the untransformed TBV and the square root of the TBV are also considered.[17]

2.3.5 Empirical Analyses

2.3.5.1 Concentration Analysis of the Audit Market for German Credit Institutions Based on Audit Fees and Total Fees

The sample of 312 credit institutions in 2006 and 301 in 2010 decreases significantly if only credit institutions that publish AF data are considered. The difference between the remaining numbers of credit institutions in 2006 and 2010—89 and 240, respectively—can be attributed to the amendments made to the HGB in 2009.

As shown in Table 2.3, p. 19, CR_2 as calculated based on AF was equal to 0.8925 in 2006 and 0.8278 in 2010. PWC was the market leader in 2006, and four years later,

[15] The following statistics do not consider parent-subsidiary relationships (Boo and Sharma 2008, 34). However, the bias from disregarding group structures should be marginal, as revealed by control checks.

[16] Bankscope defines the TBV as follows: managed securitized assets reported off the balance sheet plus other off-balance-sheet exposure to securitizations plus guarantees plus acceptances and documentary credits reported off the balance sheet plus committed credit lines plus other contingent liabilities plus the TA.

[17] Concentrations measured based on the clients' sales are not considered in this study because credit institutions do not generate sales but rather interest and similar income as well as income from commissions and fees. Concentration measures based on net interest income were also calculated; however, the discussed audit fee surrogates are clearly superior to the net interest income measure (cf. Köhler et al. 2010, 14), and thus, the results are not reported for brevity.

the largest market share belonged to KPMG. Based on the market shares of all other audit firms, this audit market can be characterized as an oligopoly. For instance, the distribution of the market shares of the Big 4 in 2010 was as follows: 46.14% KPMG, 36.65% PWC, 10.17% Ernst & Young GmbH WPG (E&Y) and 3.94% Deloitte & Touche GmbH WPG (DT). The Big 4 clearly dominated the audit market, with a combined market share of 96.90%.[18] With the market share (1.38%) of BDO AG WPG (BDO) also included, the combined market share was equal to 98.28%, and the market share of the remaining 22 audit firms was 1.72%.[19] A comparison of the combined market shares of the Big 4 and BDO between the audit market for German public-interest entities (§ 319 HGB; 713 audits in 2010) and that for credit institutions reveals that the latter market was more concentrated (98.28%) than the market for public-interest entities (95.6%; WPK 2011, 24, 26). However, it should be noted that although the audit market for credit institutions a priori requires more specialized auditors, the higher observed concentration level might also arise from other causes not analyzed in this study. The values of the absolute concentration measures $HHI_{AF;2006}$ (0.4025) and $HHI_{AF;2010}$ (0.3593) as well as those of $EXP_{AF;2006}$ (0.3296) and $EXP_{AF;2010}$ (0.2850) also indicate high levels of concentration ($HHI > 0.180$, $EXP > 0.119$; cf. Table 2.1, p. 8). This observation also applies for the measure of inequality, i.e., G, which was equal to 0.8042 in 2006 and 0.8967 in 2010.

[18] This figure is higher than that of Sipple (2014, 744), who observed a combined market share of 91.74% for the Big 4 in 2010. The results of Sipple (2014) are, however, expected to be biased downward because the sample does not include data for two large credit institutions (i.e., Deutsche Bank AG and Commerzbank AG), which were audited by KPMG and PWC. This is not disclosed in Sipple (2014, 742), but it can be concluded from the discussion in Sipple (2013, 219–220). If Deutsche Bank AG and Commerzbank AG are similarly eliminated from the current study's sample, CR_2 is equal to 74.77%. This also indicates that the findings of Sipple (2014) might simultaneously be upward biased because of the small sample considered. See also section 2.3.5.3, p. 21.

[19] In 2006, the ten largest audit firms included PWC, KPMG, E&Y, BDO, DT, Clostermann & Jasper Partnerschaft WPG StBerG, Susat & Partner oHG WPG, FIDES Treuhandgesellschaft KG WPG StBerG, DGR Deutsche Genossenschafts-Revision WPG GmbH, and MAZARS Revision & Treuhandgesellschaft mbH WPG; in 2010, they were KPMG, PWC, E&Y, DT, BDO, Susat & Partner oHG WPG, Clostermann & Jasper Partnerschaft WPG StBerG, Ebner Stolz Mönning Bachem GmbH & Co. KG WPG StBerG, Kruse (sole practitioner), and BANSBACH SCHÜBEL BRÖSZTL & PARTNER GMBH WPG StBerG.

Table 2.3: "Audit Fees and Total Fees" Sample

	Basis	**2006** ($n = 89$; 13 Audit Firms)	**2010** ($n = 240$; 27 Audit Firms)
CR_2	AF	0.8925	0.8278
	TF	0.9034	0.8426
HHI	AF	0.4025	0.3593
	TF	0.4123	0.3674
EXP	AF	0.3296	0.2850
	TF	0.3407	0.2969
G	AF	0.8042	0.8967
	TF	0.8118	0.8994
Market share (%) based on AF	PWC	45.23	36.65
	KPMG	44.03	46.14
	E&Y	5.79	10.17
	BDO	1.92	1.38
	DT	1.80	3.94
	Others	1.23	1.72

Note: This table presents the results of the concentration analysis of the audit market for German credit institutions based on audit fees and total fees in 2006 and 2010. CR_2 denotes the concentration ratio (based on the 2 largest audit firms). HHI represents the Herfindahl-Hirschman Index. EXP denotes the exponential index. G stands for the Gini coefficient. AF stands for audit fees. TF stands for total fees. PWC is the abbreviation for PricewaterhouseCoopers AG WPG. KPMG is the abbreviation for KPMG AG WPG. E&Y is the abbreviation for Ernst & Young GmbH WPG. DT is short for Deloitte & Touche GmbH WPG. BDO is short for BDO AG WPG.

The concentration measures based on TF are generally higher than those calculated using AF. Thus, the analysis based on the sum of the audit and non-audit fees implies higher concentration levels. The market share ranking in 2010 changes at the ninth audit firm (in descending order). In 2006, PWC is still the market leader (47.49%), and the market share of KPMG decreases to 42.85%.

A comparison of the two years in terms of absolute concentration measures implies a trend of deconcentration. By contrast, G increased between 2006 and 2010. However, such a comparison is not meaningful because the sub-samples for the two years differ significantly. Therefore, the following section first analyzes which surrogate best approximates the presented results, and subsequently, the change in concentration levels between 2006 and 2010 is re-examined.

2.3.5.2 Surrogates for Audit Fees

The German regulatory environment dictates that surrogates must still be used to calculate concentration measures to examine the audit market in a comprehensive

way. This, however, raises the question of which surrogate is the best. To determine the answer, the larger 2010 sub-sample (240 credit institutions; 27 audit firms) is analyzed again, and the results for the surrogates are compared with those calculated based on AF.

Table 2.4: 2010 "Audit Fees" Sub-sample ($n = 240$; 27 Audit Firms)

Row	**Basis**	**CR_2**	**HHI**	**EXP**	**G**
1	AF	0.8278	0.3593	0.2850	0.8967
2	NOC	0.4792	0.1618	0.1102	0.7272
3	TA	0.8623*	0.3898	0.3240	0.9097
4	$\sqrt{\text{TA}}$	0.6996	0.2750	0.2133	0.8652
5	(Row 3+Row 4)/2	0.7809	0.3324	0.2686	0.8875*
6	TBV	0.8665	0.3937	0.3272	0.9106
7	$\sqrt{\text{TBV}}$	0.7009	0.2750	0.2119	0.8641
8	(Row 6+Row 7)/2	0.7837	0.3344*	0.2695*	0.8873

Note: This table presents the results of the concentration analyses of the audit market for German credit institutions based on audit fees, number of clients, total assets and total business volume in 2010. CR_2 denotes the concentration ratio (based on the 2 largest audit firms). HHI represents the Herfindahl-Hirschman Index. EXP denotes the exponential index. G stands for the Gini coefficient. AF stands for audit fees. NOC represents the number of clients. TA stands for total assets. TBV stands for total business volume. * indicates the minimum difference with respect to the corresponding AF-based value.

The results shown in Table 2.4 reveal that CR_2, HHI and EXP always indicate high levels of concentration except for the measures calculated based on NOC. These sector-specific findings support the conclusions of Moizer and Turley (1987, 120).[20] On the one hand, the NOC-based concentration measures are always lower than those calculated using AF. On the other hand, the untransformed surrogates of TA and TBV regularly determine an upper bound when calculating the audit market concentration, whereas the square-root-transformed surrogates consistently underestimate the AF-based concentration values. This being the case, the arithmetic mean of an untransformed surrogate (i.e., the upper bound) and its square root (i.e., the lower bound) might best approximate the AF-based concentration. Therefore, Table 2.4 also presents the arithmetic mean of the untransformed TA and its square root (row 5) as well as that of the untransformed TBV and its square root (row 8). Moreover, in Table 2.4 the surrogates that show the minimum difference compared with the AF-based values are indicated with a star. In three of the four cases, such arithmetic-mean-based surrogates are the best approximations of the AF-based concentration measures, whereas CR_2 is best approximated by the untransformed TA.

[20] Although the reasoning of Moizer and Turley (1987, 120) refers to concentration measures based on clients' sales, similar arguments should also apply for TA and TBV (e.g., Lenz 1996a, 274–275).

In addition, Table 2.5 presents a correlation matrix of the surrogate-based and AF-based concentration measures based on AF for the 2010 sub-sample. The untransformed and square-root-transformed surrogates of TA and TBV also approximate the AF-based concentration measures quite well.[21]

Table 2.5: Correlation Matrix for the 2010 "Audit Fees" Sub-sample

	AF	NOC	TA	$\sqrt{\text{TA}}$	TBV	$\sqrt{\text{TBV}}$
AF	1.0000					
NOC	0.9096	1.0000				
TA	0.9987	0.8919	1.0000			
$\sqrt{\text{TA}}$	0.9711	0.9667	0.9587	1.0000		
TBV	0.9983	0.8889	1.0000	0.9564	1.0000	
$\sqrt{\text{TBV}}$	0.9726	0.9659	0.9605	1.0000	0.9582	1.0000

Note: This table presents the results of a correlation analysis (year 2010). All two-tailed p-values are less than 0.0001. AF stands for audit fees. NOC represents the number of clients. TA is short for total assets. TBV stands for total business volume.

Overall, it can be stated that essentially all surrogates—except NOC—reasonably approximate the concentration values calculated based on AF. The untransformed and square-root-transformed versions of either TA or TBV as well as the arithmetic means of the untransformed and square-root-transformed versions of TA or TBV can be recommended for calculating concentration measures to analyze the audit market for German credit institutions if AF data are not available. Thus, all further discussion will concentrate on these surrogates.

2.3.5.3 Concentration Analysis of the Audit Market for German Credit Institutions Based on Surrogates for Audit Fees

To analyze the entire audit market of approximately 300 credit institutions in 2006 and 2010, it is still useful to calculate concentration figures based on surrogates for AF. It is not surprising that the results presented in Table 2.6, p. 23, with the exception of the NOC-based measures, also reveal that the audit market for credit

[21] To verify these findings, the following sub-samples were also considered, but for brevity, their results are not tabulated: the 2006 sub-sample, the sub-sample of credit institutions preparing their financial statements in accordance with the HGB, the sub-sample of credit institutions preparing their financial statements in accordance with the IFRS, the sub-sample of credit institutions reporting individual financial statements, the sub-sample of credit institutions reporting consolidated financial statements, and the sub-sample of credit institutions for which the end of the fiscal year differs from the end of the calendar year. Taken together, the results for samples consisting of at least 30 observations reveal that the above-stated conclusions can be broadly confirmed. The introduced arithmetic-mean-based measures, however, result in some significantly different values compared with those calculated based on AF. Nevertheless, the fundamental conclusion of high levels of concentration remains unaltered.

institutions is highly concentrated. The TBV-based arithmetic mean surrogate indicates that the market share of the Big 2 (i.e., KPMG and PWC) was equal to 0.7808 in 2010—that is, approximately 4.70 percentage points lower than the AF-based figure in Table 2.3, p. 19. Moreover, almost all calculated concentration levels are below those reported in Table 2.3, p. 19; however, this does not apply for the measures based on the untransformed TA or TBV in 2010 or for the majority of the G values. The measures based on NOC and TBV are particularly sensitive to the size of the sample. They show the largest deviations from the AF-based figures.

This might also be interpreted to mean that the findings reported in Table 2.3, p. 19, lead to a distorted picture of the audit market's concentration. When more credit institutions—especially small ones that do not publish audit fee data—are included in the analysis, the observed concentration levels are lower. This applies at least for absolute concentration measures, i.e., CR_2, HHI and EXP; for G, the opposite appears to be the case. However, it should be noted that even if it can be shown that surrogates for AF approximate the AF-based concentration figures quite well, they still might yield biased results. Nevertheless, figures based on surrogates should provide reasonable indications regarding the market's concentration, and the following conclusions can thus be drawn: Decisions made on the basis of concentration analyses using only data from credit institutions that disclose their audit fees could be incorrect. The potential bias results from the exemption from the requirement for individual audit fee data disclosure, which is particularly relevant for relatively small credit institutions (§§ 285 Sentence 1 No. 17, 314 (1) No. 9 HGB). A comparison of Table 2.3, p. 19, and Table 2.6, p. 23, for the year 2010 reveals that four fewer audit firms are included in the sub-sample when it decreases in size from 301 credit institutions (Table 2.6, p. 23) to 240 (Table 2.3, p. 19). This problem is even worse for the year 2006: 34 audit firms are included in the larger sub-sample (Table 2.6, p. 23), but only 13 in the smaller one (Table 2.3, p. 19).

Furthermore, the larger sample makes it possible to examine the concentration trend—21 of the 28 figures indicate a marginal trend of deconcentration. For instance, for the values calculated using the TA-based arithmetic mean measure, the combined market share of the Big 2 (i.e., KPMG and PWC) decreased from 80.34% to 77.80% between 2006 and 2010, a decrease of 2.54 percentage points. The HHI (for the TBV-based arithmetic mean measure) changed from 0.3425 to 0.3325, i.e., $\Delta_{\text{HHI;}\varnothing\text{TBV}} = -0.0292$. The difference is less pronounced when the inequality measure G is considered ($\Delta_{\text{G;}\varnothing\text{TBV}} = -0.0066$). By contrast, EXP indicates an increase in

concentration ($\Delta_{\text{EXP};\varnothing\text{TBV}} = +0.0230$) between 2006 and 2010. In light of these contradictory results and in addition to possible measurement errors, it can be stated that the concentration levels have come more or less to a standstill, and thus, the audit market for credit institutions is still highly concentrated.

Table 2.6: Full Sample

CM	**Basis**	**2006** ($n = 312$; 34 Audit Firms)	**2010** ($n = 301$; 31 Audit Firms)	**Δ**
	NOC	0.5417	0.4950	-0.0862
	TA	0.8653	0.8574	-0.0091
	$\sqrt{\text{TA}}$	0.7415	0.6986	-0.0579
	⌀TA	0.8034	0.7780	-0.0316
CR_2	TBV	0.8724	0.8617	-0.0123
	$\sqrt{\text{TBV}}$	0.7435	0.6999	-0.0586
	⌀TBV	0.8080	0.7808	-0.0337
	NOC	0.1872	0.1692	-0.0962
	TA	0.3800	0.3861	+0.0161
	$\sqrt{\text{TA}}$	0.2989	0.2748	-0.0806
	⌀TA	0.3394	0.3304	-0.0265
HHI	TBV	0.3857	0.3902	+0.0117
	$\sqrt{\text{TBV}}$	0.2994	0.2749	-0.0818
	⌀TBV	0.3425	0.3325	-0.0292
	NOC	0.1185	0.1124	-0.0515
	TA	0.3025	0.3199	+0.0575
	$\sqrt{\text{TA}}$	0.2136	0.2108	-0.0131
	⌀TA	0.2580	0.2653	+0.0283
EXP	TBV	0.3077	0.3232	+0.0504
	$\sqrt{\text{TBV}}$	0.2132	0.2098	-0.0159
	⌀TBV	0.2605	0.2665	+0.0230
	NOC	0.7764	0.7588	-0.0227
	TA	0.9199	0.9204	+0.0005
	$\sqrt{\text{TA}}$	0.8925	0.8806	-0.0133
	⌀TA	0.9062	0.9005	-0.0063
G	TBV	0.9212	0.9212	-0.0000
	$\sqrt{\text{TBV}}$	0.8919	0.8798	-0.0136
	⌀TBV	0.9065	0.9005	-0.0066

Note: This table presents the results of the concentration analysis of the audit market for German credit institutions based on surrogates for audit fees in 2006 and 2010. CM is the abbreviation for a general concentration measure. CR_2 denotes the concentration ratio (based on the 2 largest audit firms). HHI represents the Herfindahl-Hirschman Index. EXP denotes the exponential index. G stands for the Gini coefficient. NOC represents the number of clients. TA stands for total assets. TBV stands for total business volume. Δ denotes the change in a concentration measure between 2006 and 2010, and it is calculated according to Formula 2.5.

Against the backdrop of these results, it may be interesting to examine how differences in concentration levels might be explained. Because EXP allows for disaggregation, it can be used to analyze whether differences in firm growth, new market

entries, market exits, mergers and acquisitions, or de-mergers are the driving forces behind changes in the market structure (Franke 1989, 332–333). Between 2006 and 2010, neither mergers and acquisitions nor de-mergers were observed among the audit firms in the sample; therefore, the audit firms can be divided into three groups: (1) audit firms exhibiting differences in growth (DIG), comprising audit firms that audited credit institutions in both years; (2) market entries (MENT), comprising audit firms that audited credit institutions in 2010 but not in 2006; and (3) market exits (MEX), comprising audit firms that audited credit institutions in 2006 but not in 2010. For each of these three groups, the logarithmic change between the two years can be calculated, and the overall change in the audit market concentration can be described in terms of the sum of these three components. This can be formulated as follows:

$$\begin{aligned}[\ln(EXP_{2010}) - \ln(EXP_{2006})] = {} & [\ln(EXP_{DIG;2010}) - \ln(EXP_{DIG;2006})] \\ & + [\ln(EXP_{MENT;2010}) - \ln(EXP_{MENT;2006})] \\ & + [\ln(EXP_{MEX;2010}) - \ln(EXP_{MEX;2006})]\end{aligned} \tag{2.6}$$

Table 2.7, p. 25, presents the results for the untransformed and square-root-transformed surrogate TA; because the results for all other surrogates are qualitatively similar, they are omitted for brevity. Between 2006 and 2010, the number of active audit firms in the market showed a net decrease of three. Based on the untransformed TA, the increase in EXP between the two years can be predominantly explained by differences in the growth of audit firms ($\Delta_{\mathrm{TA_{DIG}}} = +0.0398$) and the effect of audit firms exiting the market ($\Delta_{\mathrm{TA_{MEX}}} = +0.0184$). By contrast, calculating EXP based on the square root of TA indicates a deconcentration trend ($\Delta_{\sqrt{\mathrm{TA}}} = -0.0132$), in which the negative audit firm growth ($\Delta_{\sqrt{\mathrm{TA_{DIG}}}} = -0.0509$) outweighs the positive net effect of market entries and market exits. In summary, it can be concluded that the net effect of audit firms entering and exiting the market did not drive notable changes in the absolute concentration level; instead, differences in the growth of audit firms predominantly determined the observed changes in market concentration. Nevertheless, overall, the market concentration did not markedly change between 2006 and 2010.

Table 2.7: Disaggregation of EXP

	2006 ($n = 312$; 34 Audit Firms)	**2010** ($n = 301$; 31 Audit Firms)	**Δ**
TA_{DIG}	0.3081	0.3206	+0.0398
TA_{MENT}	–	0.9976	-0.0024
TA_{MEX}	0.9818	–	+0.0184
TA	0.3025	0.3199	+0.0559
$\sqrt{TA_{DIG}}$	0.2295	0.2181	-0.0509
$\sqrt{TA_{MENT}}$	–	0.9666	-0.0340
$\sqrt{TA_{MEX}}$	0.9306	–	+0.0719
$\sqrt{TA}$	0.2136	0.2108	-0.0132

Note: This table presents the disaggregation of EXP (EXP based on the total assets of credit institutions). EXP denotes the exponential index. TA stands for total assets. Δ denotes the change between 2006 and 2010, and it is calculated according to Formula 2.6. For the purposes of calculating Δ, a hyphen was considered equal to one.

2.3.5.4 Results and Prognoses

A comparison of the findings with the prognoses provides additional insights into the market structure of the audit market for German credit institutions. The empirical findings reveal evidence confirming *P1* (high concentration) and *P2* (dominant market share of KPMG and PWC). The audit market is characterized by high concentration levels. The combined market share of KPMG and PWC suggest a duopolistic market structure, in which no single clear market leader can be identified—market leadership depends on the measure considered. Referring to Table 2.6, p. 23, *P3* cannot be confirmed because there is no clear evidence that concentration levels further increased between 2006 and 2010. When additionally considering the results concerning the disaggregation of EXP, it can be concluded that the net effect of audit firms entering and exiting the market has not had a notable impact on changes in concentration. More importantly, differences in the growth of audit firms explain the marginal changes in EXP observed between the two years. However, it is important to note that these differences in audit firm growth should not be interpreted as internal firm growth; rather, they are changes in disparity (Franke 1989, 327). Although the concentration levels did not markedly change, some redistribution within the Big 4 can be observed; in particular, PWC lost market shares, while E&Y increased its share. This also demonstrates that the audit market concentration could decrease significantly if the market shares within the Big 5 were more evenly distributed. In such a scenario, the HHI would be approximately 0.2000, a noticeably lower figure than the present one (e.g., 0.3593 based on AF, Table 2.4,

p. 20). Furthermore, it could be assumed that the maximum concentration has been reached—at least for the credit institution sector. This is consistent with the results of two other studies, which indicate that the concentration level of the audit market for listed companies in Germany has not varied considerably in the years following 1997 (Möller and Höllbacher 2009, 659; Wild and Scheithauer 2012, 196). This could be interpreted to mean that the future market concentration will remain at a high level and that a further increase is not expected.

2.4 Conclusion

In conclusion, four aspects of this study warrant highlighting. First, previous studies (Grothe 2005; Lenz 1996b; Lenz 1997; Lenz 1998) have shown that the audit market for German credit institutions is characterized by high concentration levels. This might be explained by the dominating positions of KPMG and PWC and their historically conditioned reputation and specialization in audits of credit institutions. Moreover, it might also be driven by the importance of economies of scale, which can best be realized by larger audit firms. Eventually, if fewer audit firms are present on the market, cooperation costs are decreasing, which also promotes higher concentration levels. Second, an analysis of the audit market based on AF reveals that high concentration levels could still be observed in 2006 and 2010. However, the regulatory requirement to publish audit fees and the corresponding right to claim exemption (§§ 285 Sentence 1 No. 17, 314 (1) No. 9 HGB) do not permit the calculation of concentration figures that cover the entire audit market for credit institutions. Thus, it will continue to be necessary to use surrogates for AF. Third, newly introduced surrogates calculated as the arithmetic means of the untransformed and square-root-transformed TA or TBV reasonably approximate the values of concentration measures based on AF. Nevertheless, the non-arithmetic measures can also be used because they do not result in significantly erroneous assessments of the audit market concentration. Fourth, concentration measures based on surrogates also indicate that the audit market for German credit institutions is highly concentrated. However, the resulting values are frequently lower than those based on AF, which might be attributable to differences in the sample sizes. In addition, it can be stated that between 2006 and 2010, neither a notable trend toward higher concentration levels nor a trend of deconcentration could be observed. Therefore, it might be assumed that the audit market concentration has reached its

climax. Moreover, the concentration levels could decrease considerably if the market shares of the Big 5 were more evenly distributed—this would be in the interests of the European Commission.

In the end, it should be noted that this study is a neutral description of the audit market structure and that the stated prognoses apply only to the audit market for German credit institutions in 2006 and 2010. This study does not examine whether high audit market concentration levels are related to price competition or audit quality. A preliminary overview is given by Ewert (2011), and future research could address such questions.

3 Public-Interest Entities, Public Oversight, and Audit Fees—The Case of German Credit Institutions[22]

3.1 Introduction

The financial crisis created the impression that auditors were unaware of the business risks that credit institutions had undertaken. Assuming the truth of this assertion, the European Commission has sought to reform the European audit market (European Commission 2011).[23] The reform targeted PIEs, which generally include credit institutions according to the EU Statutory Audit Directive of 2006. However, this directive also allowed European Member States to not regard all credit institutions as PIEs (European Commission 2006a, 92, 102). The German legislature exercised this option, which led to the present circumstance in which only those credit institutions classified as PIEs ("PIE credit institutions") are subject to additional public oversight, in contrast to non-PIE credit institutions. For example, PIE credit institutions may (potentially) be examined by the Financial Reporting Enforcement Panel (Deutsche Prüfstelle für Rechnungslegung, FREP), and PIE credit institutions' auditors may be subject to random disciplinary oversight inspections (§ 62b Public Accountant Act, Wirtschaftsprüferordnung, WPO). However, it might be asked whether this additional public oversight plays a role in the financial industry, which is already a heavily—if not the most heavily—regulated industry. With regard to auditors, it might be asked whether they differentiate between audits of PIE and non-PIE credit institutions. The German setting enables an examination of whether this additional public oversight of PIEs and their auditors increases the risk to the respective auditors significantly enough to influence their audit efforts

[22] This chapter is based on a working paper titled "Public-Interest Entities, Public Oversight, and Audit Fees—The Case of German Credit Institutions", which is co-authored by Hansrudi Lenz. As this chapter is based on a working paper's 2016 version, this study's reasoning, results, and interpretations have changed after the submission of this thesis and the completion of the doctoral degree. The most recent version of this study is available either on my SSRN Author page (`http://ssrn.com/author=2334700`) or upon request.

[23] For an overview of the reform, see `http://ec.europa.eu/finance/auditing/reform/index_en.htm`; accessed on 1st May 2016.

or risk premiums (or both) and—as a result—audit fees (DeFond and Zhang 2014, 308).[24]

In line with prior research (e.g., Cameran and Perotti 2014, 161–162, 164; Cullen et al. 2013, 9, 11, 68–70; Doogar et al. 2015, 24–25, 29; Fields et al. 2004, 67) and using a sample of 573 German credit institution-year observations (excluding savings banks and cooperative banks) over the 2009–2011 period, this study first demonstrates that a client's business risk is significantly and economically related to audit fees. In addition, it shows that PIE credit institutions pay significantly higher audit fees than credit institutions not classified as a PIE. The economic relevance of this effect is remarkable: a 31.38% increase in average audit fees. Moreover, there is also some evidence that the association between other clients' business risks and audit fees is more pronounced for PIE credit institutions. The two former findings are largely robust, but this is not the case for the last finding after controlling for endogeneity (unobservable time-invariant variables).

This study extends prior research by presenting empirical evidence that public oversight of PIEs is related to audit pricing, which might not be surprising at first glance. However, as this study examines the financial industry, which is already a highly regulated industry that is characterized by intense (governmental) supervision, additional public oversight nevertheless further increases audit effort and/or auditor's business risk premiums. This is also interesting considering that the German environment is often assumed to be characterized by lower levels of litigiousness, which should reduce incentives to increase audit effort and demand higher audit fees (e.g., DeFond and Zhang 2014; La Porta et al. 2006; Wingate 1997).

The study is organized as follows: the next section outlines the formation of hypotheses. Section 3.3 begins by explaining the research design, and an overview of the sample is then provided (section 3.3.2) by explaining the sample selection and descriptive statistics. The regression analyses follow in section 3.3.3, and further analyses are discussed in section 3.3.4. Section 3.4 briefly summarizes the results and the study's limitations.

[24] It should also be remembered that many studies in auditing—including the present study—are far from being able to draw causal inferences.

3.2 Formation of Hypotheses

3.2.1 Audit Fees, Client's Business Risk, and Auditor's Business Risk

In simple terms, audit fees might be considered to be determined by three factors: audit effort, a risk component concerning the auditor's (residual) business risk and a profit margin.

Audit effort is driven by audit risk, and audit risk can be defined as "the risk that the auditor expresses an inappropriate audit opinion when the financial statements are materially misstated." (IAASB, 2015, 15) Related to the underlying logic of the Audit Risk Model (AICPA 1984), audit effort (engagement hours, qualification of the audit staff deployed, etc.) is set on the basis of the auditor's detection risk. The auditor's detection risk can be calculated by dividing the desired audit risk by the client's inherent risk multiplied by the client's control risk (IAASB 2015, ISA 200 A40, A42–A44). The pre-specified level of audit risk is determined by the auditor's business risk, which is closely related to the client's business risk. The client's inherent and control risks—i.e., the risks of material misstatements—arise as the result of the client's business risk, industry and macroeconomic factors, and the client's internal control system.[25] Accordingly, the client's business risk is expected to influence audit effort.

However, higher audit effort due to higher client business risk cannot entirely eliminate risks to the auditor—e.g., litigation risk or reputation risk (e.g., Gaver and Paterson 2007; Li 2009; Reynolds and Francis 2000; Stice 1991)—because auditors might still be sued even if the audit was conducted in accordance with the respective auditing regulations (DeFond and Zhang 2014). Thus, in addition to costs related to audit effort, auditors might charge a risk premium, i.e., all "residual risks" that cannot be controlled for via higher audit effort.

In conclusion, a client's business risk is expected to be associated with audit fees. Unfortunately, empirical audit fee models typically cannot directly test the various determinants and relationships discussed above because researchers do not have access to either auditors' or clients' internal data. However, if certain observable variables might serve as reasonable proxies for a client's business risk, it might be possible to determine whether the client's business risk plays a role in pricing audits.

[25] In general, (the client's or auditor's) business risk might be understood as the "risk resulting from significant conditions, events, circumstances, actions or inaction that could adversely affect an entity's ability to achieve its objectives and execute its strategies, or from setting of inappropriate objectives and strategies." (IAASB 2015, 16)

3.2.2 Audit Fees and Credit Institution's Business Risk

The first industry-specific study reveals that the relationship between audit fees and client business risk in the savings and loan industry is empirically observable (Hill et al. 1994, 193, 196). Stein et al. (1994a) show that operational and reporting complexity are associated with audit fees; moreover, in contrast to Hill et al. (1994), Stein et al. (1994a) find that banks' and thrifts' business risk measures, i.e., leverage and loss, are not relevant to audit pricing (Stein et al. 1994a, 136, 139–140).[26] The seminal study conducted by Fields et al. (2004) examines several variables reflecting a client's regulatory risk (credit risk, market risk, operating risk, liquidity risk and capital risk), which might be considered proxies for client business risk. Apart from market risk, the results demonstrate that client business risk—as reflected by regulatory risk factors—is significantly related to audit fees (Fields et al. 2004, 67). Further studies (Boo and Sharma 2008; Chen et al. 2010; Cullen et al. 2013; Doogar et al. 2015; Ettredge et al. 2014; Kanagaretnam et al. 2010; Kanagaretnam et al. 2011; Mohrmann et al. 2013) confirm broadly these findings.[27] Three analyses consider the audit pricing of European banks (Altmann 2008, 119–129; Cameran and Perotti 2014, 161–162, 164; Sipple 2013, 235), and these analyses also find empirical support for the association between audit fees and clients' business risk. In sum, the previous research highlights that clients' business risk in the banking industry might explain variations in audit fees.

In addition to the foregoing empirical evidence, with respect to German credit institutions, the association between a client's business risk and audit pricing is demonstrated by the BaFin's enactment of the Audit Report Regulation (Prüfungsberichtsverordnung). Section 3 (formerly section 2), "Risk Orientation and Materiality", states that auditors engaging in risk-oriented auditing shall primarily consider: a credit institution's size, its scope of business, its complexity and the level of risk of the business conducted by the institution. As a client's business risk is also one of the priorities of German credit institutions' audits, it is expected to

[26] In addition to some critical remarks (Kao 1994; Murphy 1994; Stein et al. 1994b), it is also debatable whether these findings can be transferred to other audit firms because the data comprises only information relating to one major accounting firm.

[27] These studies also make other important and relevant findings, such as that corporate governance characteristics are not significantly related to audit fees (Boo and Sharma 2008, 30, 38), that higher audit effort due to complex recognition and matters involving fair asset valuations result in significantly increased audit fees (Chen et al. 2010, 35–36; Ettredge et al. 2014, 49), and that not only economic changes from off-balance-sheet risk (Doogar et al. 2015, 24–25, 29) but also regulatory changes are related to audit pricing (Cullen et al. 2013, 9, 11, 68–70).

be associated with audit fees. Against the background of the previous section, the empirical evidence, and the German regulatory requirements, it is hypothesized as follows (alternative form):

***H1**: The higher a credit institution's business risk, the higher its audit fees, c.p.*

3.2.3 Audit Fees, Credit Institutions Classified as Public-Interest Entities, and Public Oversight

The following reference made in the explanatory memorandum of the recent EU Directive on statutory audits might be interpreted to mean that the European Commission's political efforts are driven (at least in part) by the insight that auditors may not have been aware of the level of credit institutions' business risk during (and immediately prior to) the period of the recent financial crisis: "Given that many banks revealed huge losses from 2007 to 2009 on the positions they had held both on and off balance sheet, it is difficult [...] to understand how auditors could give clean audit reports to their clients [...] for those periods." (European Commission 2011, 2) Subsequently, the European Commission also concluded that this "financial crisis has highlighted weaknesses in the statutory audit especially with regard to [...] PIE[s]." (European Commission 2011, 2) Notably, such reasoning implies that credit institutions are PIEs. According to the EU Statutory Audit Directive of 2006 this is correct, in principle; however, the use of Member State options has also meant that, until recently, not all credit institutions necessarily had to be considered PIEs in all European Member States (European Commission 2006a, 92, 102). The German legislature exercised this Member State option.[28] This decision by the German legislature led to further regulatory consequences, including that credit institutions

[28] As a consequence, only capital market-oriented companies were regarded as PIEs in the German regulatory meaning. The German legislature indirectly justified the exercise of this option by noting that it was not considered necessary to establish audit committees for all financial institutions because almost all German financial institutions had supervisory bodies in place (Deutscher Bundestag 2008, 92–93). Moreover, it might have been reasonable to discuss why only capital market-oriented companies were regarded as PIEs. The reasoning in the explanatory memorandum of the German Accounting Law Modernization Act could be interpreted to mean that all financial institutions might still have been regarded as PIEs and that financial institutions were only excluded from special regulations (Deutscher Bundestag 2008, 92). However, the enacted Commercial Code did not clearly state a definition of PIE in the German context (§§ 264d, 319a HGB), and in the end, only capital market-oriented companies were regarded as PIEs.

classified as PIEs (§§ 264d, 319a HGB) and their auditors are subject to more public oversight than non-PIE credit institutions.

As credit institutions classified as PIEs are more in the public spotlight, they may be examined by the FREP, and, of course, are subject to further regulations (e.g., the German Securities Trading Act, Wertpapierhandelsgesetz). Thus, several circumstances—such as possible additional regulatory risks or shareholder lawsuits (e.g., Hay et al. 2006, 171, 175; Seetharaman et al. 2002, 93–94; Stice 1991, 521, 530)—increase the business risk of those credit institutions. Concurrently, auditors of PIE firms have been subject, for example, to random disciplinary oversight inspections (§ 62b WPO) since 2005. This increased public oversight of the auditors of PIE credit institutions might increase auditors' business risk relative to auditors of non-PIE credit institutions (DeFond and Zhang 2014, 308). However, the financial industry is already a heavily—if not the most heavily—regulated industry, and it might therefore be reasonably questioned whether the additional oversight of PIE credit institutions and their auditors increases the risk to those auditors to a sufficient extent to influence the auditors' audit efforts or business risk premiums, or both, which would be reflected in audit fees. Moreover, the German legal environment is regularly assumed to be characterized by relatively low levels of litigiousness (e.g., La Porta et al. 1999; La Porta et al. 2006; Wingate 1997), which should reduce the incentive to intensify audit effort and, in turn, demand higher audit fees (DeFond and Zhang 2014, 297). However, it is also questionable whether this reasoning continues to apply after increases in the levels of manager and auditor liability observed over the past decade. Fortunately, the German setting enables to examine whether audit fees vary between PIE and non-PIE credit institutions, and the following hypothesis is stated in its alternative form:

***H2a**: PIE credit institutions pay higher audit fees than non-PIE credit institutions, c.p.*

German banking supervision is in line with the principle of dual proportionality required by the European Union (European Commission 2006b, 47), which means that a credit institution's supervision must consider the institution's size, business scope and transaction complexity. This principle applies to the bank's internal supervision and to the frequency and intensity of monitoring by the regulator—hence, "dual" proportionality. Therefore, higher levels of regulatory supervision are

applied because a credit institution with a higher business risk increases potential systemic risk. This effect might even be more pronounced if a credit institution is classified as a PIE. Thus, the additional oversight of PIEs and their auditors might lead not only to an "oversight premium" (*H2a*) but also to greater effort and/or risk premiums for other clients' business risks, which eventually lead to higher audit fees. In sum, it might be assumed that the effect of all (other) client business risks and their relations to audit fees is greater when a credit institution is a PIE, and, thus, the following hypothesis (in alternative form) is stated:

***H2b**: The effect of a credit institution's business risk on audit fees is greater for PIE credit institutions, c.p.*

3.3 Research Design, Sample, and Regression Results

3.3.1 Model Specification

3.3.1.1 Model Specification—*H1* and *H2a*

To test *H1*, ideally, one would employ internal information regarding credit institutions' business risk. However, as that information is frequently not directly observable, proxies that qualify as reasonable measures for a credit institution's business risk must be used. Risk-oriented banking supervision in Germany follows Basel II. The German Supervisory Review and Evaluation Process (SREP) uses ratings to classify banks, among other things, and these ratings serve also as an early warning instrument (Deutsche Bundesbank and BaFin 2009, 12). Even if specific rating methods are not disclosed by either the Deutsche Bundesbank or the BaFin, references show that the basic procedure should be grounded on the CAMEL (*C*apitalization, *A*ssets Quality, *M*anagement Capability, *E*arnings, *L*iquidity) approach (Kick and Pfingsten 2011, 9).[29] In addition, auditors are presumably an integral part of the SREP because their reports must be evaluated (§§ 7, 26 KWG), and these reports might act as the starting point for the (quantitative) bank rating

[29] The underlying notion of the CAMEL approach can be explained as follows: 1. Management defines the risk strategy that determines asset quality. 2. Asset quality is influenced by macro- and micro-economic factors, and a deterioration of some of the foregoing factors might negatively impact assets. 3. Earnings are stressed by risk provisioning and/or by depreciation and amortization. 4. Capital might decrease due to continuing losses. 5. Finally, a loss of confidence hinders access to funding sources.

procedure. Therefore, if the impact of a credit institution's risk (and complexity) on audit fees is of interest, it would seem consistent for auditors to examine metrics similar to those employed by the supervisory authority. Independent of this, analyzing publicly available information (e.g., van Laere et al. 2012) and also due to the valuable insights into the rating process provided by one of the Big 3 rating agencies (i.e., Standard & Poor's, Moody's and the Fitch Group), it might be concluded that rating agencies also use modified versions of the CAMEL concept. Additionally, I was able to discuss a more exemplary catalog of influencing factors. Based on this information, the following multivariate analysis consists of a credit institution's business risk variables related to the CAMEL bank rating method.[30]

Capitalization is affected by a credit institution's equity ratio and is the first material indicator of how resilient a credit institution's on-balance-sheet activity is and is considered an important ratio in the debate on banking regulation—even more important than the risk-weighted figure (e.g., Admati et al. 2013, 55–56; IMF 2009, 37, 115–117). A high equity ratio often represents a lower probability of distress and, hence, lower client business risk. However, other researchers regard proxies for a credit institution's riskiness in (risk-weighted) equity ratios and posit a positive association with fees (Doogar et al. 2015, 22–23). Nonetheless, a credit institution's equity ratio—defined as common equity to total assets (CETA)—is expected to be negatively associated with audit fees.

Strong total asset growth should not be regarded as negative in principle, particularly after the recent financial crisis in which many credit institutions were forced to reduce their balance sheets (through declining lending activities, write-offs, losses, etc.). Asset growth demonstrates ongoing demand for a credit institution's products and services and the availability and access to investment opportunities. Both may point toward sustained, stable business development. Arguing in the opposite direction, rapid asset growth is often treated as a red flag. Problems of subjectivity relating to write-ups of financial assets, lax lending policies or over-investing are just a few examples of non-qualitative balance sheet growth.[31] Nevertheless, as the

[30] Notably, measuring a client's business risk is somewhat complicated. Fields et al. (2004, 58) correctly state that a client's risk and complexity are interrelated. A separation of each into individual influencing factors is barely possible.

[31] It might also be assumed that auditors notice both types of relationships. In addition, to meet the effect of extreme balance growth, a variable referred to as squared total asset growth must be included in the model, and the relationship between audit fees and total asset growth would thus be expected to be U-shaped. Re-estimating the models—including squared total asset growth—suggests that all results are qualitatively unchanged.

following sample considers the years just after the financial crisis, it is hypothesized that total asset growth (TAG) is seen positively and, thus, as reducing a credit institution's business risk and audit fees.

Another variable referring to asset quality is a credit institution's loan impairment charge as a percentage of average gross loans (LICAGL).[32] Increasing impairment losses and loan loss provisions indicate a negative outlook on a credit institution's loan portfolio and higher potential risk. Higher client business risk is expected to lead to greater audit effort and, thus, to higher audit fees. Thus, a positive relationship with audit fees is hypothesized.

Management develops strategies to counter inefficiencies, and these inefficiencies are often related to excessive personnel compensation, overstaffing, data-processing costs, and investments in unprofitable branches. To evaluate the impact of management capability on audit fees, the broad proxy NONINTEXPRATIO (sum of personnel and other operating expenses plus provisions, i.e., non-interest expenses, to average total assets) is introduced, and it illustrates a credit institution's costs compared to assets invested. Lower figures are desirable, as management can strengthen the equity base via operating efficiency. High values of NONINTEXPRATIO also indicate potential risks from expanding the business. Therefore, NONINTEXPRATIO is assumed to be positively related to audit fees since higher ratios are expected to indicate higher client business risk.

Return on average assets (ROAA)—a profitability figure—is directly linked to earnings. This measure allows for the assessment of how efficiently a credit institution utilizes its asset base. Furthermore, a positive ROAA allows the credit institution to improve its capital base as far as is necessary. From this perspective, ROAA also serves as an internal capital generation ratio. Thus, a higher ROAA decreases a client's business risk, which might lead to lower audit fees.

In highlighting this matter, note that levels of ROAA exceeding certain thresholds—such as historic average industry values—might indicate an increased risk taken at the expense of a low level of capitalization. Nevertheless, as credit institutions are traditionally highly leveraged entities, the variation of ROAA over time might be a more suitable proxy for ROAA-related risk. Additionally, a volatile ROAA measure indicates greater uncertainty regarding future earnings, which makes

[32] The loan impairment charge is defined as amortization and write-downs on loans and advances to customers and certain securities as well as additions to loan loss provisions (see Form 3, Position 13 of the German Ordinance Regulating the Accounting Requirements for Financial Institutions and Financial Service Providers, Kreditinstituts-Rechnungslegungsverordnung).

audits more demanding, particularly when assessing a credit institution's ability to continue as a going concern, for example. In summary, it is hypothesized that a credit institution's higher risk due to volatile profitability—as approximated by ROAA's standard deviation over the last five fiscal years (SIGMAROAA)—is positively related to audit fees.

The last industry-specific variables are proxies for market liquidity or funding risk, which indicate liquidity in a broader sense.[33] First, the core measure is the liquid asset ratio (liquid assets to total assets; LIQTA), which describes overall liquidity (IMF 2006, 83; Poghosyan and Cihák 2009, 13). In times of funding constraints, liquid assets are another possible type of funding source. Accordingly, a high ratio implies lower liquidity risk. Moreover, liquid assets are easier to audit than illiquid assets (Chen et al. 2010, 35–36; Ettredge et al. 2014, 49). All aspects allow the assumption to be made that the higher the LIQTA, the lower the audit fees. Second, the ratio of interbank assets to interbank liabilities (INTERBANKRATIO) is an essential funding indicator. Normally, a higher ratio means higher liquidity for the credit institution. The consequences are lower fees demanded by auditors because of lower client business risk. On the downside, a substantially liquid position in the interbank market also indicates greater counter-party risk. It might be assumed that this aspect has gained particular importance in the aftermath of the financial crisis. A number of facts support this point, including, in particular, high interbank interest rate spreads, a sharp increase in banks' usage of the Eurosystem's deposit facility or even a dried up interbank market—still existing in some parts during the sample period—hint at the increased importance of counter-party risk (e.g., Brunnermeier 2009, 85–86; European Central Bank 2013, 19, 21).[34] A positive relation between INTERBANKRATIO and audit fees is expected.

In addition to those main variables of interest referring to client business risk (*H1*), the dummy PIE (which equals one if a credit institution is classified as a public interest entity in the Germany legal meaning and zero otherwise) is introduced to

[33] Market liquidity risk means that assets cannot be easily sold due to inadequate market depth or market disruption. Funding risk refers to the risk that a credit institution will be unable to provide sufficient liquidity at the expected terms. See also Brunnermeier and Pedersen (2009, 2201). With regard to this risk category, in particular, using a single ratio would fail to reflect the complexity of different sources of this type of risk (Tirole 2011, 291).

[34] Additionally, if a credit institution obtains its (short-term) funding mainly from the interbank market, periods of a dried up interbank market might also be a (significant) determinant of a credit institution's liquidity risk. This reasoning is assumed to be of lesser importance. It might be shown that the European Central Bank effectively replaced the interbank market's function by changing its tender procedure and standing facilities corridor on 8th October 2008.

empirically test *H2a*, i.e., whether PIE credit institutions pay higher audit fees than non-PIE credit institutions.

In sum, the model to test *H1* and *H2a* can be specified as follows:

$$\begin{aligned} LNAF_{it} = {} & \alpha_0 + \alpha_1 CETA_{it} + \alpha_2 TAG_{it} + \alpha_3 LICAGL_{it} \\ & + \alpha_4 NONINTEXPRATIO_{it} + \alpha_5 ROAA_{it} + \alpha_6 SIGMAROAA_{it} \\ & + \alpha_7 LIQTA_{it} + \alpha_8 INTERBANKRATIO_{it} + \alpha_9 PIE_{it} \\ & + \sum_{j=1}^{8} \alpha_{j+9} CONTROL_{jit} + \sum_{l=1}^{2} \alpha_{l+17} YR_{lit} + \varepsilon_{it} \,, \end{aligned} \tag{3.1}$$

where *CONTROL* is a set of control variables that are employed to control for further credit institution and auditor characteristics, and *YR* represents two-year dummies. First, in contrast to all previous analyses, this study does not use total assets as the size proxy. Today's German audits are individualized and risk-oriented (e.g., Eilifsen et al. 2001; IDW Auditing Standards 261 revised version), which implies that auditors must adequately consider clients' specialties, such as off-balance-sheet items in the case of financial institutions (e.g., IDW Auditing Practice Statements 9.302.1).[35] This consideration is justified by the fact that off-balance-sheet activities may markedly affect earnings while not affecting total asset balances. Furthermore, items not reported as on-balance-sheet items tend to require more audit effort and, therefore, higher audit fees because of more challenging recognizable risks and complex contract terms (Cullen et al. 2013, 5). Thus, the amount of audit effort driven by size might be inadequately approximated by using total assets alone. The credit institution's total business volume (LNTBV)—total assets plus off-balance-sheet items—is used as the size proxy, and a positive association with audit fees is expected.[36] Second, CFS—a dummy variable equal to one if the financial statement consists of consolidated accounts and zero otherwise—is introduced, as it might be assumed that auditing consolidated financial statements requires greater audit effort

[35] According to the HGB, in their notes, companies must disclose the nature and purpose of risks and benefits of off-balance-sheet transactions and their total amount (§§ 285 No. 3, 3a, 314 (1) No. 2, 2a HGB in conjunction with §§ 340a (1), (2), 340i (2) HGB). The notes are part of the annual audit (§ 316 (1), (2) HGB).

[36] Studies examining credit institutions' market structure and the concentration of German credit institutions' auditors also adopt total business volume as the size proxy (e.g., Leidner and Lenz 2013, 388; Monopolkommission 1977, 200). The database Bankscope, Bureau van Dijk, defines total business volume as follows: total assets plus managed securitized assets reported off-balance-sheet plus other off-balance-sheet exposure to securitization plus guarantees plus acceptances and documentary credits reported off-balance-sheet plus committed credit lines plus other contingent liabilities.

because the auditor not only must audit the annual financial statement of the parent company but also must "obtain sufficient appropriate audit evidence regarding the financial information of the components and the consolidation process." (IAASB 2015, 594, ISA 600.8) Thus, because the audit process is more time-consuming and cost-intensive, CFS is expected to have a positive association with audit fees. Third, if the auditor's and client's locations do not differ, Francis et al. (1999, 187) conclude that minimizing information asymmetries leads to reduced contracting costs. Against the backdrop that competition dominates the German audit market, audit firms may pass on lower costs to their customers. Such an advantage—measured by a dummy (SAMECITY) that equals one if a credit institution's office and auditor's office are in the same city and zero otherwise—is expected to show a negative coefficient in an audit fee regression.[37] Fourth, it might also be of interest whether a unique city, namely, Frankfurt am Main (FFM), influences audit prices (e.g., Basioudis and Francis 2007, 145, 154). Frankfurt am Main is a European financial center, where a large proportion of German credit institutions and the industry's leading audit firms—such as KPMG and PWC—have their registered offices. On the one hand, aspects of audit quality related to either larger local offices or high geographical density of employees qualified specifically to work in the financial industry would suggest higher audit fees. On the other hand, local business centers enable the exploitation of scale economies/learning curve effects through regional knowledge-sharing and more intense monitoring of competitors and networking (e.g., Breschi and Lissoni 2003, 18, 22–24; Malmberg and Maskell 2006, 6–8).[38] In particular, knowledge-sharing could result in lower costs (e.g., Danos et al. 1989, 94–95; Vera-Muñoz et al. 2006, 134) and might also imply lower audit fees. In sum, FFM might be positive or negative. Fifth, it is also controlled for a Big 2 premium, i.e., KPMG and PWC, as these two audit firms are the most significant suppliers of audits in the credit institution sector; all other firms have negligible market shares (e.g., Leidner and Lenz 2013, 396–397; Lenz 1997, 11). A positive sign on the BIG2 dummy—equal to one if a credit institution is audited by either KPMG

[37] However, if geographic proximity leads to higher audit quality (Choi et al. 2012, 67), a positive relationship with audit fees might also be expected.

[38] The traditionally high staff turnover between the Big 4 plus second-tier audit firms further intensifies these aspects.

or PWC and zero otherwise—is expected.[39] Sixth, the concept of fee-cutting (e.g., Bigus and Zimmermann 2009, 1295; Francis 1984, 138; Köhler et al. 2010, 20) is the primary motive for testing audit firm change as a determinant of auditor fees, and a negative sign on the variable AUDITORCHANGE (i.e., a dummy variable that equals one if the credit institution's auditor changed and zero otherwise) is expected. Seventh, it is not only controlled for audit firm change but also for audit partner change, i.e., the engagement partner or review partner within the present audit firm (EPCHANGE). Research on audit partner tenure delivers non-uniform results (e.g., Bedard and Johnstone 2010, 66; Fargher et al. 2008, 174–175; Manry et al. 2008, 565); thus, audit partner rotation might result in higher or lower audit fees. Eighth, an amendment or correction of the disclosed annual (consolidated) financial statements might be an indication of audit problems (e.g., Hitz et al. 2012, 257–259; Mande and Son 2013, 121–122, 132; Stice 1991, 518-519). A positive sign is assumed for AFS; a dummy variable that equals one if the credit institution's financial statements are amended or corrected after the first publication in the German Company Register and zero otherwise. Table 3.1, p. 41, presents the variables' definitions.

[39] It should be noted that BIG2 assumes that audit quality is equal across auditors, an assumption that is not economically justifiable (Simunic, 1984, 681), and even if KPMG and PWC dummies were included in the regression, the dummies would still assume identical and constant audit quality across different engagements.

Table 3.1: Variables and Definitions

Variable	Definition
	Dependent Variable
LNAF	Natural logarithm of a credit institution's audit fees paid.
	Variables of Interest
	Capitalization
CETA	A credit institution's common equity to total assets.
	Assets Quality
TAG	A credit institution's growth of total assets.
LICAGL	A credit institution's loan impairment charge divided by average gross loans.
	Management Capability
NONINTEXPRATIO	A credit institution's non-interest expenses to average assets.
	Earnings Capacity
ROAA	A credit institution's return on average assets.
SIGMAROAA	A credit institution's return on average assets' standard deviation over the last five fiscal years.
	Liquidity
LIQTA	A credit institution's liquid assets to total assets.
INTERBANKRATIO	A credit institution's interbank assets to interbank liabilities.
	Public-Interest Entity
PIE	A dummy variable that equals one if a credit institution is classified as a public interest entity according to the German Commercial Code and zero otherwise.
	Control Variables—CONTROL
LNTBV	Natural logarithm of a credit institution's total business volume.
CFS	A dummy variable that equals one if the financial statement consists of consolidated accounts and zero otherwise.
SAMECITY	A dummy variable that equals one if a credit institution's office and the auditor's office are in the same city and zero otherwise.
FFM	A dummy variable that equals one if the auditor's office is located at Frankfurt am Main and zero otherwise.
BIG2	A dummy variable that equals one if a credit institution is audited by either KPMG or PWC and zero otherwise.
AUDITORCHANGE	A dummy variable that equals one if the credit institution's auditor (audit firm) changed and zero otherwise.
EPCHANGE	A dummy variable that equals one if one or both engagement partners have changed and zero otherwise.
AFS	A dummy variable that equals one if the credit institution's financial statements are amended after the first publication in the German Company Register and zero otherwise.
	Fixed-Effects Variable—YR
YR	A set of two year dummies.

Note: This table presents the variables' definitions.

3.3.1.2 Model Specification—*H2b*

The model to examine *H2b* is based on the model previously introduced in Equation 3.1; however, the new model includes additional two-way interactions because they reveal whether the association between (other) client's business risk variables and audit fees differs between PIE and non-PIE credit institutions. These are excluded in Equation 3.1 because the effect of *H2a* can be observed directly and does not depend on other variables, i.e., the two-way interactions. The regression to analyze *H2b* is

$$\begin{aligned} LNAF_{it} = {} & \beta_0 + \beta_1 CETA_{it} + \beta_2 TAG_{it} + \beta_3 LICAGL_{it} \\ & + \beta_4 NONINTEXPRATIO_{it} + \beta_5 ROAA_{it} \\ & + \beta_6 SIGMAROAA_{it} + \beta_7 LIQTA_{it} + \beta_8 INTERBANKRATIO_{it} \\ & + \beta_9 PIE_{it} + \beta_{10} CETA_{it} \times PIE_{it} + \beta_{11} TAG_{it} \times PIE_{it} \\ & + \beta_{12} LICAGL_{it} \times PIE_{it} + \beta_{13} NONINTEXPRATIO_{it} \times PIE_{it} \\ & + \beta_{14} ROAA_{it} \times PIE_{it} + \beta_{15} SIGMAROAA_{it} \times PIE_{it} \\ & + \beta_{16} LIQTA_{it} \times PIE_{it} + \beta_{17} INTERBANKRATIO_{it} \times PIE_{it} \\ & + \sum_{j=1}^{8} \beta_{j+17} CONTROL_{jit} + \sum_{l=1}^{2} \beta_{l+25} YR_{lit} + \varepsilon_{it} \,, \end{aligned} \tag{3.2}$$

where the set of additional variables—i.e., CONTROL and YR—is identical to that of Equation 3.1.

3.3.2 Sample and Descriptive Statistics

The pooled sample comprises credit institutions located in Germany from fiscal 2009 to 2011 (it excludes savings banks and cooperative banks because of different regulatory requirements). The sample period begins in 2009 because all German credit institutions since that year—irrespective of their legal form or capital market orientation—have been legally responsible for publishing audit fees. Most of the data are from Bankscope, Bureau van Dijk. The variables on audit fees (LNAF), auditor location (SAMECITY, FFM), fee premiums (BIG2), auditor change (AUDITORCHANGE, EPCHANGE), and AFS have been hand-collected by analyzing published financial reports in the German Company Register.[40] To identify which German credit institutions are PIEs, published annual transparency reports from

[40] Due to problems with the interpretation of German clauses and to ensure a high degree of comparability of audit fees across different institutions, the reported audit fees are partly adjusted. The audit fees included in the regression do not include the fees of (international) networks of audit firms. If necessary, fees are reduced to account for the Value Added Tax.

2010 to 2014 were examined.[41] After merging the data from all sources, the final sample consists of 573 firm-years. Table 3.2 briefly outlines the sample selection procedure.

Table 3.2: Sample Selection

	Firm-Years
Initial sample of German bank observations (excluding savings banks and cooperative banks) with data on total assets in fiscal 2009, 2010, or 2011 in Bankscope, Bureau van Dijk.	933
Less:	
German Bank observation with no information on audit fees in fiscal 2009, 2010, or 2011; hand-collected data from financial statements disclosed at German Company Register.	(237)
	696
German Bank observation with no information on all independent variables in fiscal 2009, 2010, or 2011; data from Bankscope, Bureau van Dijk, or hand-collected from financial statements disclosed at the German Company Register.	(123)
Final sample	**573**

Note: This table outlines the sample selection procedure.

Summary statistics of the pooled sample are presented in Table 3.3, p. 45, and several points are notable. The mean of LNAF is 12.48 and its standard deviation equals 1.43; only a few credit institutions pay very high fees. The mean of LNTBV equals 21.65 (standard deviation of 2.52). Moreover, of the credit institutions in the pooled sample, 50 out of 184, 47 out of 197, and 49 out 192 are classified as PIEs in 2009, 2010 and 2011, respectively. CETA ranges from -0.003 to 0.860, indicating that the pooled sample contains credit institutions nearly on the verge of balance-sheet over-indebtedness as well as institutions predominantly financed by equity. The majority of all credit institutions are characterized by positive total asset growth during the 2009–2011 period in which TAG's standard deviation amounts to 0.19. The risk ratios on asset quality (LICAGL), profitability (ROAA, SIGMAROAA) and AFS are most likely to be influenced by outliers—examining skewness and kurtosis—however, all observation variables are within expectations.[42] Approximately 51.48% of all the auditors in the sample have their offices in the same city as the client,

[41] German auditors must publish an annual transparency report (§ 55c WPO) if they audit a PIE, as defined in § 319a HGB. See `http://www.wpk.de/eng/public/transparency-reports/`; accessed on 1st May 2016.

[42] The data for such possible outliers was checked for errors by re-examining the official published financial statements.

and 31.06% of all auditors have their registered offices at Frankfurt am Main, i.e., the financial center. Furthermore, a relatively low mean of BIG2 (0.50) does not signal very high auditor concentration levels in the German banking market at first glance. However, such a conclusion is inappropriate because the number of clients (of a pooled sample) can lead to biased results as opposed to the economically correct amounts derived from audit firms' revenues, i.e., audit fees (of yearly samples; Leidner and Lenz, 2013, 390, 392; Moizer and Turley, 1987, 120). Changes to one of the engagement partners occur more frequently than changes in the audit firm; 29.84% versus 8.38%. Finally, amendments to financial statements are seldom found (24 out of 573). This attests to either the high reporting and audit quality of German credit institutions or weak controls, e.g., through shareholders or the financial reporting enforcement system.

First indications of possible collinearity problems, i.e., Pearson product-moment correlation coefficients between independent variables as presented in Table 3.4, p. 46, can be observed for only a few variables.[43] Moreover, 14 of 17 independent variables demonstrate a statistically significant linear relationship with LNAF at the 0.10 level.

[43] The relatively high correlation between PIE and LNTBV of 0.601 suggests that PIE might also act as a size proxy. Therefore, all regressions were re-estimated to include an interaction between PIE and LNTBV. The results remain qualitatively unchanged.

Table 3.3: Summary Statistics

	Mean	**Std. Dev.**	**25%**	**50%**	**75%**	**Min.**	**Max.**
LNAF	12.484	1.434	11.451	12.160	13.159	10.127	16.670
CETA	0.124	0.162	0.036	0.062	0.121	-0.003	0.860
TAG	0.029	0.188	-0.055	0.012	0.091	-0.422	0.836
LICAGL	0.584	3.286	0.000	0.004	0.012	-1.188	25.995
NONINTEXPRATIO	0.060	0.130	0.007	0.018	0.042	0.001	0.690
ROAA	0.003	0.020	0.000	0.003	0.007	-0.079	0.102
STDROAA	0.008	0.015	0.001	0.003	0.007	0.000	0.086
LIQTA	0.250	0.236	0.073	0.170	0.351	0.000	0.924
INTERBANKRATIO	1.160	1.742	0.089	0.512	1.319	0.000	8.107
PIE	0.255	0.436	0.000	0.000	1.000	0.000	1.000
LNTBV	21.648	2.523	19.748	21.319	23.372	16.601	27.347
CFS	0.328	0.470	0.000	0.000	1.000	0.000	1.000
SAMECITY	0.515	0.500	0.000	1.000	1.000	0.000	1.000
FFM	0.311	0.463	0.000	0.000	1.000	0.000	1.000
BIG2	0.504	0.500	0.000	1.000	1.000	0.000	1.000
AUDITORCHANGE	0.084	0.277	0.000	0.000	0.000	0.000	1.000
EPCHANGE	0.298	0.458	0.000	0.000	1.000	0.000	1.000
AFS	0.042	0.201	0.000	0.000	0.000	0.000	1.000
n	573						

Note: This table presents summary statistics of pooled data based on samples of banks in Germany from 2009 to 2011. All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. Variable definitions: LNAF denotes the natural logarithm of credit institutions' audit fees paid. CETA denotes a credit institution's common equity to total assets. TAG represents a credit institution's growth of total assets. LICAGL corresponds to a credit institution's loan impairment charge divided by average gross loans. NONINTEXPRATIO denotes a credit institution's non-interest expenses to average assets. ROAA stands for a credit institution's return on average assets. SIGMAROAA equals a credit institution's return on its average assets' standard deviation over the last five fiscal years. LIQTA refers to a credit institution's liquid assets to total assets. INTERBANKRATIO corresponds to a credit institution's interbank assets to interbank liabilities. PIE is a dummy variable that equals one if a credit institution is classified as a public interest entity according to the German Commercial Code and zero otherwise. LNTBV equals the natural logarithm of a credit institution's total business volume. CFS is a dummy variable that equals one if the financial statement consists of consolidated accounts and zero otherwise. SAMECITY is a dummy variable that equals one if a credit institution's office and the auditor's office are in the same city and zero otherwise. FFM is a dummy variable that equals one if the auditor's office is located at Frankfurt am Main and zero otherwise. BIG2 is a dummy variable that equals one if a credit institution is audited by either KPMG or PWC and zero otherwise. AUDITORCHANGE is a dummy variable that equals one if the credit institution's auditor (audit firm) changed and zero otherwise. EPCHANGE is a dummy variable that equals one if one or both engagement partners have changed and zero otherwise. AFS is a dummy variable that equals one if the credit institution's financial statements are amended after the first publication in the German Company Register and zero otherwise.

Table 3.4: Pearson Product-moment Correlation Coefficients

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1)	1.000																	
(2)	-0.384	1.000																
	(0.000)																	
(3)	-0.221	-0.014	1.000															
	(0.000)	(0.731)																
(4)	-0.180	0.150	-0.023	1.000														
	(0.000)	(0.000)	(0.588)															
(5)	-0.166	0.556	-0.013	-0.008	1.000													
	(0.000)	(0.000)	(0.758)	(0.854)														
(6)	-0.083	0.151	0.096	0.070	0.097	1.000												
	(0.048)	(0.000)	(0.021)	(0.095)	(0.020)													
(7)	-0.135	0.493	0.053	-0.031	0.525	-0.108	1.000											
	(0.001)	(0.000)	(0.205)	(0.454)	(0.000)	(0.010)												
(8)	-0.065	0.052	0.084	-0.121	-0.003	-0.041	0.159	1.000										
	(0.119)	(0.216)	(0.045)	(0.004)	(0.936)	(0.332)	(0.000)											
(9)	-0.040	0.068	0.050	-0.090	0.055	0.043	0.157	0.300	1.000									
	(0.337)	(0.103)	(0.233)	(0.031)	(0.185)	(0.309)	(0.000)	(0.000)										
(10)	0.632	-0.238	-0.160	-0.103	-0.159	-0.108	-0.074	0.045	-0.096	1.000								
	(0.000)	(0.000)	(0.000)	(0.014)	(0.000)	(0.009)	(0.078)	(0.284)	(0.022)									
(11)	0.848	-0.543	-0.116	-0.123	-0.419	-0.042	-0.377	-0.043	-0.125	0.623	1.000							
	(0.000)	(0.000)	(0.005)	(0.003)	(0.000)	(0.312)	(0.000)	(0.302)	(0.003)	(0.000)								
(12)	0.696	-0.215	-0.138	-0.123	0.023	-0.045	0.002	-0.111	-0.047	0.453	0.560	1.000						
	(0.000)	(0.000)	(0.001)	(0.003)	(0.583)	(0.280)	(0.960)	(0.008)	(0.266)	(0.000)	(0.000)							
(13)	0.214	0.033	-0.148	0.011	-0.100	-0.057	-0.087	0.184	-0.017	0.255	0.238	0.083	1.000					
	(0.000)	(0.434)	(0.000)	(0.798)	(0.017)	(0.172)	(0.038)	(0.000)	(0.677)	(0.000)	(0.000)	(0.046)						
(14)	0.070	-0.026	0.013	-0.059	0.059	-0.037	-0.003	0.190	0.056	-0.038	0.049	0.061	0.191	1.000				
	(0.096)	(0.534)	(0.749)	(0.162)	(0.157)	(0.371)	(0.951)	(0.000)	(0.177)	(0.368)	(0.238)	(0.145)	(0.000)					
(15)	0.287	-0.095	-0.156	-0.004	-0.118	-0.112	-0.076	0.070	-0.047	0.195	0.254	0.150	0.204	0.085	1.000			
	(0.000)	(0.024)	(0.000)	(0.932)	(0.005)	(0.008)	(0.070)	(0.095)	(0.264)	(0.000)	(0.000)	(0.000)	(0.000)	(0.043)				
(16)	-0.097	0.063	0.026	0.050	0.018	0.050	0.001	0.011	-0.067	-0.003	-0.029	-0.023	-0.009	0.015	-0.040	1.000		
	(0.021)	(0.129)	(0.530)	(0.235)	(0.662)	(0.231)	(0.978)	(0.800)	(0.110)	(0.937)	(0.488)	(0.575)	(0.830)	(0.723)	(0.334)			

Table 3.4: Pearson Product-moment Correlation Coefficients (continued)

(17)	0.119	0.023	-0.081	0.005	-0.009	-0.061	0.018	0.009	-0.042	0.065	0.077	0.072	0.046	0.007	0.143	-0.197	1.000	
	(0.004)	(0.580)	(0.052)	(0.902)	(0.829)	(0.144)	(0.672)	(0.839)	(0.312)	(0.120)	(0.067)	(0.084)	(0.277)	(0.863)	(0.001)	(0.000)		
(18)	0.020	-0.056	0.031	-0.036	-0.006	-0.001	0.010	0.003	0.005	0.018	0.016	0.002	-0.006	-0.027	-0.072	0.031	-0.022	1.000
	(0.631)	(0.178)	(0.453)	(0.390)	(0.878)	(0.977)	(0.803)	(0.936)	(0.896)	(0.673)	(0.703)	(0.956)	(0.882)	(0.513)	(0.087)	(0.457)	(0.597)	

Note: This table presents Pearson product-moment correlation coefficients of pooled data based on samples of credit institutions in Germany from 2009 to 2011. The numbers in parentheses below the correlation coefficients indicate p-values (two-tailed test). All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. Variable definitions: (1) LNAF denotes the natural logarithm of a credit institution's audit fees paid. (2) CETA labels a credit institution's common equity to total assets. (3) TAG represents a credit institution's growth of total assets. (4) LICAGL corresponds to a credit institution's loan impairment charge divided by average gross loans. (5) NONINTEXPRATIO denotes a credit institution's non-interest expenses to average assets. (6) ROAA stands for a credit institution's return on average assets. (7) SIGMAROAA equals a credit institution's return on its average assets' standard deviation over the last five fiscal years. (8) LIQTA refers to a credit institution's liquid assets to total assets. (9) INTERBANKRATIO corresponds to a credit institution's interbank assets to interbank liabilities. (10) PIE is a dummy variable that equals one if a credit institution is classified as a public interest entity according to the German Commercial Code and zero otherwise. (11) LNTBV equals the natural logarithm of a credit institution's total business volume. (12) CFS is a dummy variable that equals one if the financial statement consists of consolidated accounts and zero otherwise. (13) SAMECITY is a dummy variable that equals one if a credit institution's office and the auditor's office are in the same city and zero otherwise. (14) FFM is a dummy variable that equals one if the auditor's office is located at Frankfurt am Main and zero otherwise. (15) BIG2 is a dummy variable that equals one if a credit institution is audited by either KPMG or PWC and zero otherwise. (16) AUDITORCHANGE is a dummy variable that equals one if the credit institution's auditor (audit firm) changed and zero otherwise. (17) EPCHANGE is a dummy variable that equals one if one or both engagement partners have changed and zero otherwise. (18) AFS is a dummy variable that equals one if the credit institution's financial statements are amended after the first publication in the German Company Register and zero otherwise.

3.3.3 Regression Results

3.3.3.1 Results—*H1* and *H2a*

The results of the pooled sample (573 bank-years) in Table 3.5, p. 51, base on an OLS estimation of Equation 3.1 that includes year dummies and standard errors clustered by credit institution.[44]

Focusing at first on *H1*—which addresses the question of whether a credit institution's business risk is related to audit fees—five out of eight credit institution business risk variables (i.e., TAG, NONINTEXPRATIO, SIGMAROAA, LIQTA and INTERBANKRATIO) are significantly associated with audit fees (p-value less than 0.050, one-tailed test). In addition to the statistical significance of those variables, they are also economically relevant. For instance, if an increase from the 25th (-0.0547) to the 75th percentile (0.0908) of TAG is considered, audit fees decrease by approximately 9.00% ($e^{-0.6479\times(0.0908+0.0547)} - 1$). An increase of NONINTEXPRATIO by the interquartile range (25th to 75th percentile) increases audit fees by approximately 4.14% (coefficient of 1.1584). A quite comparable economic influence on credit institutions' audit fees demonstrates an increase of the interquartile range of SIGMAROAA (5.56%). Finally, both liquidity risk variables are not only statistically significant at the 0.050 level (one-tailed test) but also can be considered economically relevant. A higher proportion of liquid assets to total assets (i.e., an increase of LIQTA by the interquartile range of 0.2778) results in a reduction of audit fees by approximately 8.82%, and an increase of INTERBANKRATIO of 1.2304 increases audit fees by approximately 6.61%. For CETA, LICAGL and ROAA, the null hypotheses could not be rejected at a 0.100 significance level, and whether these credit institution's business risk variables are related to audit fees

[44] Collinearity is not a concern because the maximum of all variance inflation factors is 3.25 (Wooldridge, 2010, 99).

could thus not be observed.[45] Overall, there is empirical support for *H1*, suggesting that the business risk of a credit institution is related to audit fees.

H2a hypothesizes that PIE credit institutions pay higher audit fees than non-PIE credit institutions. The PIE variable is highly significant (p-value of 0.016, one-tailed test). In addition, the economic relevance of this variable is remarkable: Audit fees of PIE credit institutions are approximately 31.38% ($e^{0.2729} - 1$) higher than audit fees of non-PIE credit institutions. Accordingly, the data reveal evidence supporting *H2a*.

Finally, some remarks on the control variables are in order. Unsurprisingly, a credit institution's size (coefficient of LNTBV of 0.4046) is highly significantly associated with audit fees, and its economic relevance is remarkable—e.g., doubling total business volume increases audit fees by approximately 32.37% ($2^{0.4046} - 1$). The audit of consolidated financial statements is not only statistically significant (p-value of 0.000, one-tailed test) but also economically relevant (increasing audit fees by approximately 94.32%). However, this effect might also be due to legal requirements surrounding audit fee disclosure in Germany. Audit fees disclosed in consolidated financial statements cover both the expenditures for auditing the parent accounts and all audit fees related to audits of subsidiaries that were performed by the parent company's auditor (e.g., Leidner and Lenz 2013, 382). Thus, the increase of 94.32% in average audit fees might be explained at least in part by the German audit fee disclosure requirements. A fee premium of approximately 18.96% is reported for the Big 2, i.e., KPMG and PWC, and fee-cutting can be observed on initial audit engagements.[46] Concurrently, changing engagement partners is not re-

[45] However, an examination of the two-tailed p-values reveals that LICAGL is significantly negatively (p-value of 0.023, two-tailed test) related to audit fees. It was hypothesized that higher LICAGL values indicate a negative outlook on loan portfolios and a higher potential business risk for credit institutions. When related to a single year's audit, however, it might be assumed that higher LICAGL actually represents a client's accounting conservatism. German stakeholders are accustomed to the prudence principle—protecting creditors and maintaining capital (e.g., § 252 HGB)—whereby provisions or write-offs are not necessarily viewed negatively. Moreover, recent research demonstrates that auditors demand lower fees if a client's accounting is more conservative (DeFond et al. 2012, 10–11, 22–23). Although LICAGL is generally a risk indicator, when related to German credit institutions, its function as a conservative accounting proxy might be of greater importance, and a negative association with audit fees would thus be explained.

[46] To be entirely accurate, it cannot definitely be stated whether the significant coefficient of AUDITORCHANGE reflects fee-cutting and/or a "reduction in [audit fees'] stickiness at the time of the switch." (de Villiers et al. 2014, 22) Moreover, to precisely test fee-cutting, the initial audit fees must be compared "to: (1) the predecessor auditor's fees, (2) the second-year fee, or (3) a continuing audit fee for a comparable audit." (Francis 1984, 138)

lated to LNAF. Neither remaining controls on auditor location (SAMECITY, FFM) nor audit problems (AFS) are related to audit fees at the 0.100 significance level.

3.3.3.2 Results—*H2b*

H2b addresses the question not only regarding whether PIE credit institutions pay higher audit fees and whether increased public oversight of these companies and their auditors leads to an "oversight premium" (*H2a*) but also regarding whether this additional oversight also results in greater risk premiums for other clients' business risk variables.[47] The interactions with PIE present the empirical findings for this hypothesis (Table 3.6, p. 52), and credit institution's total asset growth (TAG×PIE), management capabilities (NONINTEXPRATIO×PIE) and volatile profitability (SIGMAROAA×PIE) are significantly associated with audit fees. However, this does not apply to the interactions with the liquidity variables of LIQTA and INTERBANKRATIO. By contrast, the interaction with CETA is significantly negatively related to audit fees, which might indicate that a credit institution's capitalization plays a role in pricing audits, at least for PIEs. In sum, the results broadly support *H2b*.

[47] To examine the relationship hypothesized in *H2a* again using regression Equation 3.2, the PIE variable and all its interactions must be considered. All respective estimated coefficients are jointly different from zero (Prob > F of 0.061), and the calculation of the marginal effect of PIE on LNAF for a median credit institution results in a value of 0.2854.

Table 3.5: Audit Fee OLS Regression—*H1* and *H2a*

Variable	**Expected Sign**	**Coefficient**	**Robust Standard Error**	**p-value**
CETA	-	-0.2099	0.2629	0.213
TAG	-	-0.6479	0.1284	0.000
LICAGL	+	-0.0213	0.0093	0.988
NONINTEXPRATIO	+	1.1584	0.3815	0.001
ROAA	-	-0.6986	1.8053	0.350
SIGMAROAA	+	9.9790	3.0817	0.001
LIQTA	-	-0.3323	0.1744	0.029
INTERBANKRATIO	+	0.0520	0.0172	0.001
PIE	+	0.2729	0.1257	0.016
LNTBV	+	0.4046	0.0276	0.000
CFS	+	0.6643	0.1119	0.000
SAMECITY	-	0.0199	0.0876	0.590
FFM	+/-	0.0514	0.0952	0.590
BIG2	+	0.1736	0.0796	0.015
AUDITORCHANGE	-	-0.2829	0.0939	0.001
EPCHANGE	+/-	0.0623	0.0600	0.300
AFS	+	0.0904	0.1146	0.216
INTERCEPT	+	3.2885	0.5728	0.000
Year Dummies:			Yes	
Clustered by:			Credit Institution	
n			573	
$Adj.R^2$			0.838	
$Prob > F$			0.0000	

Note: This table presents the results of a pooled OLS regression based on samples of credit institutions in Germany from 2009 to 2011. Standard errors and t-statistics are adjusted; clustered by credit institution. p-values are based on one-sided tests when the coefficient's sign is predicted; otherwise, two-tailed tests are used. The regression includes a set of year dummies (YR), which are omitted from the table. All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. The following regression model is tested: $LNAF_{it} = \alpha_0 + \alpha_1 CETA_{it} + \alpha_2 TAG_{it} + \alpha_3 LICAGL_{it} + \alpha_4 NONINTEXPRATIO_{it} + \alpha_5 ROAA_{it} + \alpha_6 SIGMAROAA_{it} + \alpha_7 LIQTA_{it} + \alpha_8 INTERBANKRATIO_{it} + \alpha_9 PIE_{it} + \alpha_{10} LNTBV_{it} + \alpha_{11} CFS_{it} + \alpha_{12} SAMECITY_{it} + \alpha_{13} FFM_{it} + \alpha_{14} BIG2_{it} + \alpha_{15} AUDITORCHANGE_{it} + \alpha_{16} EPCHANGE_{it} + \alpha_{17} AFS_{it} + \sum_{l=1}^{2} \alpha_{l+17} YR_{lit} + \varepsilon_{it}$, where LNAF denotes the natural logarithm of a credit institution's audit fees paid. CETA denotes a credit institution's common equity to total assets. TAG represents a credit institution's growth of total assets. LICAGL corresponds to a credit institution's loan impairment charge divided by average gross loans. NONINTEXPRATIO denotes a credit institution's non-interest expenses to average assets. ROAA stands for a credit institution's return on average assets. SIGMAROAA equals a credit institution's return on average assets' standard deviation over the last five fiscal years. LIQTA refers to a credit institution's liquid assets to total assets. INTERBANKRATIO corresponds to a credit institution's interbank assets to interbank liabilities. PIE is a dummy variable that equals one if a credit institution is classified as a public interest entity under the German Commercial Code and zero otherwise. LNTBV equals the natural logarithm of a credit institution's total business volume. CFS is a dummy variable that equals one if the financial statement consists of consolidated accounts and zero otherwise. SAMECITY is a dummy variable that equals one if a credit institution's office and the auditor's office are in the same city and zero otherwise. FFM is a dummy variable that equals one if the auditor's office is located at Frankfurt am Main and zero otherwise. BIG2 is a dummy variable that equals one if a credit institution is audited by either KPMG or PWC and zero otherwise. AUDITORCHANGE is a dummy variable that equals one if the credit institution's auditor (audit firm) changed and zero otherwise. EPCHANGE is a dummy variable that equals one if one or both engagement partners have changed and zero otherwise. AFS is a dummy variable that equals one if the credit institution's financial statements are amended after the first publication in the German Company Register and zero otherwise.

Table 3.6: Audit Fee OLS Regression—*H2b*

Variable	**Expected Sign**	**Coefficient**	**Robust Standard Error**	**p-value**
CETA	-	-0.1382	0.2506	0.291
TAG	-	-0.5383	0.1320	0.000
LICAGL	+	-0.0218	0.0095	0.988
NONINTEXPRATIO	+	1.2238	0.3927	0.001
ROAA	-	-0.5417	1.8265	0.384
SIGMAROAA	+	8.4911	3.1513	0.004
LIQTA	-	-0.3184	0.1784	0.038
INTERBANKRATIO	+	0.0515	0.0178	0.002
PIE	+	0.4759	0.2101	0.012
CETA×PIE	-	-6.7835	3.3006	0.021
TAG×PIE	-	-0.5854	0.4352	0.090
LICAGL×PIE	+	-1.4733	0.5648	0.995
NONINTEXPRATIO×PIE	+	5.4793	3.1654	0.042
ROAA×PIE	-	6.0610	4.4959	0.910
SIGMAROAA×PIE	+	22.6639	8.4914	0.004
LIQTA×PIE	-	-0.3852	0.4421	0.192
INTERBANKRATIO×PIE	+	0.0507	0.0737	0.246
LNTBV	+	0.4057	0.0280	0.000
CFS	+	0.6305	0.1162	0.000
SAMECITY	-	0.0187	0.0860	0.586
FFM	+/-	0.0677	0.0961	0.482
BIG2	+	0.1857	0.0798	0.010
AUDITORCHANGE	-	-0.2857	0.0927	0.001
EPCHANGE	+/-	0.0617	0.0587	0.294
AFS	+	0.1179	0.1130	0.149
INTERCEPT	+	3.2518	0.5783	0.000
Year Dummies:			Yes	
Clustered by:			Credit Institution	
n			573	

Table 3.6: Audit Fee OLS Regression—*H2b* (continued)

$Adj.R^2$	0.841
$Prob > F$	0.0000

Note: This table presents the results of a pooled OLS regression based on samples of credit institutions in Germany from 2009 to 2011. Standard errors and t-statistics are adjusted; clustered by credit institution. p-values are based on one-sided tests when the coefficient's sign is predicted; otherwise, two-tailed tests are used. The regression includes a set of year dummies (YR), which are omitted from the table. The variables with "×" are interaction terms. All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. The following regression model is tested: $LNAF_{it} = \beta_0 + \beta_1 CETA_{it} + \beta_2 TAG_{it} + \beta_3 LICAGL_{it} + \beta_4 NONINTEXPRATIO_{it} + \beta_5 ROAA_{it} + \beta_6 SIGMAROAA_{it} + \beta_7 LIQTA_{it} + \beta_8 INTERBANKRATIO_{it} + \beta_9 PIE_{it} + \beta_{10} CETA_{it} \times PIE_{it} + \beta_{11} TAG_{it} \times PIE_{it} + \beta_{12} LICAGL_{it} \times PIE_{it} + \beta_{13} NONINTEXPRATIO_{it} \times PIE_{it} + \beta_{14} ROAA_{it} \times PIE_{it} + \beta_{15} SIGMAROAA_{it} \times PIE_{it} + \beta_{16} LIQTA_{it} \times PIE_{it} + \beta_{17} INTERBANKRATIO_{it} \times PIE_{it} + \beta_{18} LNTBV_{it} + \beta_{19} CFS_{it} + \beta_{20} SAMECITY_{it} + \beta_{21} FFM_{it} + \beta_{22} BIG2_{it} + \beta_{23} AUDITORCHANGE_{it} + \beta_{24} EPCHANGE_{it} + \beta_{25} AFS_{it} + \sum_{l=1}^{2} \beta_{l+25} YR_{lit} + \varepsilon_{it}$, where LNAF denotes the natural logarithm of a credit institution's audit fees paid. CETA denotes a credit institution's common equity to total assets. TAG represents a credit institution's growth of total assets. LICAGL corresponds to a credit institution's loan impairment charge divided by average gross loans. NONINTEXPRATIO denotes a credit institution's non-interest expenses to average assets. ROAA stands for a credit institution's return on average assets. SIGMAROAA equals a credit institution's return on average assets' standard deviation over the last five fiscal years. LIQTA refers to a credit institution's liquid assets to total assets. INTERBANKRATIO corresponds to a credit institution's interbank assets to interbank liabilities. PIE is a dummy variable that equals one if a credit institution is classified as a public interest entity according to the German Commercial Code and zero otherwise. LNTBV equals the natural logarithm of a credit institution's total business volume. CFS is a dummy variable that equals one if the financial statement consists of consolidated accounts and zero otherwise. SAMECITY is a dummy variable that equals one if a credit institution's office and the auditor's office are in the same city and zero otherwise. FFM is a dummy variable that equals one if the auditor's office is located at Frankfurt am Main and zero otherwise. BIG2 is a dummy variable that equals one if a credit institution is audited by either KPMG or PWC and zero otherwise. AUDITORCHANGE is a dummy variable that equals one if the credit institution's auditor (audit firm) changed and zero otherwise. EPCHANGE is a dummy variable that equals one if one or both engagement partners have changed and zero otherwise. AFS is a dummy variable that equals one if the credit institution's financial statements are amended after the first publication in the German Company Register and zero otherwise.

3.3.4 Further Analyses

3.3.4.1 Sensitivity Checks

Initially, several clients' size and business risk variables were replaced, leading to a first impression of the results' robustness.[48] First, size is traditionally approximated by the natural logarithm of total assets, and as a result, a credit institution's total asset figure is also examined. Second, capitalization is measured separately by total equity as a percentage of total assets and total equity relative to total liabilities. Third, the growth of gross loans affects asset quality in the same manner as total asset growth; thus, TAG is replaced by a comparable variable on gross loan growth. Fourth, management capability is proxied by the cost-to-income ratio. Fifth, ROAA is replaced by return on average equity. Sixth, LIQTA is replaced by liquid assets as a percentage of customer and short-term funds. Seventh, to examine whether results about a credit institution's funding relationship with audit fees is stable, INTERBANKRATIO is replaced by the ratio of gross loans to customer deposits (both less reverse repurchase agreements). The results remain qualitatively unchanged, apart from three cases: growth of gross loans (*H1* and *H2b*) is not related to audit fees, *H2b* is not supported in the regression including the cost-to-income ratio, and *H2b* is supported by both liquidity measures when liquid assets as a percentage of customer and short-term funds is employed. In addition, if non-winsorized data are used or if only the dependent variable is winsorized, the results do not alter the stated conclusions (Dyckman and Zeff 2014, 702). The regression results are also robust for *H1* and *H2a* but not for TAG in *H2b* when the independent variables—but not the dependent variable—are winsorized.

3.3.4.2 Random Effects, Fixed Effects, and Hausman-Taylor Estimator

This study's research design (OLS estimator) might be subject to the problem of unobservable (time-invariant) variables that determine audit fees and certain independent variables, which might lead to biased and inconsistent estimates (e.g., Verbeek 2012, 144-146; Wooldridge 2010, 347–348). For example, a client's business risk variables (which are based on reported, audited information) could theoretically be determined by financial reporting quality before an audit occurred (Wild

[48] For the sake of brevity, all results in this section are untabulated. Due to data availability considerations, the number of firm-years included differs slightly (with n between 536 and 573), which might not ensure full comparability of the results.

2010, 522). Moreover, a client's financial reporting quality before the audit might be related to the audit scope and plan and, in turn, to audit fees. Another example is the control variable BIG2, which attempts to measure fee premiums due to the supposed higher audit quality of the Big 2. However, fee premiums do not solely depend on the notion that KPMG and PWC are industry leaders and are perceived to yield higher-quality audits. For instance, the bargaining power of the auditor and the client also determine the existence and amount of a fee premium (DeFond and Zhang 2014, 300). To partly address this possible problem, Equations 3.1 and 3.2 are re-estimated by using a random effects (RE) regression, a fixed effects (FE) regression (Verbeek 2012, 377–386; Wooldridge 2010, 493) and the Hausman-Taylor estimator (HT; Cameron and Trivedi 2010, 291–293; Hausman and Taylor 1981).

The results regarding *H1* are slightly different. Indeed, all three estimators continue to indicate that a client's business risk plays a role in pricing audits (Table 3.7, p. 56). However, the variables concerning a credit institution's liquidity are not significantly different from zero. Moreover, in all regressions, ROAA is significantly related to audit fees, whereas SIGMAROAA is significantly different from zero using an OLS estimator (Table 3.5, p. 51). *H2a* is only supported by the RE regression. That no effects are found in the FE and the HT regressions might be because of the inefficiency of both estimators due to the very low within-PIE variation (within variation: standard deviation of 0.076; between variation: standard deviation of 0.420; cf. Cameron and Trivedi 2010, 245; Plümper and Troeger 2007, 124–125, 134).[49] Notably, if 18 firm-years are deleted such that PIE is time-invariant and it is assumed that PIE is not endogenous, PIE is significant (HT estimator, bootstrapped p-value less than 0.050, one-tailed test), which supports *H2a*. If the RE, the FE or the HT estimator is used instead of the OLS estimator (Table 3.8, p. 58), the interactions are not significant, and there is thus no empirical support for *H2b*, but it also does not prove that there is no relationship.

[49] The Hausman test (Prob>chi2 = 0.0153) indicates that the FE approach is more appropriate than a RE estimator. However, the Hausman test is also considered problematic if the within variation is very low, as is the case for all clients' business risk variables and PIE. Therefore, its result is questionable.

Table 3.7: Audit Fee Random Effects, Fixed Effects and Hausman-Taylor Estimator Regression—*H1* and *H2a*

		(1) Random Effects			(2) Fixed Effects			(3) Hausman-Taylor Estimator		
Variable	**Expected Sign**	**Coefficient**	**Robust Standard Error**	**p-value**	**Coefficient**	**Robust Standard Error**	**p-value**	**Coefficient**	**Robust Standard Error**	**p-value**
CETA	-	0.2563	0.1956	0.905	0.3054	0.3129	0.835	0.3232	0.3511	0.821
TAG	-	-0.3768	0.0670	0.000	-0.2612	0.0814	0.001	-0.2641	0.0833	0.001
LICAGL	+	-0.0093	0.0055	0.954	-0.0020	0.0040	0.693	-0.0020	0.0057	0.635
NONINTEXPRATIO	+	1.2402	0.2502	0.000	0.7826	0.4381	0.038	0.8134	0.5729	0.078
ROAA	-	-1.8610	0.5869	0.001	-1.6808	0.7788	0.016	-1.6907	1.0094	0.047
SIGMAROAA	+	4.4118	1.7982	0.007	2.1678	2.4930	0.193	2.2009	3.0673	0.237
LIQTA	-	-0.0484	0.1289	0.354	0.0031	0.1464	0.508	0.0067	0.1717	0.516
INTERBANKRATIO	+	0.0025	0.0093	0.394	-0.0036	0.0105	0.632	-0.0036	0.0114	0.626
PIE	+	0.1831	0.0832	0.014	0.0957	0.0892	0.142	0.0950	0.2934	0.373
LNTBV	+	0.4026	0.0233	0.000	0.2415	0.1063	0.012	0.2465	0.1043	0.009
CFS	+	0.7840	0.1050	0.000	Omitted, because time-invariant			1.3241	0.3499	0.000
SAMECITY	-	0.0442	0.0555	0.787	0.0715	0.0609	0.879	0.0713	0.0706	0.844
FFM	+/-	-0.0455	0.0655	0.487	-0.1274	0.0658	0.054	-0.1252	0.3315	0.706
BIG2	+	0.1227	0.0480	0.005	0.1039	0.0587	0.039	0.1038	0.0632	0.050
AUDITORCHANGE	-	-0.1747	0.0298	0.000	-0.1659	0.0309	0.000	-0.1658	0.0318	0.000
EPCHANGE	+/-	-0.0032	0.0242	0.894	-0.0134	0.0249	0.591	-0.0134	0.0250	0.591
AFS	+	0.0259	0.0460	0.287	0.0335	0.0451	0.229	0.0333	0.0470	0.239
INTERCEPT	+	3.3329	0.4987	0.000	7.1444	2.3295	0.001	6.5823	2.1720	0.001
Year Dummies:		Yes			Yes			Yes		
Clustered by:		Credit Institution			Credit Institution			–		
Bootstrapped Standard Errors:		No			No			Yes, 100,000 repetitions		
n		573			573			573		
$Prob > F$		0.000			0.000			0.000		

Table 3.7: Audit Fee Random Effects, Fixed Effects and Hausman-Taylor Estimator Regression—*H1* and *H2a* (continued)

Note: This table presents the results of three regressions (column (1) random effects, column (2) fixed effects, column (3) Hausman-Taylor estimator) based on samples of credit institutions in Germany from 2009 to 2011. Standard errors and t-statistics are adjusted; clustered by credit institution in the random and fixed effects regression; bootstrapped standard errors with 100,000 replications in the Hausman-Taylor estimator regression. p-values are based on one-sided tests when the coefficient's sign is predicted; otherwise, two-tailed tests are used. The regression includes a set of year dummies (YR), which are omitted from the table. For the Hausman-Taylor estimator regression, it is assumed that CFS and YR are exogenous. All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. The following regression model is tested: $LNAF_{it} = \alpha_0 + \alpha_1 CETA_{it} + \alpha_2 TAG_{it} + \alpha_3 LICAGL_{it} + \alpha_4 NONINTEXPRATIO_{it} + \alpha_5 ROAA_{it} + \alpha_6 SIGMAROAA_{it} + \alpha_7 LIQTA_{it} + \alpha_8 INTERBANKRATIO_{it} + \alpha_9 PIE_{it} + \alpha_{10} LNTBV_{it} + \alpha_{11} CFS_{it} + \alpha_{12} SAMECITY_{it} + \alpha_{13} FFM_{it} + \alpha_{14} BIG2_{it} + \alpha_{15} AUDITORCHANGE_{it} + \alpha_{16} EPCHANGE_{it} + \alpha_{17} AFS_{it} + \sum_{l=1}^{2} \alpha_{l+17} YR_{lit} + \varepsilon_{it}$, where LNAF denotes the natural logarithm of a credit institution's audit fees paid. CETA labels a credit institution's common equity to total assets. TAG represents a credit institution's growth of total assets. LICAGL corresponds to a credit institution's loan impairment charge divided by average gross loans. NONINTEXPRATIO denotes a credit institution's non-interest expenses to average assets. ROAA stands for a credit institution's return on average assets. SIGMAROAA equals a credit institution's return on average assets' standard deviation over the last five fiscal years. LIQTA refers to a credit institution's liquid assets to total assets. INTERBANKRATIO corresponds to a credit institution's interbank assets to interbank liabilities. PIE is a dummy variable that equals one if a credit institution is classified as a public interest entity according to the German Commercial Code and zero otherwise. LNTBV equals the natural logarithm of a credit institution's total business volume. CFS is a dummy variable that equals one if the financial statement consists of consolidated accounts and zero otherwise. SAMECITY is a dummy variable that equals one if a credit institution's office and the auditor's office are in the same city and zero otherwise. FFM is a dummy variable that equals one if the auditor's office is located at Frankfurt am Main and zero otherwise. BIG2 is a dummy variable that equals one if a credit institution is audited by either KPMG or PWC and zero otherwise. AUDITORCHANGE is a dummy variable that equals one if the credit institution's auditor (audit firm) changed and zero otherwise. EPCHANGE is a dummy variable that equals one if one or both engagement partners have changed and zero otherwise. AFS is a dummy variable that equals one if the credit institution's financial statements are amended after the first publication in the German Company Register and zero otherwise.

Table 3.8: Audit Fee Random Effects, Fixed Effects and Hausman-Taylor Estimator Regression—*H2b*

		(1) Random Effects			(2) Fixed Effects			(3) Hausman-Taylor Estimator		
Variable	**Expected Sign**	**Coefficient**	**Robust Standard Error**	**p-value**	**Coefficient**	**Robust Standard Error**	**p-value**	**Coefficient**	**Robust Standard Error**	**p-value**
CETA	-	0.2585	0.2001	0.902	0.3653	0.3244	0.869	0.3780	0.3692	0.847
TAG	-	-0.3734	0.0808	0.000	-0.2556	0.1021	0.006	-0.2577	0.1059	0.007
LICAGL	+	-0.0096	0.0056	0.958	-0.0016	0.0039	0.658	-0.0016	0.0055	0.613
NONINTEXPRATIO	+	1.3637	0.2619	0.000	1.0908	0.4321	0.006	1.1155	0.5960	0.031
ROAA	-	-1.9751	0.7481	0.004	-1.5737	1.2106	0.098	-1.5827	1.4498	0.137
SIGMAROAA	+	3.9811	1.9923	0.023	1.9555	2.8830	0.249	1.9795	3.5040	0.286
LIQTA	-	-0.0613	0.1652	0.355	0.1464	0.2113	0.528	0.0176	0.2450	0.529
INTERBANKRATIO	+	0.0055	0.0102	0.295	-0.0004	0.0118	0.514	-0.0005	0.0127	0.516
PIE	+	0.2745	0.1243	0.014	0.1412	0.1427	0.162	0.1407	1.1743	0.452
CETA×PIE	-	-2.2411	1.9653	0.127	-1.2829	2.5563	0.308	-1.2771	4.1270	0.378
TAG×PIE	-	0.0518	0.1641	0.624	0.0367	0.1550	0.593	0.0382	0.1966	0.577
LICAGL×PIE	+	-0.6934	0.3388	0.980	-0.6153	0.3987	0.938	-0.6198	1.5256	0.658
NONINTEXPRATIO×PIE	+	1.1934	1.9883	0.274	0.3476	2.7156	0.449	0.3275	8.5838	0.485
ROAA×PIE	-	3.7514	2.1508	0.959	2.7051	2.7074	0.841	2.7283	6.1864	0.670
SIGMAROAA×PIE	+	15.0534	7.4024	0.021	15.8479	7.7738	0.021	16.0227	19.4652	0.205
LIQTA×PIE	-	-0.2208	0.3257	0.249	-0.3185	0.3448	0.178	-0.3252	0.4952	0.256
INTERBANKRATIO×PIE	+	-0.0126	0.0337	0.645	-0.0324	0.0397	0.792	-0.0323	0.0695	0.679
LNTBV	+	0.4069	0.0247	0.000	0.2554	0.1123	0.012	0.2588	0.1135	0.011
CFS	+	0.7490	0.1044	0.000	Omitted, because time-invariant			1.2883	0.6025	0.016
SAMECITY	-	0.0588	0.0557	0.855	0.0950	0.0610	0.940	0.0947	0.0742	0.899
FFM	+/-	-0.0339	0.0664	0.610	-0.1144	0.0640	0.075	-0.1126	0.0645	0.707
BIG2	+	0.1303	0.0477	0.003	0.1110	0.0587	0.030	0.1110	0.0632	0.043
AUDITORCHANGE	-	-0.1729	0.0298	0.000	-0.1629	0.0309	0.000	-0.1628	0.0320	0.000
EPCHANGE	+/-	-0.0029	0.0242	0.904	-0.0151	0.0249	0.545	-0.0151	0.0254	0.552
AFS	+	0.0369	0.0459	0.211	0.0428	0.0455	0.174	0.0427	0.0495	0.194

Table 3.8: Audit Fee Random Effects, Fixed Effects and Hausman-Taylor Estimator Regression—*H2b* (continued)

		(1) Random Effects			(2) Fixed Effects			(3) Hausman-Taylor Estimator		
Variable	**Expected Sign**	**Coefficient**	**Robust Standard Error**	**p-value**	**Coefficient**	**Robust Standard Error**	**p-value**	**Coefficient**	**Robust Standard Error**	**p-value**
INTERCEPT	+	3.2350	0.5266	0.000	6.8065	2.4579	0.003	6.2908	2.3583	0.004
Year Dummies:		Yes			Yes			Yes		
Clustered by:		Credit Institution			Credit Institution			–		
Bootstrapped Standard Errors:		No			No			Yes, 100,000 repetitions		
n		573			573			573		
$Prob > F$		0.000			0.000			0.000		

Note: This table presents the results of three regressions (column (1) random effects, column (2) fixed effects, column (3) Hausman-Taylor estimator) based on samples of credit institutions in Germany from 2009 to 2011. Standard errors and t-statistics are adjusted; clustered by credit institution in the random and fixed effects regression; bootstrapped standard errors with 100,000 replications in the Hausman-Taylor estimator regression. p-values are based on one-sided tests when the coefficient's sign is predicted; otherwise, two-tailed tests are used. The regression includes a set of year dummies (YR), which are omitted from the table. The variables with "×" are interaction terms. For the Hausman-Taylor estimator regression, it is assumed that CFS and YR are exogenous. All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. The following regression model is tested: $LNAF_{it} = \beta_0 + \beta_1 CETA_{it} + \beta_2 TAG_{it} + \beta_3 LICAGL_{it} + \beta_4 NONINTEXPRATIO_{it} + \beta_5 ROAA_{it} + \beta_6 SIGMAROAA_{it} + \beta_7 LIQTA_{it} + \beta_8 INTERBANKRATIO_{it} + \beta_9 PIE_{it} + \beta_{10} CETA_{it} \times PIE_{it} + \beta_{11} TAG_{it} \times PIE_{it} + \beta_{12} LICAGL_{it} \times PIE_{it} + \beta_{13} NONINTEXPRATIO_{it} \times PIE_{it} + \beta_{14} ROAA_{it} \times PIE_{it} + \beta_{15} SIGMAROAA_{it} \times PIE_{it} + \beta_{16} LIQTA_{it} \times PIE_{it} + \beta_{17} INTERBANKRATIO_{it} \times PIE_{it} + \beta_{18} LNTBV_{it} + \beta_{19} CFS_{it} + \beta_{20} SAMECITY_{it} + \beta_{21} FFM_{it} + \beta_{22} BIG2_{it} + \beta_{23} AUDITORCHANGE_{it} + \beta_{24} EPCHANGE_{it} + \beta_{25} AFS_{it} + \sum_{l=1}^{2} \beta_{l+25} YR_{lit} + \varepsilon_{it}$, where LNAF denotes the natural logarithm of a credit institution's audit fees paid. CETA labels a credit institution's common equity to total assets. TAG represents a credit institution's growth of total assets. LICAGL corresponds to a credit institution's loan impairment charge divided by average gross loans. NONINTEXPRATIO denotes a credit institution's non-interest expenses to average assets. ROAA stands for a credit institution's return on average assets. SIGMAROAA equals a credit institution's return on average assets' standard deviation over the last five fiscal years. LIQTA refers to a credit institution's liquid assets to total assets. INTERBANKRATIO corresponds to a credit institution's interbank assets to interbank liabilities. PIE is a dummy variable that equals one if a credit institution is classified as a public interest entity according to the German Commercial Code and zero otherwise. LNTBV equals the natural logarithm of a credit institution's total business volume. CFS is a dummy variable that equals one if the financial statement consists of consolidated accounts and zero otherwise. SAMECITY is a dummy variable that equals one if a credit institution's office and the auditor's office are in the same city and zero otherwise. FFM is a dummy variable that equals one if the auditor's office is located at Frankfurt am Main and zero otherwise. BIG2 is a dummy variable that equals one if a credit institution is audited by either KPMG or PWC and zero otherwise. AUDITORCHANGE is a dummy variable that equals one if the credit institution's auditor (audit firm) changed and zero otherwise. EPCHANGE is a dummy variable that equals one if one or both engagement partners have changed and zero otherwise. AFS is a dummy variable that equals one if the credit institution's financial statements are amended after the first publication in the German Company Register and zero otherwise.

3.4 Summary and Limitations

The German legislature's decision not to classify all credit institutions as PIEs resulted in different levels of public oversight, and PIE credit institutions and their auditors are subject to additional public oversight. This regulatory setting allows to examine whether this public oversight of PIEs and their auditors increases the risks to those auditors to an extent sufficient to influence audit effort, an auditor's business risk premiums, or both—i.e., whether such increased oversight is related to audit fees.

Employing a sample of 573 German credit institutions covering the 2009–2011 period, this study first presents supporting evidence that a client's business risk is related to audit fees, which accords with the results of previous research (e.g., Cameran and Perotti 2014, 161–162, 164; Cullen et al. 2013, 9, 11, 68–70; Fields et al. 2004, 67). Next, this study demonstrates not only that PIE credit institutions pay significantly higher audit fees but also that this effect is economically remarkable (representing a 31.38% increase in average audit fees). Furthermore, there are some indications that the relationship between other clients' business risks and audit fees is greater for PIE credit institutions. However, this result is not robust when it is controlled for possible endogeneity (unobservable time-invariant variables); thus, generally stated, the result depends on the statistical methodology used. Overall, this empirical evidence sheds light on the question of whether public oversight of PIEs increases audit fees, and this question is answered in the financial industry, one that is already highly regulated and characterized by intense (governmental) supervision.

Finally, this study is subject to certain limitations. First, the outcomes are only valid for the German sample of the fiscal years considered. Second, even if it is empirically demonstrated that audit fees are higher for PIE credit institutions, this study does not determine whether the additional costs (to those credit institutions and their auditors) related to the public oversight of PIEs outweigh the benefits. For instance, do random inspections of auditors increase audit quality, on average (Hay et al. 2014, 184–185)? Third, the regression model does not allow to make statements regarding whether auditors consider fee determinants knowingly or unknowingly when setting audit prices. Although many studies have attempted to explain how variations in audit fees might be explained (e.g., Hay et al. 2006; Hay 2013), far too little is known about this (behavioral) topic. For instance, is the

positive relationship observed for PIE due to higher audit effort, which is based on rational and conscious decisions, or is this positive relationship the result of emotions and/or subconscious decisions? To address this question, future analyses might include internal data concerning the auditor's choice of procedures involving the risk assessment of financial statements and its results, which might also enable scholars to distinguish in detail how a client's business risk determines audit risk, audit effort and, ultimately, audit fees.

4 Results of Auditor Ratification Votes and Shareholders' Perceptions of External Financial Reporting Quality[50]

4.1 Introduction

A primary objective of the Securities and Exchange Commission (SEC) is to ensure the provision and disclosure of important information to shareholders.[51] To achieve this goal, the SEC regularly amends its rules, as it did with the "Proxy Disclosure Enhancements" in 2010 (SEC 2009; SEC 2010). One part of these amendments—which seems to have been overlooked or unappreciated thus far—is that the SEC emphasized the importance of the result of the auditor ratification vote by requiring its disclosure on Form 8-K. This disclosure requirement implies that the result of the auditor ratification vote constitutes important market-related information.

Indeed, previous research hints at a linkage between shareholders' perceptions of audit topics and their voting decisions (e.g., Liu et al. 2009; Mishra et al. 2005; Raghunandan and Rama 2003) and market reactions to reported earnings (e.g., Balsam et al. 2003; Eilifsen and Knivsfla 2013; Krishnan et al. 2005; Teoh and Wong 1993).[52] However, whether there is a relationship between the decision-usefulness of reported earnings and the results of auditor ratification votes remains an open question, especially because shareholder voting on auditors is nor-

[50] This chapter is based on a working paper titled "Results of Auditor Ratification Votes and Shareholders' Perceptions of External Financial Reporting Quality", which is co-authored by Sven Hörner. As this chapter is based on a working paper's 2016 version, this study's reasoning, results, and interpretations have changed after the submission of this thesis and the completion of the doctoral degree. The most recent version of this study is available either on my SSRN Author page (`http://ssrn.com/author=2334700`) or upon request.

[51] For example, the SEC states the following on its website: "The SEC oversees the key participants in the securities world [...]. Here the SEC is concerned primarily with promoting the disclosure of important market-related information, maintaining fair dealing, and protecting against fraud." (`http://www.sec.gov/about/whatwedo.shtml`; accessed on 1st May 2016) See also Saul (1996, 135), SEC (2000a) and SEC (2000b).

[52] When the word "market" (as in "market" reaction) is used, the study refers to equity markets and their investors and not to debt markets and debt investors.

mally a routine, non-binding action and the share of votes for (supporting) the auditor's engagement is in the 95% region or higher.

Thus, the study is interested in whether the result of the auditor ratification vote is market-related information. The study also provides theoretical reasoning in the sense that the influence of shareholders' perceptions of firm- and auditor-specific characteristics in the determination of perceived external financial reporting quality (EFRQ) is captured by the result of shareholder voting on auditor ratification. Accordingly, the result of a recent auditor ratification vote might enable individual (prospective) shareholders to draw conclusions about the market's perception of EFRQ and might help them in making informed investment decisions.[53]

Using a returns-earnings design (U.S. 10-K-filers; 2010 to 2013), this study's results reveal that the decision-usefulness of earnings is associated with results of auditor ratification votes; the higher the percentage of votes supporting an auditor's engagement is, the higher the earnings response coefficient (ERC). Moreover, this effect appears to be greater when firms are characterized by higher levels of information asymmetries between managers and shareholders. Additional analyses reveal that the voting result remains significant if other audit-related variables are considered and that the time lag between the voting date and the earnings announcement influences the importance of the voting results.

This study contributes to the accounting and auditing literature in several ways. First, the study extends the auditor ratification literature by showing that the results of the auditor ratification votes are associated with the decision-usefulness of earnings. Second, the study examines how the ERC is related to a comprehensive variable—shareholder votes in support of the auditor—which captures shareholders' perceptions of the interaction of firm characteristics and the auditor's quality attributes. It also provides incremental information content beyond that of other publicly available audit-related information. Third, and resulting from the two previous points, because the result of the auditor ratification vote is important market-related information, it might benefit (prospective) shareholders in making informed investment decisions. Fourth, if perceived EFRQ is associated with shareholder ratification voting results, it might be legitimate to more intensively debate policy

[53] Indeed, it is understandable that the research question might be regarded as somewhat tautological if one assumes that shareholder voting on auditor ratification and the earnings response coefficient are measures of the same construct, i.e., perceived audit quality. However, that does not necessarily contradict this study's reasoning that the voting results might yield information about the expected perceived EFRQ at the earnings announcement date, and, thus, might be of interest to (prospective) shareholders.

recommendations regarding shareholder ratification of auditors—as is the case, for example, in the recently issued SEC Concept Release (SEC 2015, 39007). The report of the Advisory Committee on the Auditing Profession (ACAP) released a few years ago (ACAP 2008, VIII:20–VIII:21), which made a foray into this domain, is a natural focal point in this regard.

The remainder of this chapter is structured as follows: The next section provides some background information, and two hypotheses are developed. In the third section, the model specification is explained, both the sample selection procedure and the descriptive statistics are described and the empirical findings are discussed. Further analyses are presented in section four. This chapter closes with a brief summary and an examination of the study's limitations.

4.2 Background and Formation of Hypotheses

4.2.1 Results of Auditor Ratification Votes: Important Market-related Information?

Shareholder ratification of auditors is not mandatory, nor is the result binding. Voting ratios are normally in the 95% region or higher and tend to have relatively low variation across firms and years (e.g., Glezen and Millar 1985, 863; Liu et al. 2009, 233). Moreover, it might be argued that the result of the auditor ratification vote is "timely stale information" and that other information regarding the firm's auditor is already publicly available. Therefore, it might be questionable whether the voting results really matter, especially if a considerable fraction of shareholders are passive in director elections or auditor ratification (Dao et al. 2008, 308–309). Nonetheless, a regulatory change (NYSE Rule 452) in 2010 led more companies to seek shareholder ratification of auditors because this typically routine matter helps firms to achieve quorums in their annual meetings. Thus, procedural technicalities—as opposed to boards' interest in shareholders' opinions—might have increased the importance of auditor ratification votes in recent years.[54] In short, there are several reasons that shareholders might not attach great importance to the results of auditor ratification votes (Hermanson et al. 2009, 394). Thus, it appears unsurprising that the SEC did not emphasize shareholders' role in electing, approving or ratifying

[54] See `http://ww2.cfo.com/risk-compliance/2010/06/more-shareholder-say-on-auditors/`; accessed on 1st May 2016.

the auditor but the role of the audit committee during the implementation of the Sarbanes-Oxley Act (Brown 2012, 524–528; SEC 2003a).

Another picture emerges, however, if one considers related research. Recent evidence suggests that shareholders' perceptions of audit-related issues are associated with their decisions regarding the auditor. For example, the non-audit to audit fee ratio has a positive and significant effect on the percentage of shareholder votes against auditor ratification (Raghunandan 2003, 160). In a similar vein, Mishra et al. (2005, 20–21) find that shareholders perceive various categories of non-audit services differently. Another study notes that such empirical observations depend on the composition of the audit committee (Raghunandan and Rama 2003, 260). Moreover, Sainty et al. (2002, 128) reveal, among other findings, that engagements of less credible auditors and going concern opinions are related to the proportion of votes opposed to auditor ratification. In part conflicting with the results of Dao et al. (2008, 305), no effect is observed for variables relating to auditor's industry specialization or audit tenure. There is also evidence that financial restatements (Liu et al. 2009, 233–235) and an adverse Section 404 internal control opinion (Hermanson et al. 2009, 403–405) influence shareholders' votes. Regarding this stream of literature, it seems that shareholders consider their vote thoroughly and use it as a communication tool, and hence, the voting result is a matter of public concern. Thus, it appears understandable that shareholder activists and the ACAP demand mandatory shareholder ratification of auditors (ACAP 2008, VIII:20–VIII:21; Liu et al. 2009, 227).[55] Simultaneously, it remains debatable whether perceptions of audit quality—including auditor independence—are related to shareholders' investment decisions and, therefore, constitute important market-related information.

The objective of external audits is not an end in itself; rather, the aim is to ensure a sufficient level of EFRQ, which implies that audited financial reports should provide decision-useful information. Further, the two fundamental requirements of decision-useful information are relevance and reliability (FASB 1978, Para. 16; FASB 2010, Para. QC5).[56] Thus, assuming a given level of relevance, an audit's purpose is to safeguard an adequate degree of reliability (FASB, 1978, Para. 8). Even if the

[55] For an example, see the petition for rulemaking (File No. 4–570) submitted to the SEC by the California State Teachers' Retirement System (`https://www.sec.gov/rules/petitions/2008/petn4-570.pdf`; accessed on 1st May 2016).

[56] The term "reliability", which is used throughout this thesis, is not entirely accurate under the current nomenclature of the FASB ("faithful representation"). For example, an asset stated at fair value might be faithfully represented, but its valuation might be not reliable. For a brief discussion of this topic, see FASB (2010, Para. BC3.25–3.26).

qualitative characteristics of EFRQ or decision-useful information are not directly observable, studies of the market's reaction to reported earnings make it possible to measure shareholders' related perceptions, which means that it is also possible to indirectly examine perceived audit quality. For instance, the results of Teoh and Wong (1993, 349, 364) highlight increased perceived EFRQ for Big 8 clients relative to non-Big 8 clients. Although, Big N auditors and their office size might essentially define audit quality (Francis and Yu 2009, 1547–1548), Balsam et al. (2003, 89) provide evidence that the stock market's reaction to earnings surprises is positively related to auditor industry specialization. Another stream of literature addresses shareholders' perceptions of potentially compromised auditor independence, which is a sign of impaired audit quality. In these analyses, researchers commonly focus on the economic bond between auditor and auditee: audit and non-audit fees. Overall, there is some evidence to suggest that high levels of non-audit fees are associated with shareholders' perceptions of impaired auditor independence, which leads to a lower perceived EFRQ (e.g., Eilifsen and Knivsfla 2013, 101–107; Francis and Ke 2006, 509; Ghosh et al. 2009, 377–379; Higgs and Skantz 2006, 13–19; Lim and Tan 2008, 233; Krishnan et al. 2005, 131). A closer examination of these studies shows that the evidence on whether perceived audit quality is related to shareholders' assessments of the reliability of earnings information, and therefore the perceived EFRQ, is not entirely homogeneous and is conditional on various combinations of firm characteristics (e.g., board composition, the audit committee, internal controls) and auditor characteristics (e.g., Big N auditor, specialization, independence).

The outlined literature suggests and the SEC assumes (SEC 2000a; SEC 2000b) that shareholders' perceptions of audit-related issues determine certain of their voting and investment actions. In particular, shareholder voting on auditor ratification is one of the few or possibly the only opportunity for shareholders to express their views concerning the auditor or their perceptions of audit quality (e.g., Marshall 2005, 41; Sainty et al. 2002, 111; Saul 1996, 135). Consistent with this point, the SEC clarified in 2003 that although the audit committee's responsibility is to appoint the auditor (Exchange Act Rule 10A-3), this responsibility does not conflict with or oppose shareholder ratification of auditors (SEC 2003a). More important, a few years ago, the SEC stressed the relevance of the result of the auditor ratification vote by requiring its disclosure on Form 8-K (SEC 2009; SEC 2010). The SEC argues that the "disclosure of the voting results [...] would benefit investors and the markets." (SEC 2009, 62) Therefore, considering the U.S. regulatory setting and

reviewing the existing literature, the result of the auditor ratification vote might be important market-related information.

To supplement the more empirically based reasoning, there is also a theoretical argument for why the disclosure of the result of the auditor ratification vote might be important market-related information. Seminal studies (Holthausen and Verrecchia 1988, 83–87; Lev 1989, 186–187; Kormendi and Lipe 1987, 325-334) reveal that the extent of the price reaction due to a single earnings announcement depends, inter alia, on the quality of the earnings signal, i.e., the variance of the earnings noise or the EFRQ. To explain this in more detail a closer look is taken at the theoretical model developed by Lev (1989, 186–187), which considers the revision of a firm's market price due to a single earnings announcement.

Beginning at date 0, the price of a firm, P_0, equals the present value of the unknown random future cash flows to the firm's risk-neutral shareholders, $E(\widetilde{CF})$, which follows a normal distribution.

$$\begin{aligned} P_0 &= E(\widetilde{CF}) \\ \widetilde{CF} &\sim \mathcal{N}(E(\widetilde{CF}), \sigma^2) \end{aligned} \tag{4.1}$$

At date 1, the firm releases an earnings signal, e_1, before any cash flow to the firm's shareholders is observable. As a result of this signal, shareholders can revalue the firm because the expected future cash flows are linked to the firm's earnings. The earnings signal corresponds to a scale factor, a, multiplied by the present value of random future cash flows, $\widetilde{CF}$, plus a random noise term, $\tilde{\epsilon}$, which is independent of these cash flows. Moreover, the noise is normally distributed with mean zero and variance σ_ϵ^2.

$$\begin{aligned} \tilde{e} &= a\widetilde{CF} + \tilde{\epsilon} \\ \tilde{\epsilon} &\sim \mathcal{N}(0, \sigma_\epsilon^2) \\ cov(\widetilde{CF}, \tilde{\epsilon}) &= 0 \end{aligned} \tag{4.2}$$

As it is assumed that the shareholders use Bayes' rule to update their expectations regarding the present value of the unknown random future cash flows, the price of the firm after the announcement of the signal is represented by Equation 4.3.

$$P_1 = E(\widetilde{CF}|e_1) = \frac{\frac{e_1/a}{\sigma_\epsilon^2} + \frac{E(\widetilde{CF})}{a^2\sigma^2}}{\frac{1}{\sigma_\epsilon^2} + \frac{1}{a^2\sigma^2}} \tag{4.3}$$

Considering Equation 4.2, it follows that $E(\tilde{e}) = aE(\widetilde{CF})$. For further simplification, the scale factor, a, is set to 1.

$$P_1 - P_0 = \frac{\sigma^2}{\sigma^2 + \sigma_\epsilon^2} \left(e_1 - E(\tilde{e_1})\right) \tag{4.4}$$

In summary, Equation 4.4 highlights that the change in the stock price is determined by the earnings signal, e_1, and its expectation, $E(\tilde{e_1})$. In addition, the change in the stock price also depends on variances in the value of the company and the earnings noise, i.e., the ERC, $\sigma^2/(\sigma^2 + \sigma_\epsilon^2)$.

$$\begin{aligned} \frac{\partial ERC}{\partial \sigma^2} &> 0 \\ \frac{\partial ERC}{\partial \sigma_\epsilon^2} &< 0 \end{aligned} \tag{4.5}$$

The variance, σ^2 (σ_ϵ^2), has a positive (negative) influence on the ERC (Equation 4.5). Notably, the EFRQ is represented by the variance of the earnings noise, σ_ϵ^2. Thus, higher quality means higher reliability and, hence, a lower variance; it results, c.p., in a higher ERC and, therefore, a greater price reaction.

However, what is behind the variance of the earnings noise? The noise, $\tilde{\epsilon}$, represents deficiencies in reported earnings due, for instance, to insufficient reliability. Therefore, it might be the case that the financial statements do not correctly represent the substance of an economic transaction (FASB 2010, Para. BC3.26); such a material misstatement results in a non-faithful or non-reliable representation. Hence, it is assumed that the earnings noise, $\tilde{\epsilon}$, consists of a random amount of material misstatements, $\tilde{\omega}$, multiplied by the risk that the audited financial statements contain material misstatements, $\widetilde{\kappa_{post}}$. The latter term is further denoted as the financial reporting risk after the audit. Thus, $\tilde{\epsilon}$ can be interpreted as the total amount of material misstatements that remain undetected. Related to the logic of the Audit Risk Model (AICPA 1984), the financial reporting risk after the audit, $\widetilde{\kappa_{post}}$, consists of the financial reporting risk before the audit (which summarizes the inherent and

control risks), $\widetilde{\kappa_{pre}}$, and the auditor's detection risk, $\tilde{\tau}$.[57] The expected value and the variance of the former express the financial reporting quality before the audit.[58] Accordingly, the audit quality is characterized by the auditor's expected detection risk and its variance.[59] Thus, both attributes of quality have an impact on the variance of the financial reporting risk after the audit, $\widetilde{\kappa_{post}}$, and, moreover, on σ_ϵ^2, i.e., the EFRQ.

A simplified example can be described that allows a deeper understanding of the reasoning outlined above. It is assumed that the capital market forms its expectation based only on the means of the financial reporting risk before the audit, κ_{pre}, and the auditor's detection risk, τ. Therefore, the variances are set to zero. The constant expectation values are interpreted as the perceived quality of the financial reporting before the audit and of the audit; the assumption is made for simplicity. In fact, expectations should also be formed regarding the variances. Nevertheless, with a sufficient number of audit areas, the variances might be comparatively small and, thus, their impact—relative to the influence of the means—might be marginal. Hence, in this simplified case, the capital market decides based on a heuristic.

$$\begin{aligned} \tilde{\epsilon} &= \tilde{\omega}\kappa_{post} \\ \tilde{\omega} &\sim \mathcal{N}(0, \sigma_\omega^2) \end{aligned} \tag{4.6}$$

Further, the financial reporting risk after the audit, κ_{post}, depends solely on the means of the financial reporting risk before the audit and the auditor's detection risk.

$$\kappa_{post} = \kappa_{pre}\tau \tag{4.7}$$

Thus, the variance of σ_ϵ^2 can be derived using Taylor series expansion.

$$\sigma_\epsilon^2 = (\kappa_{pre}\tau)^2\sigma_\omega^2 \tag{4.8}$$

[57] It is notable that the Audit Risk Model originally referred to the audit planning process. However, detection risk could be interpreted as the probability that the auditor does not detect material misstatements. This probability is affected by an auditor's incentives, motivation, professional skepticism, expertise, etc. (e.g., Knechel et al. 2013, 404–405). Detection risk could also be understood to mean one minus the "market-assessed joint probability that a given auditor will *both* (a) discover a breach in the client's accounting system, and (b) report the breach." (DeAngelo 1981b, 186)

[58] Financial reporting quality before the audit is interpreted in a fashion similar to DeFond and Zhang (2014, 281–282). However, in the above reasoning, the achievable level of EFRQ is not constrained by the financial reporting quality before the audit.

[59] For further discussions regarding the definition of audit quality, see, for example, DeFond and Zhang (2014), Francis (2011) and Knechel et al. (2013).

Considering Equations 4.4 and 4.8, the price reaction formula is now defined as follows:

$$P_1 - P_0 = \frac{\sigma^2}{\sigma^2 + [(\kappa_{pre}\tau)^2\sigma_\omega^2]}(e_1 - E(\tilde{e_1})) \tag{4.9}$$

Differentiating the ERC of Equation 4.9 with respect to the variables of interest leads to the additional conclusions provided below.

$$\begin{aligned} \frac{\partial ERC}{\partial \tau} &< 0 \\ \frac{\partial ERC}{\partial \kappa_{pre}} &< 0 \end{aligned} \tag{4.10}$$

Equation 4.10 demonstrates that the expected auditor's detection risk, τ, as well as the expected financial reporting risk before the audit, κ_{pre}, are inversely related to the ERC. Consequently, the same (causal) link applies to the financial reporting risk after the audit, κ_{post}. One further aspect to note is that any level of EFRQ is achievable by different combinations of financial reporting quality before the audit and audit quality. If it is assumed that financial reporting quality before the audit is constant in the short term, then the audit quality demanded can be used as an instrument to achieve a certain desired level of financial reporting risk after the audit and, thus, a certain EFRQ.

In addition, it is supposed that shareholders demand a certain level of EFRQ. If auditor ratification votes enable shareholders to indicate their level of satisfaction regarding perceived audit quality (τ), given a certain level of financial reporting quality before the audit (κ_{pre}), they also indirectly enable shareholders to signal their satisfaction with EFRQ (σ_ϵ^2). This also means that results of auditor ratification votes capture shareholders' perceptions of the interaction between firm characteristics and the auditor's quality attributes. The voting decision is made at the voting date (VD_t). As shown in Figure 4.1, p. 72, the vote occurs before the audit of the financial statements begins (AS_t).[60] Thus, the vote represents an expression of shareholders' satisfaction or dissatisfaction with expected (perceived) audit quality and, as a result, with expected (perceived) EFRQ. Consequently, a high percentage of votes supporting an auditor's engagement might indicate shareholders' satisfaction with the expected (perceived) EFRQ. At a later date (i.e., the earnings announcement date, EAD_t), the market's reaction to earnings surprises (investment

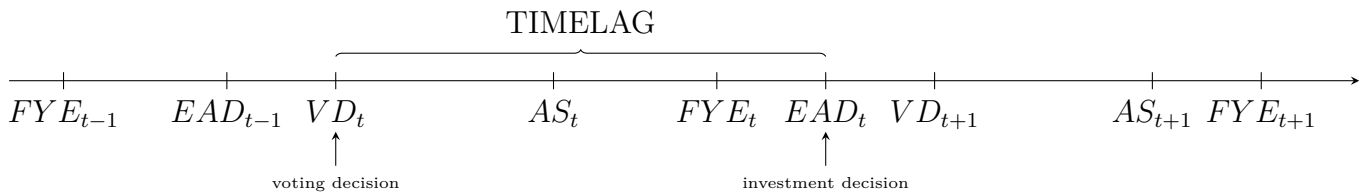
[60] The audit process is explained in a simplified manner and should not be interpreted too literally. Contemporary audits are often characterized by a continuing audit process.

decision) is observable, hence, as are shareholders' perceptions of the EFRQ. If the reasoning described above holds and shareholders' investment decisions are made in accordance with their voting decisions, then shareholders' expectations concerning the (perceived) EFRQ on the date of the voting decision will yield information regarding perceived EFRQ on the earnings announcement date. This voting result would, therefore, be important market-related information and meaningful to disclose because it might help shareholders make informed investment decisions.

Based on this theoretical framework and the aforementioned U.S. background and literature, the alternative form of Hypothesis 1 is stated as follows:

***H1**: The higher the percentage of votes supporting an auditor's engagement is, the higher the perceived EFRQ, c.p.*

Figure 4.1: Timeline of Shareholder Voting Date, Beginning of the Audit Process, Fiscal Year-end Date, and Earnings Announcement Date



Note:

VD_t	Shareholder voting date for fiscal year t.
AS_t	Beginning of the audit process for fiscal year t.
FYE_t	Fiscal year-end date of fiscal year t.
EAD_t	Earnings announcement date for fiscal year t.
TIMELAG	Period measured in days between the date of the auditor ratification and the earnings announcement date.

4.2.2 Results of Auditor Ratification Votes and Information Asymmetries

A wide variety of studies focus on the question of measuring the extent to which audits or different levels of audit quality can effectively mitigate agency costs due to information asymmetries between managers and owners (e.g., Jensen and Meckling 1976, 338–339).[61] It is often argued that auditing enhances the reliability of accounting information because it acts as a monitoring device and reduces information asymmetries between management and shareholders (e.g., DeAngelo 1981b, 185–187). Even if the importance of audits might differ for various groups of shareholders—e.g., major versus minor shareholders, insiders—the common argument should hold for an average firm. However, some recent contributions express general doubts concerning the extent to which accounting reports provide new information to shareholders (Ball 2013, 848–850) and whether EFRQ may have direct effects on a firm's value (Zimmerman 2013, 888–889). For instance, Ball et al. (2012, 138–140, 146–150) show that audited financial reports and other disclosed private information—such as voluntary management earnings forecasts—are complements rather than substitutes.[62] Nevertheless, if there is at least a second- or third-order effect of different levels of EFRQ on firm values—as posited by Zimmerman (2013)—it is assumed that the following reasoning holds: Higher levels of information asymmetries mean that the reliability of published financial reports is more important. Consequently, the audit process, the auditor and, finally, the result of the auditor ratification vote become more important. Thus, the second hypothesis (alternative form) is stated as follows:

***H2**: The higher the level of information asymmetries between managers and shareholders is, the greater the effect of the votes supporting an auditor's engagement on the perceived EFRQ, c.p.*

[61] Of course, in addition to agency conflicts, other issues also determine the demand for audits. See, for example, Francis et al. (2011).

[62] Therefore, it is questionable whether audited reported earnings serve more as a "confirmation" function and are not a primary information source (Ball and Shivakumar 2008, 1012; Gigler and Hemmer 1998, 138). Contradicting this perspective, Basu et al. (2013, 221) argue that reported earnings represent a crucial source of new information.

4.3 Research Design, Sample, And Empirical Results

4.3.1 Model Specification

4.3.1.1 Results of Auditor Ratification Votes: Important Market-related Information—Model

The study employs a returns-earnings methodology to answer the research question. This approach is chosen because shareholders' perceptions of EFRQ are reflected in the extent of stock price responses to unexpected earnings. Following prior research, the price reaction around a firm's fiscal year-end earnings release is measured by the cumulative abnormal return (CAR)—i.e., the stock's cumulative excess return over the Standard and Poor's 500 Composite return—aggregated over a 3-day window (-1 day to +1 day) relative to the earnings announcement date.[63] To test the hypotheses, the variable SURP is introduced, which is defined as the earnings surprise for a respective fiscal year. SURP is calculated as the reported earnings for a respective fiscal year minus the mean earnings forecast for that fiscal year one week before the earnings announcement date, scaled by the firm's stock price two days before the earnings announcement. Furthermore, VOTEFOR represents shareholders' voting result in percentage terms with respect to the votes for (supporting) the auditor's engagement. Eventually, the ERC is determined by the variable SURP, its interaction with VOTEFOR, its interactions with the control variables described below and its interactions with industry and year dummies.

The model to test *H1*—concerning the question of whether the result of the auditor ratification vote is important market-related information—is specified as follows:

$$\begin{aligned} CAR_{it} = {} & \alpha_0 + \alpha_1 SURP_{it} + \alpha_2 VOTEFOR_{it} + \alpha_3 VOTEFOR_{it} \times SURP_{it} \\ & + \sum_{j=1}^{7} \alpha_{j+3} CONTROL_{jit} + \sum_{j=1}^{7} \alpha_{j+10} CONTROL_{jit} \times SURP_{it} \\ & + \sum_{k=1}^{8} \alpha_{k+17} IND_{kit} + \sum_{k=1}^{8} \alpha_{k+25} IND_{kit} \times SURP_{it} \\ & + \sum_{l=1}^{3} \alpha_{l+33} YR_{lit} + \sum_{l=1}^{3} \alpha_{l+36} YR_{lit} \times SURP_{it} + \varepsilon_{it} \,, \end{aligned} \tag{4.11}$$

[63] The calculation of the CAR is based on a market model estimated over the 180-day window ending 21 trading days before the earnings announcement date. Following Bergh and Gibbons (2011, 552), a sufficiently long event window is chosen to capture the market's price response to unexpected earnings. However, the window should also remain as short as possible to guard against confounding events (e.g., McWilliams and Siegel 1997, 636).

where *CONTROL* is a set of control variables that are introduced to control for additional firm characteristics. Firm size is measured as the natural log of the market value of equity (MVE; e.g., Atiase 1985, 21–22). The market-to-book value of equity (MB) proxies for a firm's growth opportunities (e.g., Hackenbrack and Hogan 2002, 207, 213). Following Higgs and Skantz (2006, 7), an indicator variable (MBNEG) controls for a negative MB. A negative MB value is replaced with zero because MB ratios less than zero are not economically reasonable. With respect to a firm's risk, two independent variables are included in the regression. On the one hand, a firm's financing structure is represented by its leverage ratio (LEV), which is calculated as long-term debt plus short-term debt plus the current portion of long-term debt divided by total capital plus short-term debt plus the current portion of long-term debt (e.g., Baber et al. 2014). On the other hand, the beta factor (BETA) captures a firm's systematic risk (e.g., Collins and Kothari 1989, 157). Further, a dummy variable (SURPNEG) equals one for negative values of SURP; this variable is introduced because shareholders capitalize unexpected negative and positive earnings differently (e.g., Basu 1997, 23). The model also tests for variations in a firm's predisclosure environment (e.g., Bhushan 1989, 255; Teoh and Wong 1993, 359, 364), and this variable is calculated as the natural log of one plus the number of earnings estimates by analysts following the firm (ANALYST). Finally, *IND* is a set of industry dummies, and *YR* represents three year dummies. Table 4.1, p. 76, presents the variables' definitions.

Table 4.1: Variables and Definitions

Variable	Definition
	Dependent Variable
CAR	A stock's cumulative excess return over the Standard and Poor's 500 Composite return aggregated over a 3-day window, i.e., -1 day to +1 day relative to the earnings announcement date. The calculation is based on the market model estimated over the 180-day window ending 21 trading days before the earnings announcement date.
	Variables of Interest
SURP	Reported earnings for a respective fiscal year minus the mean earnings forecast for this fiscal year one week before the earnings announcement date, scaled by the firm's stock price two days before the earnings announcement.
VOTEFOR	Shareholders' voting result in percentage terms with respect to the votes for (supporting) the auditor's engagement.
TSH	Percentage of total shares in issue not available to ordinary investors (percentage of total shares in issue of 5% or more held strategically).
DOAF	The standard deviation of the earnings forecasts for a respective fiscal year, scaled by reported earnings for this fiscal year.
	Additional Variables of Interest—Further Analyses
INDLEADER	A dummy variable that equals one if the firm's auditor is the national annual audit fee market share leader in the firm's industry (industry according to the SIC Division Structure as used by the U.S. Department of Labor, Occupational Safety & Health Administration; cf. `https://www.osha.gov/pls/imis/sic_manual.html`) and zero otherwise.
NAFAF	The ratio of non-audit to audit fees.
AUDITORCHANGE	A dummy variable that equals one if the firm changed its auditor and zero otherwise.
TIMELAG	The period measured in days between the date of the auditor ratification and the earnings announcement date.
	Control Variables—CONTROL
MVE	Natural logarithm of the market value of equity.
MB	Market-to-book value, defined as the market value of the common equity divided by the balance sheet value of the common equity. Negative values are replaced with zeros.
MBNEG	A dummy variable that equals one if a firm has a negative market-to-book value and zero otherwise.
LEV	Leverage, defined as long-term debt plus short-term debt plus the current portion of long-term debt divided by total capital plus short-term debt plus the current portion of long-term debt.
BETA	Beta factor from the market model regression, which is calculated over the 180-day window ending 21 days before the earnings announcement date.
SURPNEG	A dummy variable that equals one if a firm has a negative earnings surprise (SURP) and zero otherwise.
ANALYST	Natural logarithm of one plus the number of earnings per share estimates made by analysts.
	Fixed-Effects Variables—IND, YR
IND	A set of eight industry dummies representing the SIC Division Structure as used by the U.S. Department of Labor, Occupational Safety & Health Administration (cf. `https://www.osha.gov/pls/imis/sic_manual.html`).
YR	A set of three year dummies.

Note: This table presents the variables' definitions.

4.3.1.2 Results of Auditor Ratification Votes and Information Asymmetries—Model

In contrast to Equation 4.11, the model to test *H2* has to include additional two- and three-way interactions. These are excluded in the regression of *H1* because first the marginal effect of VOTEFOR on the ERC is of interest. This effect can be analyzed directly in Equation 4.11 and does not depend on other regressors, i.e., the three-way interaction term, as is the case in Equation 4.12. Based on the discussion concerning *H2*, the following model is tested:

$$\begin{aligned} CAR_{it} = {} & \beta_0 + \beta_1 SURP_{it} + \beta_2 VOTEFOR_{it} + \beta_3 VOTEFOR_{it} \times SURP_{it} \\ & + \beta_4 VOTEFOR_{it} \times IA_{it} \times SURP_{it} + \beta_5 IA_{it} \\ & + \beta_6 VOTEFOR_{it} \times IA_{it} + \beta_7 IA_{it} \times SURP_{it} \\ & + \sum_{j=1}^{7} \beta_{j+7} CONTROL_{jit} + \sum_{j=1}^{7} \beta_{j+14} CONTROL_{jit} \times SURP_{it} \\ & + \sum_{k=1}^{8} \beta_{k+21} IND_{kit} + \sum_{k=1}^{8} \beta_{k+29} IND_{kit} \times SURP_{it} \\ & + \sum_{l=1}^{3} \beta_{l+37} YR_{lit} + \sum_{l=1}^{3} \beta_{l+40} YR_{lit} \times SURP_{it} + \varepsilon_{it} \,, \end{aligned} \tag{4.12}$$

where *IA* is a proxy for information asymmetries and the sets of further variables—i.e., *CONTROL*, *IND* and *YR*—remain the same as in Equation 4.11. To examine how information asymmetries between managers and shareholders influence the effect of VOTEFOR on the ERC, two different proxies are used.

The first variable refers to the firm's ownership structure and, hence, the possible existence and complexity of information asymmetries. It might be argued that ordinary shareholders face higher levels of information asymmetries than do major shareholders (e.g., Jensen and Meckling 1976, 312–330, 338–339). Major shareholders might have access to non-public information sources (e.g., via appointed board members) and, as a result, are not as reliant on published audited financial reports. The line of reasoning regarding *H2* can thus be further specified: higher levels of dispersed ownership mean that there are higher levels of information asymmetries in principle, and as a result, shareholders will demand that published financial reports have higher levels of reliability. Therefore, the audit and the result of the auditor ratification vote become more important. As a inverse measure of dispersed ownership and related information asymmetries, a variable named total strategic holdings (TSH) is introduced. It is defined as the percentage of total shares in issue not

available to ordinary investors (percentage of total shares in issue of 5% or more held strategically). In other words, it equals one minus free float. Moreover, TSH could also be interpreted as a "proxy for the presence of insiders." (Leuz 2003, 457) In conclusion, it is expected that the effect of *H1* is lower when this inverse measure of information asymmetries, i.e., TSH, is higher.

The second variable (DOAF) refers to the dispersion of analysts' forecasts—i.e., the standard deviation of the earnings forecasts for a respective fiscal year, scaled by reported earnings for this fiscal year—and approximates information asymmetries related to the firm's disclosure policy and its informativeness (e.g., Lang and Lundholm 1996, 471–472). Higher levels of information asymmetries should lead to increased disagreement among analysts and, hence, an increase in the standard deviation of forecasts (e.g., Krishnaswami and Subramaniam 1999, 85). To partly mitigate these information asymmetries, the market should demand higher levels of reliability for available information (e.g., published financial reports), and as argued above, the audit and the result of the auditor ratification vote thus become more important. Accordingly, the effect of *H1* is expected to be greater for higher levels of DOAF.

4.3.2 Sample and Descriptive Statistics

The data for the sample are taken from four databases: Audit Analytics, Datastream, I/B/E/S and Worldscope. First, Audit Analytics is used. As the main variables of interest refer to shareholder ratification of auditors, 15,703 firm-years for SEC registrants for fiscal years 2010, 2011, 2012 and 2013 are initially obtained. In addition, Audit Analytics provides information on other variables regarding auditors and formal information on financial statements (e.g., fiscal year-end date). Because this information is taken from sub-databases of Audit Analytics, 10,395 firm-years are eventually obtained. Datastream is the source for all financial market-related variables, such as daily stock prices. Balance sheet and income statement data are collected from Worldscope. Using both databases, the sample decreases by 472 observations. It is commonly acknowledged that I/B/E/S typically causes the largest decline in sample size because its coverage tends to be biased toward larger companies.[64] In this study, the problem concerns some information that is relevant to calculating an earnings surprise, i.e., earnings per share and forecasts, in addition to

[64] There are further problems regarding I/B/E/S or, generally, in using forecast data; cf. Easterwood and Nutt (1999, 1777) or Zhang (2006, 572).

the calculation of the ANALYST variable. The sample consists of 7,158 firm-years after merging all four databases. Subsequently, the sample decreases to 7,042 firm-years of 10-K-filers. On the one hand, it is controlled for significant inconsistencies in the dataset (e.g., overlapping dates regarding the vote date for the fiscal year and the earnings announcement date for the previous fiscal year). On the other hand, firm-years with time lags greater than 365 days between the auditor ratification vote and the earnings announcement are deleted. This should ensure that the data related to auditor ratification remain relevant with respect to time. In addition, 16 observations concerning penny stocks are deleted because the literature shows that such stocks are frequently associated with price anomalies (e.g., Ball et al. 1995, 104–105; Bhardwaj and Brooks 1992, 558–559). Moreover, the forecasts must be economically meaningful and approximate market opinion. Hence, earnings forecasts are only employed if at least three analyst estimates are available (e.g., Barron et al. 2002, 829; Imhoff and Lobo 1992, 431).[65] Finally, 8 firm-years are lost because these firms report earnings per share of zero, and hence, the variable DOAF could not be calculated. The final sample consists of 6,621 firm-years and 2,359 different firms. In Table 4.2, Panel B, p. 80, the sample composition by industry is also presented. Even if it differs slightly, for example, from other samples (Ball and Shivakumar 2008, 1001; Krishnan et al. 2005, 119), no industry is largely overrepresented.

[65] This step in the sample selection process also indirectly addresses possible problems of stale forecasts. Nevertheless, this procedure enhances the sample's large company bias that is already present from using I/B/E/S forecast data.

Table 4.2: Sample Selection and Sample Composition by Industry

Panel A: Sample Selection

	Firm-Years
Initial sample of SEC registrants with shareholder voting results for the ratification of auditors for fiscal years 2010, 2011, 2012 or 2013 in Audit Analytics.	15,703
Less: firm-years with more than one shareholder voting (date) for the ratification of an auditor in a respective fiscal year.	196
Less: firm-years with no data regarding other used variables from Audit Analytics.	5,112
	10,395
Less: firm-years with no data in Datastream.	466
	9,929
Less: firm-years with no data in Worldscope.	6
	9,923
Less: firm-years with no data in I/B/E/S.	2,765
	7,158
Less: firm-years with inconsistent data; e.g., a negative time lag between the voting date and the earnings announcement date or filing date.	111
	7,047
Less: firm-years with lag greater than 365 days between voting date and earnings announcement date.	5
	7,042
Less: firm-years referring to penny stocks, i.e., the price three days before the earnings announcement date is less than $1.	16
	7,026
Less: firm-years with fewer than three analysts following.	397
	6,629
Less: firm-years with announced earnings per share of zero.	8
Final sample	**6,621**

Panel B: Sample Composition by Industry

SIC	**Division**	**Sample (%)**
100–999	Agriculture, Forestry, And Fishing	0.20
1000–1499	Mining	6.46
1500–1799	Construction	1.80
2000–3999	Manufacturing	36.76
4000–4999	Transportation, Communications, Electric, Gas, And Sanitary Services	10.15
5000–5199	Wholesale Trade	1.95
5200–5999	Retail Trade	4.18
6000–6799	Finance, Insurance, And Real Estate	21.93
7000–8999	Services	16.57
Total		**100**

Note: This table outlines the sample selection procedure and the sample composition by industry.

It should first be noted that all continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to protect the results against the possible influence of outliers. Certain aspects of the summary statistics warrant highlighting. The CAR and the SURP are both close to zero, whether focusing on the mean or the median. Each variable is slightly left-skewed. On average, approximately 98% of all shareholders vote for (support) the auditor's engagement, which is comparable with previous research. Although there is evidence that acceptance levels decreased at the beginning of the 2000s (Hermanson et al. 2009, 394, 400) and that auditor ratification gained increasing importance in the aftermath of Enron (Raghunandan and Rama 2003, 262), the sample does not confirm such trends with respect to current and prior periods. The percentage of total shares in issue not available to ordinary investors lies between 0% and 69%, whereby approximately three-quarters of all observations are characterized by free floats of at least 73%. DOAF ranges from 0.00 to 1.33. The mean observation exhibits an untransformed market value of equity of approximately $1.65 billion. Apart from DOAF, the highest noticeable skewness and kurtosis concern the variables MB (median of 1.98) and MBNEG (median of 0.00), which signifies the possible influence of outliers. Less than 3% of all the market-to-book ratios are negative and are therefore replaced with the value of zero for MB. LEV ranges from 0.00 to 1.46, indicating that the pooled sample contains firms financed solely by equity and clearly indebted firms. The beta's median equals 1.17. Further, approximately 34% of all observations show a negative earnings surprise. The median observation has approximately nine analysts following the firm. Table 4.3, p. 82, presents the summary statistics of the pooled sample.

In addition, Table 4.4, p. 83, shows the Pearson product-moment correlation coefficients. Except for the correlation between MVE and ANALYST, an analysis of these values does not indicate potential collinearity problems. Nevertheless, this simple procedure may be insufficient. Because the two regressions (Equations 4.11 and 4.12) include two- and three-way interactions, collinearity is present by construction.[66] However, that is not problematic as long as the collinear variables are significant and the F-statistic indicates rejection of the null hypothesis that all coefficient estimates are jointly zero (e.g., Brambor et al. 2006, 70–71; Eilifsen and Knivsfla 2013, 92).

[66] Indeed, the Variance Inflation Factors (VIF) indicate that possible collinearity problems might be present. However, if all the interaction terms and industry dummies in Model 1 (Equation 4.11) are excluded—and, therefore, the "constructed collinearity"—the highest VIF is 2.4 for the MVE variable.

Table 4.3: Summary Statistics

	Mean	**Std. Dev.**	**25%**	**50%**	**75%**	**Min.**	**Max.**
CAR	0.00087	0.06789	-0.03251	0.00131	0.03572	-0.21465	0.19529
SURP	-0.00004	0.01205	-0.00109	0.00046	0.00235	-0.06667	0.04641
VOTEFOR	0.98297	0.02216	0.98020	0.98960	0.99530	0.85740	0.99990
TSH	0.19464	0.14783	0.09000	0.17000	0.27000	0.00000	0.69000
DOAF	0.08022	0.18552	0.01064	0.02326	0.06250	0.00000	1.33333
MVE	21.22586	1.63462	20.05339	21.14046	22.27374	17.78410	25.53935
MB	3.22164	4.01601	1.25000	1.98000	3.47000	0.00000	27.59000
MBNEG	0.02915	0.16824	0.00000	0.00000	0.00000	0.00000	1.00000
LEV	0.34935	0.28776	0.11020	0.33240	0.51810	0.00000	1.45890
BETA	1.21039	0.42415	0.91463	1.16742	1.48219	0.31954	2.37042
SURPNEG	0.34421	0.47515	0.00000	0.00000	1.00000	0.00000	1.00000
ANALYST	2.37134	0.60829	1.79176	2.30259	2.89037	1.38629	3.63759
n	6,621						

Note: This table presents the summary statistics for the pooled data for fiscal years 2010 to 2013. All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. Variable definitions: CAR represents a stock's cumulative excess return over the Standard and Poor's 500 Composite return aggregated over a 3-day window, i.e., -1 day to +1 day relative to the earnings announcement date. The calculation is based on the market model estimated over the 180-day window ending 21 trading days before the earnings announcement date. SURP equals reported earnings for a respective fiscal year minus the mean earnings forecast for this fiscal year one week before the earnings announcement date, scaled by the firm's stock price two days before the earnings announcement. VOTEFOR represents the shareholders' voting result in percentage terms with respect to the votes for (supporting) the auditor's engagement. TSH is the percentage of total shares in issue not available to ordinary investors (percentage of total shares in issue of 5% or more held strategically). DOAF denotes the standard deviation of the earnings forecasts for a respective fiscal year, scaled by reported earnings for this fiscal year. MVE is the natural logarithm of the market value of equity. MB equals market-to-book value, defined as the market value of common equity divided by the balance sheet value of common equity. Negative values are replaced with zeros. MBNEG is a dummy variable that equals one if a firm has a negative market-to-book value and zero otherwise. LEV represents leverage, defined as long-term debt plus short-term debt plus current portion of long-term debt divided by total capital plus short-term debt plus the current portion of long-term debt. BETA is the beta factor from the market model regression, which is calculated over the 180-day window ending 21 days before the earnings announcement date. SURPNEG is a dummy variable that equals one if a firm has a negative earnings surprise (SURP) and zero otherwise. ANALYST is the natural logarithm of one plus the number of earnings per share estimates made by analysts.

Table 4.4: Pearson Product-moment Correlation Coefficients

	CAR	SURP	VOTEFOR	TSH	DOAF	MVE	MB	MBNEG	LEV	BETA	SURPNEG	ANALYST
CAR	1.00000											
SURP	0.16375	1.00000										
	(0.00000)											
VOTEFOR	-0.00684	0.02291	1.00000									
	(0.57798)	(0.06227)										
TSH	-0.00742	-0.00854	0.14122	1.00000								
	(0.54588)	(0.48711)	(0.00000)									
DOAF	-0.01907	-0.09443	-0.00687	0.02582	1.00000							
	(0.12079)	(0.00000)	(0.57648)	(0.03562)								
MVE	0.01180	0.05484	0.01770	-0.24825	-0.18588	1.00000						
	(0.33692)	(0.00001)	(0.14989)	(0.00000)	(0.00000)							
MB	0.00618	-0.00888	0.00584	0.04641	0.00179	0.08252	1.00000					
	(0.61538)	(0.47004)	(0.63454)	(0.00016)	(0.88410)	(0.00000)						
MBNEG	-0.00860	-0.00779	0.01998	0.00501	0.01641	-0.04153	-0.13901	1.00000				
	(0.48416)	(0.52648)	(0.10400)	(0.68348)	(0.18193)	(0.00073)	(0.00000)					
LEV	0.00696	-0.04590	0.00861	-0.06127	0.03958	0.15252	0.02051	0.47348	1.00000			
	(0.57135)	(0.00019)	(0.48381)	(0.00000)	(0.00128)	(0.00000)	(0.09510)	(0.00000)				
BETA	-0.00614	-0.01444	-0.02386	0.05858	0.10946	-0.13751	0.00837	0.02743	-0.00367	1.00000		
	(0.61740)	(0.24013)	(0.05220)	(0.00000)	(0.00000)	(0.00000)	(0.49612)	(0.02562)	(0.76501)			
SURPNEG	-0.24222	-0.49364	-0.01625	0.01046	0.12690	-0.10008	-0.01537	0.02375	0.06293	0.04359	1.00000	
	(0.00000)	(0.00000)	(0.18609)	(0.39486)	(0.00000)	(0.00000)	(0.21104)	(0.05331)	(0.00000)	(0.00039)		
ANALYST	0.01191	0.03569	-0.00442	-0.24070	-0.11695	0.74613	0.07473	-0.01842	0.09780	-0.02411	-0.07994	1.00000
	(0.33271)	(0.00368)	(0.71888)	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.13387)	(0.00000)	(0.04975)	(0.00000)	

Note: This table presents the Pearson product-moment correlation coefficients for the pooled data for fiscal years 2010 to 2013. The numbers in parentheses below the correlation coefficients indicate p-values (two-tailed test). All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. Variable definitions: CAR represents a stock's cumulative excess return over the Standard and Poor's 500 Composite return aggregated over a 3-day window, i.e., -1 day to +1 day relative to the earnings announcement date. The calculation is based on the market model estimated over the 180-day window ending 21 trading days before the earnings announcement date. SURP equals reported earnings for a respective fiscal year minus the mean earnings forecast for this fiscal year one week before the earnings announcement date, scaled by the firm's stock price two days before the earnings announcement. VOTEFOR represents the shareholders' voting result in percentage terms with respect to the votes for (supporting) the auditor's engagement. TSH is the percentage of total shares in issue not available to ordinary investors (percentage of total shares in issue of 5% or more held strategically). DOAF denotes the standard deviation of the earnings forecasts for a respective fiscal year, scaled by reported earnings for this fiscal year. MVE is the natural logarithm of the market value of equity. MB equals market-to-book value, defined as the market value of common equity divided by the balance sheet value of common equity. Negative values are replaced with zeros. MBNEG is a dummy variable that equals one if a firm has a negative market-to-book value and zero otherwise. LEV represents leverage, defined as long-term debt plus short-term debt plus current portion of long-term debt divided by total capital plus short-term debt plus the current portion of long-term debt. BETA is the beta factor from the market model regression, which is calculated over the 180-day window ending 21 days before the earnings announcement date. SURPNEG is a dummy variable that equals one if a firm has a negative earnings surprise (SURP) and zero otherwise. ANALYST is the natural logarithm of one plus the number of earnings per share estimates made by analysts.

4.3.3 Regression Results

4.3.3.1 Results of Auditor Ratification Votes: Important Market-related Information—Results

In essence, the question of interest in *H1* is technically whether VOTEFOR is related to the ERC. The ERC is given as the first derivative of Equation 4.11 with respect to SURP.

$$\begin{aligned}\frac{\partial CAR}{\partial SURP} &= \alpha_1 + \alpha_3 VOTEFOR_{it} + \sum_{j=1}^{7} \alpha_{j+10} CONTROL_{jit} \\ &\quad + \sum_{k=1}^{8} \alpha_{k+25} IND_{kit} + \sum_{l=1}^{3} \alpha_{l+36} YR_{lit} \\ &= ERC_{E1}\end{aligned} \tag{4.13}$$

Finally, the effect of VOTEFOR on the ERC is mathematically determined by the derivation of the ERC with respect to VOTEFOR.

$$\frac{\partial ERC_{E1}}{\partial VOTEFOR} = \alpha_3 \tag{4.14}$$

The empirical outcome of α_3 is positive (coefficient of 5.83) and highly significant. If a one-tailed test is calculated, the p-value totals 0.017. Thus, VOTEFOR is positively associated with the ERC. Moreover, the effect's economic relevance is also of interest. Regarding this, the ERC_{E1} (Equation 4.13) is compared in two cases: (1) a one percentage point increase in VOTEFOR from its mean (i.e., from 0.9830 to 0.9930) for an average firm and (2) an increase from the 25th to the 75th percentile of VOTEFOR (i.e., from 0.9802 to 0.9953) for an average firm. In the first case, the ERC_{E1} changes from 0.7411 to 0.7994, an increase of approximately 7.87%. In the latter case, the ERC_{E1} increases by approximately 12.14%. These results show that the association of VOTEFOR with the ERC is not only statistically significant but also economically relevant. They also imply that a higher percentage of votes for (supporting) an auditor's engagement indicates greater shareholder satisfaction with the perceived EFRQ. An increased market response to earnings surprises results because shareholders rely more on reported information. Therefore, there appears to be evidence that shareholders are interested in results of auditor ratification votes because investment decisions are associated with voting decisions regarding auditor ratification. Because the result of the auditor ratification vote—i.e., shareholders' perceptions of the interaction of firm characteristics and auditor's

quality attributes—is positively associated with the decision-usefulness of reported earnings, this information might also benefit prospective shareholders.

Table 4.5: OLS Regression—Hypothesis 1

	H1—Dependent Variable = CAR		
Variable	**Coefficient**	**Robust Standard Error**	**p-value**
SURP	-3.7006	3.2611	0.257
VOTEFOR	-0.0134	0.0394	0.735
VOTEFOR×SURP	5.8299	2.7576	0.035
MVE	-0.0004	0.0008	0.591
MB	-0.0001	0.0003	0.705
MBNEG	-0.0138	0.0064	0.032
LEV	0.0110	0.0038	0.004
BETA	-0.0013	0.0022	0.559
SURPNEG	-0.0294	0.0020	0.000
ANALYST	0.0000	0.0022	0.998
MVE×SURP	0.0097	0.0836	0.907
MB×SURP	0.0164	0.0229	0.474
MBNEG×SURP	0.4688	0.4088	0.252
LEV×SURP	-1.2222	0.3276	0.000
BETA×SURP	0.1493	0.1795	0.406
SURPNEG×SURP	-0.4517	0.2270	0.047
ANALYST×SURP	0.2803	0.2467	0.256
INTERCEPT	0.0377	0.0453	0.406
Industry Dummies:		Yes	
Year Dummies:		Yes	
Clustered by:		Firm	
n		6,621	
Adjusted R^2		0.073	
$Prob > F$		0.000	

Note: This table presents the results of a OLS regression based on the pooled data for fiscal years 2010 to 2013. Standard errors and t-statistics are adjusted and clustered by firm; p-values are based on two-tailed tests. The regression includes a set of interactions between SURP and industry, as well as year dummies, which are omitted from the table. The variables with "×" are interaction terms. All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. For *H1*, the following regression model is tested: $CAR_{it} = \alpha_0 + \alpha_1 SURP_{it} + \alpha_2 VOTEFOR_{it} + \alpha_3 VOTEFOR_{it} \times SURP_{it} + \sum_{j=1}^{7} \alpha_{j+3} CONTROL_{jit} + \sum_{j=1}^{7} \alpha_{j+10} CONTROL_{jit} \times SURP_{it} + \sum_{k=1}^{8} \alpha_{k+17} IND_{kit} + \sum_{k=1}^{8} \alpha_{k+25} IND_{kit} \times SURP_{it} + \sum_{l=1}^{3} \alpha_{l+33} YR_{lit} + \sum_{l=1}^{3} \alpha_{l+36} YR_{lit} \times SURP_{it} + \varepsilon_{it}$, where CAR represents a stock's cumulative excess return over the Standard and Poor's 500 Composite return aggregated over a 3-day window, i.e., -1 day to +1 day relative to the earnings announcement date. The calculation is based on the market model estimated over the 180-day window ending 21 trading days before the earnings announcement date. SURP equals reported earnings for a respective fiscal year minus the mean earnings forecast for this fiscal year one week before the earnings announcement date, scaled by the firm's stock price two days before the earnings announcement. VOTEFOR represents the shareholders' voting result in percentage terms with respect to the votes for (supporting) the auditor's engagement. MVE is the natural logarithm of the market value of equity. MB equals market-to-book value, defined as the market value of common equity divided by the balance sheet value of common equity. Negative values are replaced with zeros. MBNEG is a dummy variable that equals one if a firm has a negative market-to-book value and zero otherwise. LEV represents leverage, defined as long-term debt plus short-term debt plus current portion of long-term debt divided by total capital plus short-term debt plus the current portion of long-term debt. BETA is the beta factor from the market model regression, which is calculated over the 180-day window ending 21 days before the earnings announcement date. SURPNEG is a dummy variable that equals one if a firm has a negative earnings surprise (SURP) and zero otherwise. ANALYST is the natural logarithm of one plus the number of earnings per share estimates made by analysts.

4.3.3.2 Results of Auditor Ratification Votes and Information Asymmetries—Results

The same procedure—i.e., derivatives of Equation 4.12 with respect to SURP, VOTEFOR and, finally, the proxy for IA—is also used to analyze *H2*: Do different levels of information asymmetries influence the relationship in *H1*? However, prior to answering the question, one further (technical) note regarding the relationship in *H1* is in order: To capture the effect of VOTEFOR on the ERC, Equation 4.15 must now be considered (e.g., Brambor et al. 2006, 71–77).

$$\frac{(\partial CAR/\partial SURP)}{\partial VOTEFOR} = \beta_3 + \beta_4 IA \tag{4.15}$$

Here, the marginal effect of VOTEFOR on the ERC depends, in addition, on the proxy for IA. The two coefficients (β_3, β_4) for each proxy are jointly different from zero ($Prob > F$ of 0.032 for TSH and 0.009 for DOAF), and the calculation of the marginal effect of VOTEFOR on the ERC for an average firm results in values of 3.5489 for TSH and 3.5599 for DOAF.

Referring to *H2* and its first metric, it is hypothesized that TSH—an inverse measure of information asymmetries—is negatively related to the effect of VOTEFOR on the ERC. For this purpose, the β_4 ($VOTEFOR \times TSH \times SURP$) of the respective regression in column (1), Table 4.6, p. 89, is examined (coefficient of -33.70) because it is the result of the necessary derivatives of Equation 4.12. The non-existence of the hypothesized effect can be rejected at a 0.009 significance level (one-tailed test). In light of higher levels of information asymmetries, this finding provides evidence that the result of the auditor ratification vote is of particular interest for firms characterized by higher levels of dispersed ownership.

In addition to ownership structure, DOAF—a measure of information asymmetries due to variances in the informativeness of firms' disclosure policies—is examined. Analyzing the data, the coefficient on $VOTEFOR \times DOAF \times SURP$ is positive (20.85) and significantly different from zero (p-value of 0.014, one-tailed test). This result also indicates that higher levels of information asymmetries—represented by larger standard deviations of analysts' forecasts—are accompanied by a greater importance of the result of the auditor ratification vote.

In summary, the result of the auditor ratification vote is associated with the decision-usefulness of reported earnings. Moreover, this effect seems to be positively influenced by higher levels of information asymmetries between managers and

shareholders; in other words, the voting result is of particular interest for firms characterized by higher levels of dispersed ownership and disagreement among analysts.

Table 4.6: OLS Regression—Hypothesis 2

	H2—Dependent Variable = CAR					
	(1) Information asymmetries measured by TSH			(2) Information asymmetries measured by DOAF		
Variable	**Coefficient**	**Robust Standard Error**	**p-value**	**Coefficient**	**Robust Standard Error**	**p-value**
SURP	-7.8636	4.2904	0.067	-0.1133	3.5863	0.975
VOTEFOR	0.0026	0.0633	0.967	0.0090	0.0422	0.831
VOTEFOR×SURP	10.1084	3.9447	0.010	1.8874	3.2216	0.558
VOTEFOR×TSH×SURP	-33.7013	14.3293	0.019			
TSH	0.1265	0.3056	0.679			
VOTEFOR×TSH	-0.1300	0.3093	0.674			
TSH×SURP	34.6248	13.9619	0.013			
VOTEFOR×DOAF×SURP				20.8485	9.4986	0.028
DOAF				0.1774	0.1539	0.249
VOTEFOR×DOAF				-0.1794	0.1578	0.256
DOAF×SURP				-20.5963	9.2707	0.026
MVE	-0.0004	0.0008	0.607	-0.0004	0.0008	0.599
MB	-0.0001	0.0003	0.699	-0.0001	0.0003	0.677
MBNEG	-0.0142	0.0064	0.027	-0.0135	0.0064	0.036
LEV	0.0111	0.0038	0.004	0.0107	0.0038	0.005
BETA	-0.0014	0.0022	0.527	-0.0014	0.0023	0.530
SURPNEG	-0.0294	0.0020	0.000	-0.0293	0.0020	0.000
ANALYST	-0.0001	0.0022	0.961	-0.0000	0.0022	0.985
MVE×SURP	-0.0250	0.0854	0.770	0.0170	0.0833	0.838
MB×SURP	0.0200	0.0224	0.372	0.0186	0.0234	0.426
MBNEG×SURP	0.5588	0.3963	0.159	0.4224	0.4077	0.300
LEV×SURP	-1.2776	0.3221	0.000	-1.1810	0.3290	0.000
BETA×SURP	0.1255	0.1752	0.474	0.1621	0.1802	0.368
SURPNEG×SURP	-0.4901	0.2268	0.031	-0.4177	0.2296	0.069

Table 4.6: OLS Regression—Hypothesis 2 (continued)

	H2—Dependent Variable = CAR					
	(1) Information asymmetries measured by TSH			(2) Information asymmetries measured by DOAF		
ANALYST×SURP	0.3936	0.2521	0.119	0.2791	0.2474	0.259
INTERCEPT	0.0220	0.0671	0.743	0.0153	0.0476	0.748
Industry Dummies:	Yes			Yes		
Year Dummies:	Yes			Yes		
Clustered by:	Firm			Firm		
n	6,621			6,621		
Adjusted R^2	0.075			0.074		
$Prob > F$	0.000			0.000		

Note: This table presents the results of two OLS regressions based on the pooled data for fiscal years 2010 to 2013. Standard errors and t-statistics are adjusted and clustered by firm; p-values are based on two-tailed tests. The regressions include a set of interactions between SURP and industry, as well as year dummies, which are omitted from the table. The variables with "×" are interaction terms. All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. For *H2*, the following regression models are tested: column (1) $CAR_{it} = \beta_0 + \beta_1 SURP_{it} + \beta_2 VOTEFOR_{it} + \beta_3 VOTEFOR_{it} \times SURP_{it} + \beta_4 VOTEFOR_{it} \times TSH_{it} \times SURP_{it} + \beta_5 TSH_{it} + \beta_6 VOTEFOR_{it} \times TSH_{it} + \beta_7 TSH_{it} \times SURP_{it} + \sum_{j=1}^{7} \beta_{j+7} CONTROL_{jit} + \sum_{j=1}^{7} \beta_{j+14} CONTROL_{jit} \times SURP_{it} + \sum_{k=1}^{8} \beta_{k+21} IND_{kit} + \sum_{k=1}^{8} \beta_{k+29} IND_{kit} \times SURP_{it} + \sum_{l=1}^{3} \beta_{l+37} YR_{lit} + \sum_{l=1}^{3} \beta_{l+40} YR_{lit} \times SURP_{it} + \varepsilon_{it}$, and column (2) $CAR_{it} = \beta_0 + \beta_1 SURP_{it} + \beta_2 VOTEFOR_{it} + \beta_3 VOTEFOR_{it} \times SURP_{it} + \beta_4 VOTEFOR_{it} \times DOAF_{it} \times SURP_{it} + \beta_5 DOAF_{it} + \beta_6 VOTEFOR_{it} \times DOAF_{it} + \beta_7 DOAF_{it} \times SURP_{it} + \sum_{j=1}^{7} \beta_{j+7} CONTROL_{jit} + \sum_{j=1}^{7} \beta_{j+14} CONTROL_{jit} \times SURP_{it} + \sum_{k=1}^{8} \beta_{k+21} IND_{kit} + \sum_{k=1}^{8} \beta_{k+29} IND_{kit} \times SURP_{it} + \sum_{l=1}^{3} \beta_{l+37} YR_{lit} + \sum_{l=1}^{3} \beta_{l+40} YR_{lit} \times SURP_{it} + \varepsilon_{it}$, where CAR represents a stock's cumulative excess return over the Standard and Poor's 500 Composite return aggregated over a 3-day window, i.e., -1 day to +1 day relative to the earnings announcement date. The calculation is based on the market model estimated over the 180-day window ending 21 trading days before the earnings announcement date. SURP equals reported earnings for a respective fiscal year minus the mean earnings forecast for this fiscal year one week before the earnings announcement date, scaled by the firm's stock price two days before the earnings announcement. VOTEFOR represents the shareholders' voting result in percentage terms with respect to the votes for (supporting) the auditor's engagement. TSH is the percentage of total shares in issue not available to ordinary investors (percentage of total shares in issue of 5% or more held strategically). DOAF denotes the standard deviation of the earnings forecasts for a respective fiscal year, scaled by reported earnings for this fiscal year. MVE is the natural logarithm of the market value of equity. MB equals market-to-book value, defined as the market value of common equity divided by the balance sheet value of common equity. Negative values are replaced with zeros. MBNEG is a dummy variable that equals one if a firm has a negative market-to-book value and zero otherwise. LEV represents leverage, defined as long-term debt plus short-term debt plus current portion of long-term debt divided by total capital plus short-term debt plus the current portion of long-term debt. BETA is the beta factor from the market model regression, which is calculated over the 180-day window ending 21 days before the earnings announcement date. SURPNEG is a dummy variable that equals one if a firm has a negative earnings surprise (SURP) and zero otherwise. ANALYST is the natural logarithm of one plus the number of earnings per share estimates made by analysts.

4.4 Further Analyses

4.4.1 Incremental Information of Results of the Auditor Ratification Votes beyond Other Audit-related Information

Even if one follows the reasoning presented above, it remains questionable whether the result of the auditor ratification vote captures only other audit-related information or if it provides information beyond that contained in other audit-related information disclosures (Biddle et al. 1995, 3, 7–11; Hoskin et al. 1986, 6–8). Therefore, in the regression model of *H1* three additional variables are included, which represent publicly available information on audit-related issues.[67] First, it is controlled for the effect of auditor industry specialization—measured by a dummy variable that equals one if the firm's auditor is the national annual audit fee market share leader in the firm's industry and zero otherwise (INDLEADER)—because there is evidence that the reliability of audited, reported earnings is perceived to be higher if the auditor is an industry specialist (e.g., Balsam et al. 2003, 89).[68] Second, research has also shown that the ratio of non-audit to audit fees (NAFAF) is associated with shareholders' perceptions of audit quality and, eventually, EFRQ (e.g., Eilifsen and Knivsfla 2013, 101–107; Francis and Ke 2006, 509; Higgs and Skantz 2006, 13–19; Lim and Tan 2008, 233; Krishnan et al. 2005, 131). Third, if the firm changes its auditor—measured by a dummy variable named AUDITORCHANGE, where one indicates a change in the firm's auditor and zero otherwise—shareholders' perceptions of audited, reported earnings could also change because different audit firms supply different audit quality because the audit market is differentiated (e.g., Wei et al. 2015, 113).

The regression result in column (1), Table 4.7, p. 94, still supports *H1*; VOTEFOR is important market-related information (coefficient of 5.74, one-tailed p-value of 0.020). Examining the p-values of INDLEADER, NAFAF and AUDITORCHANGE shows an interesting picture. The interactions with SURP and, hence, their effects on the ERC are not significantly different from zero, which is not in conformity with the coefficients' predictions. Nevertheless, the finding for INDLEADER

[67] In this and the following section, the results of modified regressions of *H1* are discussed. However, the regressions of *H2* with the variables introduced in both sections were also examined. All stated conclusions are qualitatively unchanged and, therefore, not tabulated.

[68] Of all firm observations, 86.81% are audited by a Big 4 auditor, and every identified market share leader in an industry belongs to one of the Big 4. Hence, a dummy referring to Big 4 auditors is not included in the regression. However, it also was a regression with a Big 4 dummy instead of INDLEADER analyzed; the Big 4 dummy is not significantly different from zero.

is in line with prior research (e.g., Francis et al. 1999, 186–198; Wallman 1996, 78) arguing that audit research at the office-level is more appropriate in this context, and Krishnan et al. (2013, 680) demonstrate that shareholders' positive perceptions of auditor industry expertise exists primarily for city-only or joint city-national industry leaders. Another explanation might be that identifying auditor industry specialization could be costly for an average shareholder (Wei et al. 2015, 114), and thus, it is not related to reported earnings' decision-usefulness.[69] Furthermore, NAFAF could also be of limited usefulness for an average shareholder, who is unaware of regulatory details concerning fee disclosure. Dickins and Higgs (2005, 101) note that due to inconsistent and insufficient disclosures among firms, the information is useful only if a shareholder has a deeper understanding of the fee composition, which could at least be questionable for the average shareholder. This might also partly explain the non-significant results of Ghosh et al. (2009, 377, 379).[70]

To conclude, even if it is controlled for further audit-related variables, VOTEFOR is associated with the ERC, which implies that the disclosure of the result of the auditor ratification vote provides information beyond that included in other publicly available audit-related information, and hence, there is empirical support that VOTEFOR captures shareholders' perceptions of the interaction of further firm and auditor characteristics in addition to those proxied by INDLEADER, NAFAF and AUDITORCHANGE.

4.4.2 Time Lag between Voting Date and Earnings Announcement Date

The variable VOTEFOR should indicate shareholders' level of satisfaction with expected (perceived) audit quality, given a certain expected level of (perceived) financial reporting quality before the audit. It might be argued that shareholders' satisfaction can change over time, and the relationship in *H1* could thus be amplified, diminished or even disappear because the longer the time lag between the audit ratification and the earnings announcement is, the greater the possibility that issues concerning the ratified auditor might arise and directly influence shareholders' expectations of the quality of the audit. For example, consider the case of Enron:

[69] The recent study of Audousset-Coulier et al. (2016) casts doubt on the validity of auditor industry specialization measures, which includes this study's measure.

[70] The empirical evidence might also be explained by potential issues of "constructed collinearity" due to the relatively large number of interactions in the ERC regression. As this statistical problem cannot be completely ruled out, the empirical findings (i.e., the non-significance of other audit-related variables) should be interpreted with caution.

Chaney and Philipich (2002, 1243) demonstrate that Arthur Andersen's clients suffered from negative abnormal returns on event dates during the Enron scandal when Arthur Andersen was the auditor. Of course, there might also be situations that favor a particular auditor. Thus, variances in auditor reputation might cause changes in the effect of *H1*. Ultimately, this study cannot identify what auditor-related events can either confirm and strengthen or refute and weaken a recent ratification vote, and hence, no coefficient's sign is predicted.

Referring to column (2), Table 4.7, p. 94, even after introducing TIMELAG—where TIMELAG denotes the period measured in days between the date of the auditor ratification and the earnings announcement date—the overall marginal effect of VOTEFOR on the ERC is positive for the average firm ($\gamma_3 + \gamma_4 \times TIMELAG = -54.2963 + 0.2181 \times 270.1127$). Moreover, the coefficient of interest ($VOTEFOR \times TIMELAG \times SURP$) is highly significant (two-tailed p-value of 0.026). In the first instance, there seems to be evidence that the effect of VOTEFOR on the ERC is also determined by the time elapsed since auditor ratification. In the present sample, a positive effect (coefficient of 0.22) is observable. This result can be interpreted to mean that the effects of confirming the latest ratification vote outweigh the non-confirming effects. Furthermore, if the overall circumstances support shareholders' voting results over time, a greater effect on the ERC should be observable. This result possibly indicates that shareholders execute their auditor ratification vote thoroughly and give weight to it. Finally, this significant result also might challenge the point that results of auditor ratification votes represent "timely stale information" and, therefore, shareholders do not pay attention to the disclosure of this information.

Table 4.7: OLS Regressions—Audit-related Variables and Time Lag between Voting Date and Earnings Announcement Date

	Further Analyses—Dependent Variable = CAR					
	(1) Audit-related Variables			(2) Time Lag between Voting Date and Earnings Announcement Date		
Variable	**Coefficient**	**Robust Standard Error**	**p-value**	**Coefficient**	**Robust Standard Error**	**p-value**
SURP	-3.6487	3.2499	0.262	56.2404	25.9616	0.030
VOTEFOR	-0.0117	0.0396	0.767	0.6556	0.3808	0.085
VOTEFOR×SURP	5.7353	2.7939	0.040	-54.2963	26.2818	0.039
INDLEADER	-0.0011	0.0020	0.575			
INDLEADER×SURP	0.1561	0.2256	0.489			
NAFAF	0.0002	0.0031	0.946			
NAFAF×SURP	-0.0196	0.3579	0.956			
AUDITORCHANGE	-0.0068	0.0083	0.414			
AUDITORCHANGE×SURP	0.1133	0.7141	0.874			
VOTEFOR×TIMELAG×SURP				0.2181	0.0978	0.026
TIMELAG				0.0024	0.0014	0.084
VOTEFOR×TIMELAG				-0.0025	0.0014	0.076
TIMELAG×SURP				-0.2173	0.0952	0.023
MVE	-0.0004	0.0008	0.614	-0.0004	0.0008	0.628
MB	-0.0001	0.0003	0.705	-0.0001	0.0003	0.655
MBNEG	-0.0138	0.0065	0.033	-0.0140	0.0064	0.028
LEV	0.0110	0.0038	0.004	0.0115	0.0038	0.003
BETA	-0.0013	0.0022	0.557	-0.0013	0.0022	0.557
SURPNEG	-0.0294	0.0020	0.000	-0.0295	0.0020	0.000
ANALYST	-0.0000	0.0022	0.991	-0.0003	0.0022	0.898
MVE×SURP	0.0059	0.0847	0.944	0.0017	0.0838	0.984
MB×SURP	0.0174	0.0230	0.448	0.0126	0.0229	0.582
MBNEG×SURP	0.4852	0.4165	0.244	0.4481	0.4097	0.274
LEV×SURP	-1.2356	0.3349	0.000	-1.1735	0.3275	0.000

Table 4.7: OLS Regressions—Audit-related Variables and Time Lag between Voting Date and Earnings Announcement Date (continued)

	Further Analyses—Dependent Variable = CAR					
	(1) Audit-related Variables			(2) Time Lag between Voting Date and Earnings Announcement Date		
BETA×SURP	0.1433	0.1826	0.433	0.1597	0.1792	0.373
SURPNEG×SURP	-0.4432	0.2273	0.051	-0.4538	0.2269	0.046
ANALYST×SURP	0.2887	0.2496	0.247	0.2907	0.2440	0.234
INTERCEPT	0.0362	0.0453	0.424	-0.6030	0.3742	0.107
Industry Dummies:	Yes			Yes		
Year Dummies:	Yes			Yes		
Clustered by:	Firm			Firm		
n	6,621			6,621		
Adjusted R^2	0.072			0.074		
$Prob > F$	0.000			0.000		

Note: This table presents the results of two OLS regressions based on the pooled data for fiscal years 2010 to 2013. Standard errors and t-statistics are adjusted and clustered by firm; p-values are based on two-tailed tests. The regressions include a set of interactions between SURP and industry, as well as year dummies, which are omitted from the table. The variables with "×" are interaction terms. All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. The following regression models are tested: column (1) $CAR_{it} = \gamma_0 + \gamma_1 SURP_{it} + \gamma_2 VOTEFOR_{it} + \gamma_3 VOTEFOR_{it} \times SURP_{it} + \gamma_4 INDLEADER_{it} + \gamma_5 INDLEADER_{it} \times SURP_{it} + \gamma_6 NAFAF_{it} + \gamma_7 NAFAF_{it} \times SURP_{it} + \gamma_8 AUDITORCHANGE_{it} + \gamma_9 AUDITORCHANGE_{it} \times SURP_{it} + \sum_{j=1}^{7} \gamma_{j+9} CONTROL_{jit} + \sum_{j=1}^{7} \gamma_{j+16} CONTROL_{jit} \times SURP_{it} + \sum_{k=1}^{8} \gamma_{k+23} IND_{kit} + \sum_{k=1}^{8} \gamma_{k+31} IND_{kit} \times SURP_{it} + \sum_{l=1}^{3} \gamma_{l+39} YR_{lit} + \sum_{l=1}^{3} \gamma_{l+42} YR_{lit} \times SURP_{it} + \varepsilon_{it}$, and column (2) $CAR_{it} = \gamma_0 + \gamma_1 SURP_{it} + \gamma_2 VOTEFOR_{it} + \gamma_3 VOTEFOR_{it} \times SURP_{it} + \gamma_4 VOTEFOR_{it} \times TIMELAG_{it} \times SURP_{it} + \gamma_5 TIMELAG_{it} + \gamma_6 VOTEFOR_{it} \times TIMELAG_{it} + \gamma_7 TIMELAG_{it} \times SURP_{it} + \sum_{j=1}^{7} \gamma_{j+7} CONTROL_{jit} + \sum_{j=1}^{7} \gamma_{j+14} CONTROL_{jit} \times SURP_{it} + \sum_{k=1}^{8} \gamma_{k+21} IND_{kit} + \sum_{k=1}^{8} \gamma_{k+29} IND_{kit} \times SURP_{it} + \sum_{l=1}^{3} \gamma_{l+37} YR_{lit} + \sum_{l=1}^{3} \gamma_{l+40} YR_{lit} \times SURP_{it} + \varepsilon_{it}$, where CAR represents a stock's cumulative excess return over the Standard and Poor's 500 Composite return aggregated over a 3-day window, i.e., -1 day to +1 day relative to the earnings announcement date. The calculation is based on the market model estimated over the 180-day window ending 21 trading days before the earnings announcement date. SURP equals reported earnings for a respective fiscal year minus the mean earnings forecast for this fiscal year one week before the earnings announcement date, scaled by the firm's stock price two days before the earnings announcement. VOTEFOR represents the shareholders' voting result in percentage terms with respect to the votes for (supporting) the auditor's engagement. INDLEADER represents a dummy variable that equals one if the firm's auditor is the national, annual audit fee market share leader in the firm's industry (industry according to the SIC Division Structure as used by the U.S. Department of Labor, Occupational Safety & Health Administration) and zero otherwise. NAFAF represents the ratio of non-audit to audit fees. AUDITORCHANGE is a dummy variable that equals one if the firm changed its auditor and zero otherwise. TIMELAG denotes the period measured in days between the date of the auditor ratification and the earnings announcement date. MVE is the natural logarithm of the market value of equity. MB equals market-to-book value, defined as the market value of common equity divided by the balance sheet value of common equity. Negative values are replaced with zeros. MBNEG is a dummy variable that equals one if a firm has a negative market-to-book value and zero otherwise. LEV represents leverage, defined as long-term debt plus short-term debt plus current portion of long-term debt divided by total capital plus short-term debt plus the current portion of long-term debt. BETA is the beta factor from the market model regression, which is calculated over the 180-day window ending 21 days before the earnings announcement date. SURPNEG is a dummy variable that equals one if a firm has a negative earnings surprise (SURP) and zero otherwise. ANALYST is the natural logarithm of one plus the number of earnings per share estimates made by analysts.

4.4.3 Additional Robustness Checks

At the end, the results of further robustness checks of *H1* and *H2* are presented; for the sake of brevity, they are not tabulated.

Qualitatively similar results are found when the CARs are summed over other event windows, i.e., -1 to 0, -2 to +2 and -3 to +3. However, for the -1 to +0 period and the -3 to +3 period, the three-way interaction of $VOTEFOR \times DOAF \times SURP$ is not significantly different from zero. Further, the empirical evidence is insensitive to the selected market return index (Standard and Poor's 500 Composite versus Dow Jones Industrial Average). The same applies when the respective variables refer to median forecasts rather than mean forecasts. Some control variables are also replaced to provide another impression of the robustness of the results. First, to proxy for firm size, the natural log of total assets is used (e.g., Balsam et al. 2003, 76). Second, leverage can be measured as total debt to common equity (e.g., Francis and Ke 2006, 502). Third, the values of the beta factors also depend on the estimation period (e.g., Dimson and Marsh 1983, 756, 773). Hence, beta factors calculated over five years with monthly data on the fiscal year-end dates instead of those from the market model regression are included in the regression models. Fourth, a dummy variable that is related to negative net income rather than SURPNEG is introduced (e.g., Krishnan et al. 2005, 118). In all four cases, the regression results are robust. In addition, TSH and DOAF are included in Equation 4.11 as control variables because they are introduced in Equation 4.12; the results regarding *H1* are qualitatively unchanged. Moreover, it is controlled for potential time-invariant endogeneity (e.g., Chenhall and Moers 2007, 175–186; Roberts and Whited 2012, 8–24), and—except for DOAF—a fixed effects analysis does not alter the stated conclusions. If non-winsorized data is used or if only the dependent variable is winsorized (e.g., Dyckman and Zeff 2014, 702), significant results can be found for the regression of *H2* using the proxy TSH. However, the regression results are robust if all independent variables are winsorized but not the dependent variable. To ensure that the results are not driven by observations with very low auditor ratification rates, the quartile of the sample's lowest auditor ratification rates is dropped. The results are qualitatively unchanged except for the three-way interaction of DOAF. Furthermore, the industry fixed effects are based upon the SIC Division Structure as used by the U.S. Department of Labor, Occupational Safety & Health Administration. On the one hand, the set of SIC dummies is replaced by a set of SIC dummies introduced by Frankel et al. (2002, 78). On the other hand, the respective

SIC dummies are replaced by an indicator variable that equals one for industries characterized by a high exposure to litigation risk (e.g., Rogers and Stocken 2005, 1257; Zhan Shu 2000, 187). In the first case, the results are nearly the same except for the three-way interaction of $VOTEFOR \times TSH \times SURP$ regarding *H2*—its one-tailed p-value equals 0.146. In the latter case, all results are qualitatively similar. The procedure of dropping observations with fewer than three analysts following (cf. Table 4.2, p. 80) might strengthen the sample's large company bias. Therefore, the regressions of *H1* and *H2* are re-estimated based on a sample that includes the 397 firm-years in question; the results are unchanged.

4.5 Summary and Limitations

At present, shareholder ratification of auditors is frequently a routine, non-binding matter, which may seem surprising because it is one of the few ways for shareholders to express their views about a firm's auditor and, as a result, expected (perceived) audit quality (Marshall 2005, 41; Sainty et al. 2002, 111). Nevertheless, in 2010, the SEC emphasized the importance of the results of auditor ratification by amending the disclosure requirements concerning this shareholder voting result (SEC 2009; SEC 2010). If one of the SEC's main objectives is to ensure the provision and disclosure of important information to shareholders (SEC 2000a; SEC 2000b), this would imply that the result of the auditor ratification vote constitutes important market-related information. However, we know little about shareholders' interests in and perceptions of the auditor's election, approval or ratification process and whether it might affect overall audit quality (Wei et al. 2015, 128–168). Indeed, some research reveals that auditor ratification votes and the extent of stock price responses to unexpected earnings are conditional on shareholders' perceptions of audit quality (e.g., Eilifsen and Knivsfla 2013, 101–107; Francis and Ke 2006, 509; Liu et al. 2009, 227; Mishra et al. 2005, 20–21; Raghunandan 2003, 160). However, it remains unclear whether the disclosure of the result of the auditor ratification vote is related to the decision-usefulness of reported earnings and, hence, is of interest to shareholders.

The empirical evidence presented in this study demonstrates that results of auditor ratification votes—which capture shareholders' perceptions of the interaction of firm characteristics and auditor's quality attributes—are associated with the decision-usefulness of reported earnings. In addition, there are moderate indications that

this effect seems to be positively related to higher levels of information asymmetries between managers and shareholders. Further analyses show that if it is controlled for additional audit-related variables, the voting results are still related to the ERC and that the time lag between the voting date and earnings announcement influences this vote's importance. To summarize, the results suggest that it seems comprehensible to disclose the result of the auditor ratification vote because this study shows that it is important market-related information. Finally, the idea that such shareholder votes are "more than a symbolic act" (Saul 1996, 135) is supported. Whether it is economically meaningful to regulate this matter—i.e., the implementation of auditor ratification as a mandatory and/or binding agenda item at shareholder meetings (Hermanson et al. 2009, 407; Liu et al. 2009, 238)—is beyond the scope of this study, and further research is required to answer this question.

Although the results are largely robust, all empirical research has limitations, including that conducted in this study. The ERC framework is used to examine shareholders' perceptions. Even if the adjusted R^2 values are relatively high compared with prior research (e.g., Francis and Ke 2006, 515; Higgs and Skantz 2006, 14–15; Krishnan et al. 2005, 128; Lev 1989, 163–164), returns-earnings regressions are apparently associated with an omitted variable problem (e.g., Balsam et al. 2003, 95; Dechow et al. 2010, 370). Another approach to examine the market's perception might be to measure it via the cost of capital (e.g., Mansi et al. 2004). Although the use of this methodology may be debatable (DeFond and Zhang 2014, 288–289), it would nonetheless also enable the analysis of the perceptions of debt investors. The vast majority of listed firms—94% of S&P in 2006 (ACAP 2008, VIII:20) and more than 90% of Russel 3000 between 2009 and 2012 (Cunningham 2015, 1)—seek shareholder ratification of auditors; however, the results are constrained to these firms. As demonstrated in prior research, these firms may differ from those that do not seek such shareholder voting. For example, shareholder participation in auditor selection enhances auditor independence and—as a result—audit quality; this notion has been supported experimentally (Mayhew and Pike 2004, 817). It can also be empirically observed that firms asking shareholders to ratify the auditor are not only more likely to pay higher audit fees and have a qualitative audit committee but also less likely to issue subsequent restatements and have lower abnormal accruals (Dao et al. 2012, 157, 159, 162, 167; Krishnan and Ye 2005, 248–249). Future research could address whether shareholders' perceptions of EFRQ differ for firms with shareholder ratification relative to those firms that do not implement

shareholder ratification of auditors and how possible differences could be explained. Ultimately, there might be situations in which shareholders do not provide the required instructions to their brokers regarding how to vote on this matter, i.e., the cases of so-called "broker non-votes". However, such cases of reported broker non-votes concerning shareholder auditor ratification are rare.[71] These cases might be significant for shareholder voting-related research questions, which makes this topic an interesting one to examine in future studies.

[71] In the sample, 161 out of 6,621 firm-years report a value for "broker non-votes". The mean of those 161 observations equals 5.46%.

5 Economic Importance of the Client: When Do Shareholders Care about Auditor Independence?[72]

5.1 Introduction

Shareholders are one of the primary users of audited financial statements. Shareholders' perceptions of the credibility of those financial statements depend on their perceptions of the auditor's independence. Thus, it is unsurprising that the SEC (SEC 2000a; SEC 2000b; SEC 2003b) has repeatedly noted that audit-related disclosures are meaningful for shareholders in determining an auditor's independence and, hence, EFRQ because such disclosures aid shareholders in making their investment decisions. For instance, disclosures enable shareholders—at least broadly—to reach an informed opinion regarding an auditor's economic dependence on a client. The related theory—referred to as the economic dependence hypothesis—suggests that the economic importance of the client might be a reason for threatened auditor independence due to an existing economic bond caused by client-specific quasi-rents (e.g., DeAngelo 1981b, 190, 192; DeFond and Zhang 2014, 311; Reynolds and Francis 2000, 376). Consequently, if information regarding an auditor's client dependence is of interest to shareholders, client dependence should influence shareholders' perceptions of the credibility of those financial statements. Indeed, some studies provide evidence that auditor independence is perceived to be jeopardized (e.g., Ghosh et al. 2009, 377-379; Khurana and Raman 2006, 995; Lim and Tan 2008, 233). However, the circumstances under which shareholders are concerned about an auditor's economic dependence on the client remain unclear. One reason that shareholders' interest in auditor independence may differ across firms is variations in firms' financial conditions. Research has demonstrated that a firm's financial condition is, for instance, related to errors in financial statements (Kreutzfeldt and Wallace 1986, 37),

[72] This chapter is based on a working paper titled "Economic Importance of the Client: When Do Shareholders Care about Auditor Independence?", which is co-authored by Sven Hörner. As this chapter is based on a working paper's 2016 version, this study's reasoning, results, and interpretations have changed after the submission of this thesis and the completion of the doctoral degree. The most recent version of this study is available either on my SSRN Author page (`http://ssrn.com/author=2334700`) or upon request.

restatements (Kinney and McDaniel 1989, 91), or the likelihood of lawsuits against auditors (e.g., DeFond et al. 2015, 10; Stice 1991, 521, 536). Thus, this study's focus is not merely on whether shareholders perceive client importance to be negative but also on if those perceptions exist irrespective of a client's financial condition.

Based on a sample of 6,018 firm-years of 10-K-filers audited by a Big 4 firm (2010 to 2014), this study demonstrates that shareholders' perceptions of EFRQ and, hence, of audit quality and auditor independence are negatively associated with the auditor's economic dependence on the client measured at the office-level. This finding holds regardless of whether shareholders' perceptions are proxied by the ERC or the ex ante cost of equity capital. Regarding the two broad components of total fees—i.e., audit and non-audit fees—the ERC model shows that the audit fee component appears to be the driver of the perception of jeopardized independence. The ex ante cost of equity capital yields ambiguous results depending on the specific regression model considered. Moreover, shareholders perceive a strong auditor-client economic bond as a threat to auditor independence, especially for firms that are more likely to be financially distressed.

This study contributes to the auditor independence literature focusing on the association of an auditor's economic dependence on the client with shareholders' perceptions of EFRQ. This analysis provides supporting evidence for the economic dependence hypothesis; client importance measured at the office-level is negatively related to the decision-usefulness of earnings and positively associated with the ex ante cost of equity capital—especially for clients in relatively poor financial condition—given the current U.S. context. This could be interpreted as indicating, for example, that shareholders and analysts might pay particular attention to auditor independence issues due to client dependence if a firm is not in good financial shape. Furthermore, Hollingsworth and Li (2012, 100) suggest that the Sarbanes-Oxley Act (SOX) partly mitigated shareholders' concerns regarding an auditor's economic dependence on the client. This study completes the picture to a certain degree by showing that even several years after the implementation of SOX, client fee dependence remains an issue (cf. Kao et al. 2014), at least for firms in bad financial condition. In conclusion, this study shows that shareholders' concerns regarding auditor independence might be conditional on client's circumstances—such as the client's financial condition. As this analysis provides initial insights into this complex subject, it might therefore be of interest to identify other client attributes that could influence shareholders'

perceptions of audit-related issues, and further broad evidence on this topic could also assist in better targeting future regulations.

The remainder of this chapter is structured as follows: In the next section, the related literature is outlined and hypotheses are developed. The third section presents the research design and the sample selection process. Section four explains the model specifications and presents the descriptive statistics, the multivariate results and additional analyses. Finally, the fifth section concludes this chapter with a brief summary and this study's limitations.

5.2 Related Literature and Formation of Hypotheses

5.2.1 Economic Importance of the Client and Perceived Auditor Independence

Attempts to define audit quality often refer to the seminal work of DeAngelo (1981b, 186), in which she suggests that audit quality is a market assessment of an auditor's expertise and independence. Auditor independence is then described as "the conditional probability that, given a breach has been discovered, the auditor will report the breach." (DeAngelo 1981a, 116) Auditor independence—which thus has a direct impact on audit quality—is compromised if the audit opinion does not coincide with auditor's findings and beliefs (Magee and Tseng 1990, 322). Auditors might also have incentives to maintain their independence; they wish to protect their reputation and avoid litigation exposure (e.g., Bonner et al. 1998; DeAngelo 1981a; Dye 1993; Lys and Watts 1994; Palmrose 1988; Watts and Zimmerman 1983).[73]

DeFond and Zhang (2014, 279) note that threats to audit quality are regularly characterized by conflicting goals between an auditor's expertise and independence. Moreover, the economic bond between auditor and client—caused by client-specific quasi-rents resulting from future audit and non-audit fees (e.g., Zhang 1999, 180)—is commonly assumed to be one reason for threatened auditor independence and, thus, impaired audit quality. This economic bond can result in opportunistic behavior by the incumbent auditor that pursues its own (financial) interests and is interested in maintaining profitable clients. These incentives are assumed to be stronger for clients accounting for a larger share of an auditor's revenues (e.g., DeAngelo 1981b, 190, 192; DeFond and Zhang 2014, 311; Gul 1991, 163). Following this reasoning—referred to as the economic dependence hypothesis (Reynolds and Francis 2000, 376)—client importance, defined as the client's share of the auditor's (office's) total revenues, is

[73] For a literature review on auditor independence and audit quality, see Tepalagul and Lin (2015).

expected to have a negative overall impact on auditor independence. In this context, the Cohen Report famously suggested, "When one or a few large clients supply a significant portion of the total fees of a public accounting firm, the firm will have greater difficulty in maintaining its independence." (AICPA, 1978, 113) However, auditor's concerns regarding the potential loss of reputation and increased litigation risk are supposed to be greater for larger clients (Lys and Watts 1994, 88; Schmidt 2012, 1052–1055; Stice 1991, 529), which contradicts the reasoning of the economic dependence hypothesis.

Overall, prior studies provide evidence that actual auditor independence is not compromised for economically important clients (e.g., Ashbaugh et al. 2003, 634; Chung and Kallapur 2003, 951; DeFond et al. 2002, 1264, 1271; Gaver and Paterson 2007, 312; Kao et al. 2014, 174; Kinney et al. 2004, 584; Larcker and Richardson 2004, 641; Li 2009, 217-219; Raghunandan et al. 2003, 231; Reynolds and Francis 2000, 386, 394, 397).[74] However, the economic bond between auditor and client might not only affect independence in fact but also independence in appearance. Moreover, the SEC highlights the importance of shareholders' perceptions regarding auditor independence and states, "If investors do not believe that the auditor is truly independent from the issuer, they will derive little confidence from the auditor's opinion and will be far less likely to invest in the issuer's securities. Fostering investor confidence, therefore, requires not only that auditors actually be independent of their audit clients, but also that reasonable investors perceive them to be independent." (SEC 2000a) Therefore, it is quite interesting that—in contrast to independence in fact—several studies show that the independence of auditors of economically important clients is perceived to be jeopardized. For instance, high non-audit fee ratios (Francis and Ke 2006, 509; Krishnan et al. 2005, 122, 124–125, 131) and high proportions of client fees to the auditor's total revenues (Ghosh et al. 2009, 377-379) are negatively related to perceived EFRQ as measured by the ERC. Higgs and Skantz (2006, 19) find only limited support for such a relationship but observe a positive association between the ERC and unexpectedly high audit and total fees. Moreover, Lim and Tan (2008, 233) show that if an auditor is an industry specialist, this reduces the perceived threat to independence caused by fee dependence. Examining the cost of equity capital as another proxy for shareholders' perceptions, Khurana and Raman (2006, 995) reveal a positive relationship between the economic importance of the client and the ex ante cost of equity capital. This evidence

[74] Nevertheless, Frankel et al. (2002) reports contradictory results.

is supported by Hollingsworth and Li (2012, 109–112) for financial periods prior to SOX. However, their results also indicate that the ex ante cost of equity capital is less likely to be higher after the implementation of SOX. The latter findings imply that SOX has mitigated shareholders' concerns regarding auditor independence due to client importance issues. However, the ERC study of Ghosh et al. (2009, 382) does not confirm that SOX had an effect. Therefore, these findings might lead one to question whether shareholders continue to have a negative perception of client importance.[75]

In summary and despite the weak evidence in studies addressing independence in fact, shareholders' concerns regarding auditor independence are held to increase if the auditor-client economic bond is stronger. Hence, the first hypothesis in its alternative form is stated as follows:

***H1**: The higher the economic importance of the client, the lower the perceived EFRQ, c.p.*

5.2.2 Economic Importance of the Client and the Client's Financial Condition

The focus of this study is not only on whether shareholders have a negative perception of client dependence but also on the circumstances under which shareholders are concerned about the economic bond between the client and the auditor. In particular, it could be of interest whether the economic dependence hypothesis applies irrespective of the client's financial condition.

Firms under financial pressure might have stronger incentives to engage in "window dressing" to conceal their financial difficulties (e.g., DeFond and Jiambalvo 1991, 653; DeFond and Jiambalvo 1994, 174; Kinney and McDaniel 1989, 74). Moreover, those financially distressed firms may exert greater pressure on the auditor to treat them more favorably because of their financial woes. Thus, one might expect that shareholders perceive client importance to be a particular threat to auditor independence if a firm is financially stressed (Dichev et al. 2016, 30). For example, Kreutzfeldt and Wallace (1986, 37) examine the relationship between errors in financial statements and environmental factors and find that the probability

[75] An experiment further demonstrates that jurors perceive high client importance as a threat to auditor independence (Brandon and Mueller 2006, 15), which is also indirectly supported by an archival paper (Schmidt 2012, 1052-1055).

of an error occurring is higher for firms with greater liquidity difficulties and lower profitability. Furthermore, restatements are more likely to be disclosed if a firm's financial status is weak (Kinney and McDaniel 1989, 91).

However, research also indicates that the likelihood of lawsuits against an auditor increases with the degree of the client's financial distress because of the greater incentives for claimants to recover their losses from the auditor (e.g., DeFond et al. 2015, 10; Stice 1991, 521, 530). This might also strengthen an auditor's concerns about reputation losses or litigation exposure and, thus, strengthen an auditor's incentives to remain independent. In line with this, Reynolds and Francis (2000, 388) state that financially distressed firms pose a greater risk to an auditor. The authors also observe that a stronger auditor-client bond leads to a higher likelihood of issuing conservative going concern opinions, and this effect is driven by the most distressed 25% of the sample (Reynolds and Francis 2000, 393, 395–396). The results can be interpreted to mean that reputation and litigation concerns dominate the economic dependence hypothesis, which is also supported by other studies' outcomes (e.g., Gaver and Paterson 2007, 312; Li 2009, 217–219).

Although independence in fact does not appear to be compromised in cases of high client dependence and for clients in bad financial condition, it remains an open question whether shareholders' concerns regarding the economic bond between the client and the auditor depend on the client's financial condition.[76] To better understand this issue and begin filling this research gap, the following Hypothesis 2 in its alternative form is tested:

***H2**: The negative association between the economic importance of the client and perceived EFRQ exists not irrespective of the client's financial condition, c.p.*

[76] The "footnote" remark of Krishnan et al. (2005, 130) indicates that shareholders' concerns regarding non-audit services might be especially present for financially distressed clients. However, Schmidt (2012, 1057) is unable to experimentally demonstrate that a firm's financial distress is related to the perceptions of jurors.

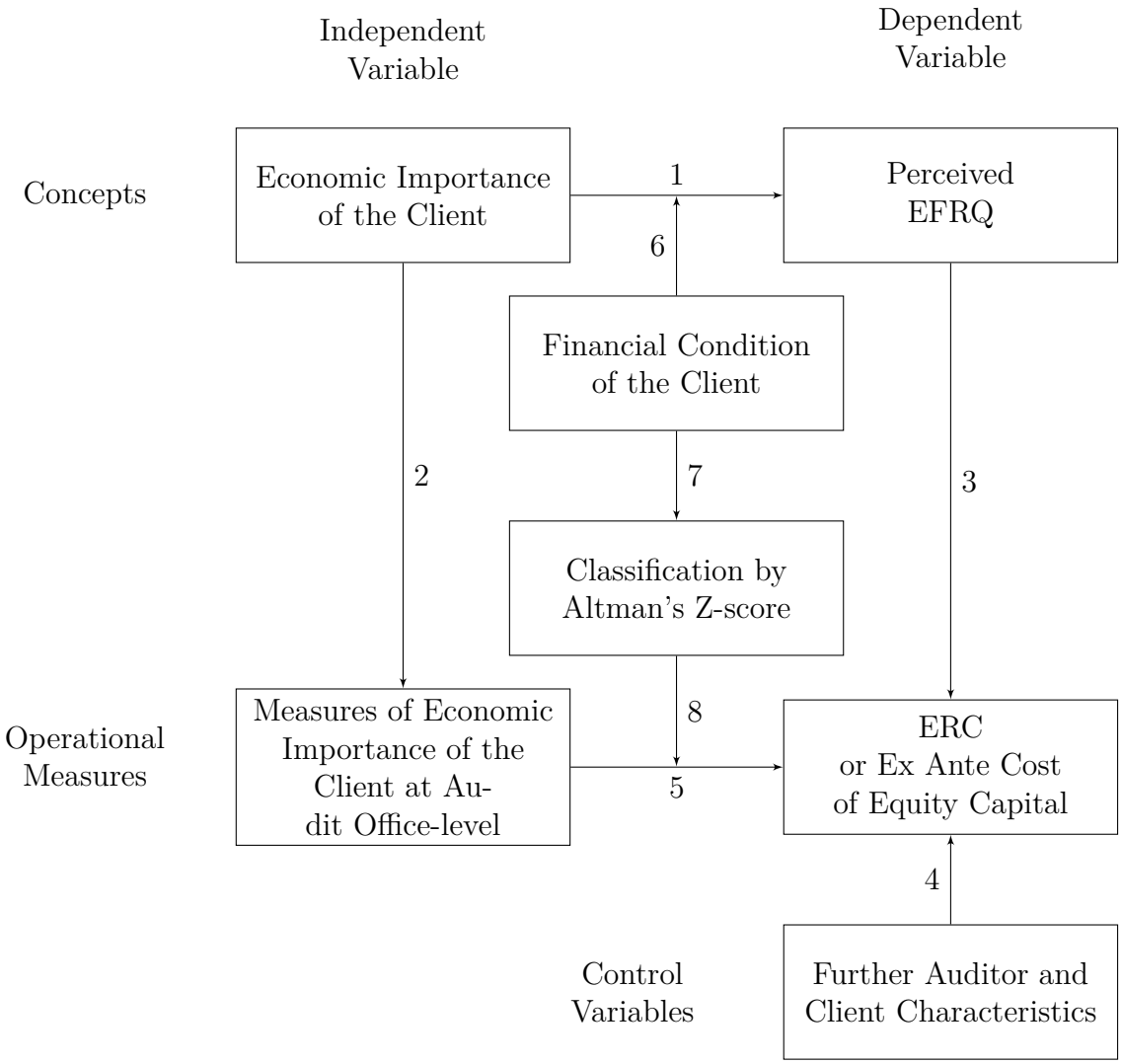
5.3 Research Design and Sample

5.3.1 Research Design

5.3.1.1 Conceptual Model

To illustrate the research design, Figure 5.1 presents the conceptual model, which constitutes a modification of the predictive validity model of Kinney and Libby (2002, 108). This study's aim is to examine whether (link 1; *H1*) and when (link 6; *H2*) the economic importance of the client is related to perceived threatened independence and, therefore, reduced perceived EFRQ.

Figure 5.1: Conceptual Model



The theoretical concept of perceived EFRQ is used because it can be theoretically and empirically demonstrated that—in addition to an auditor's expertise—an auditor's incentives for independence are related to shareholders' perceptions of EFRQ (e.g., DeFond and Zhang 2014, 280). The empirical proxies (link 3) for shareholders' perceptions—ERC and ex ante cost of equity capital—and further control variables affecting the independent and dependent variables (link 4) are introduced during the model specification in the following sections. First, however, the empirical measures of the economic dependence on the client are discussed (link 2). Based on the empirical evidence of the association between the measures of the economic importance of the client and the ERC or the ex ante cost of equity capital (link 5), the conclusions regarding link 1 are drawn.

Furthermore, the study is interested in empirically testing (link 8) whether the association of *H1* (link 1) exists irrespective of the client's financial condition (link 6, *H2*). Therefore, Altman's Z-score is used (link 7) to classify the financial condition of the client.

5.3.1.2 Measures of the Economic Importance of the Client

To test the economic dependence hypothesis, a proxy for the economic importance of an auditor's client is needed. Ideally, client importance is defined as total quasi-rents of a specific client divided by the total quasi-rents of an auditor. Because quasi-rents are unobservable, an alternative measure of client dependence is required. A reasonable surrogate might be the percentage of total fees generated by a specific client relative to total fees earned from all clients (DeAngelo 1981b, 192–193; Reynolds and Francis 2000, 376). In addition, prior research has shown that examining the auditor-client economic bond at the audit office-level might be superior to the national-level approach (e.g., DeFond and Francis 2005, 14–15; Francis 2006, 756; Reynolds and Francis 2000, 376; Wallman 1996, 78). Therefore, the primary measure of client dependence is defined as the total fees paid by the client to the auditor divided by the total fees of the audit office (TFCTFAO).[77] Although the client-specific total fees to the total fees of all clients of an audit office might be the most appropriate measure of economic dependence, the components of the total fees generated by a client—i.e., audit and non-audit fees—are also examined.

[77] The total fees of an audit office are calculated by summing all fees received from SEC registrants by the auditor in a certain (the audit office's) core-based statistical area. To determine the auditor's core-based statistical area, the classification of the U.S. Census Bureau (`http://www.census.gov/population/metro/`) is used.

AFCTFAO represents audit fees, and NAFCTFAO equals non-audit fees paid by the client, both divided by the total fees of the audit office.

Table 5.1: Main Models' Variables and Definitions

Variable	**Definition**
	Dependent Variables
CAR	A stock's cumulative excess return over the Russell 3000's return calculated for the 3-day window, i.e., -1 day to +1 day relative to the earnings reporting date. The calculation is based on the market model estimated over the 180-day window ending 21 trading days before the earnings reporting date.
COEC	Client-specific ex ante cost of equity capital based on the PEG ratio-model by Easton (2004).
	Variables of Interest
SURP	Reported earnings for a respective fiscal year minus the mean earnings forecast for this fiscal year one week before the earnings reporting date, scaled by the firm's stock price two trading days before the earnings reporting date.
TFCTFAO	Total fees paid by the client to the auditor divided by total fees of the audit office.
AFCTFAO	Audit fees paid by the client to the auditor divided by total fees of the audit office.
NAFCTFAO	Non-audit fees paid by the client to the auditor divided by total fees of the audit office.
ALTZS	A dummy variable equals one if a firm's Altman's Z-score $\geq$ 2.99 and zero otherwise.
	Control Variables—CONTROL
SPECIALIST	A dummy variable that equals one if an auditor's two-digit SIC-industry share is top-ranked at the city-level (based on the client's CBSA) and zero otherwise.
SEC	A dummy variable that equals one if the client is located in the same CBSA as an SEC office and zero otherwise (cf. `https://www.sec.gov/contact/addresses.htm`).
PCAOB	A dummy variable that equals one if the audit office is located in the same CBSA as a PCAOB office and zero otherwise (cf. `http://pcaobus.org/About/Ops/Pages/default.aspx`).
POPULATION	Natural logarithm of the total population in the audit office's CBSA (cf. `http://www.census.gov/popest/data/metro/totals/2014/CSA-EST2014-alldata.html`).
MVE	Natural logarithm of the market value of equity.
MB	Market-to-book value, defined as the market value of the common equity divided by the balance sheet value of the common equity. Negative values are replaced with zeros.
MBNEG	A dummy variable that equals one if a firm has a negative market-to-book value and zero otherwise.
LEV	Leverage, defined as long-term debt plus short-term debt plus the current portion of long-term debt divided by total capital plus short-term debt plus the current portion of long-term debt.
BETA	Beta factor from the market model regression, which is calculated over the 180-day window ending 21 days before the earnings reporting date.
RET	Recent fiscal-year ex post realized stock return.
SURPNEG	A dummy variable that equals one if a firm has a negative earnings surprise (SURP) and zero otherwise.
ANALYST	Natural logarithm of one plus the number of earnings per share estimates made by analysts.
	Fixed-Effects Variables—IND, YR
IND	A set of seven industry dummies representing the SIC Division Structure as used by the U.S. Department of Labor, Occupational Safety & Health Administration (cf. `https://www.osha.gov/pls/imis/sic_manual.html`).
YR	A set of four year dummies.

Note: This table presents the variables' definitions.

5.3.1.3 Measure of Client's Financial Condition

To test *H2*, a firm's financial condition has to be measured. In this study, Altman's Z-score is used (Altman 1968), as is common in the accounting and auditing literature to proxy for a firm's financial distress (e.g., Francis and Yu 2009, 1528; Litt et al. 2014, 69; Peterson et al. 2015, 2500; Reynolds and Francis 2000, 383; Stice 1991, 521). Altman's Z-score is computed according to the following formula (Altman 1968, 594; Altman 2000, 9–13):

$$ALTZ_{it} = 1.2\frac{WC_{it}}{TA_{it}} + 1.4\frac{RETEARN_{it}}{TA_{it}} + 3.3\frac{EBIT_{it}}{TA_{it}} + 0.6\frac{MV_{it}}{TL_{it}} + 1.0\frac{SALES_{it}}{TA_{it}}, \tag{5.1}$$

where WC equals working capital, TA represents total assets, RETEARN stands for retained earnings, EBIT denotes earnings before interest and taxes, MV corresponds to market value of equity, TL equals total liabilities, and SALES represents total sales. Subsequently, firms are classified as either financially "safe" or financially "non-safe" to distinguish between financially non-distressed and distressed firms. This classification is based on Altman (1968, 606). Technically, the classification is represented by a dummy variable (ALTZS) that equals one if Altman's Z-score ranges in the "safe" non-bankrupt zone with values greater than or equal to 2.99 and zero if Altman's Z-score ranges in the "gray" area (1.81 to 2.99) or in the bankrupt zone (values below 1.81).

5.3.2 Sample

Table 5.2, Panel A, p. 110, contains the sample selection process. The sample's data are obtained from four databases, i.e., Audit Analytics, Datastream, I/B/E/S and Worldscope. The initial sample consists of U.S. SEC registrants with audit-related data for the years 2010 to 2014 in Audit Analytics.[78] This initial sample consists of 42,745 firm-years, and it is used to compute client importance and auditor industry specialization variables. Further, 23,408 firm-year observations are lost because firms are not covered by Datastream, I/B/E/S or Worldscope or inconsistent data from those databases are obtained. As a next step, 4,442 firm-years referring to firms in the financial services industry (SIC codes 6000–6999) are deleted. All financial market-related variables are taken from Datastream, and Worldscope is the source

[78] The sample starts in 2010, in order to avoid results being influenced by both the implementation of SOX as well as the financial crisis (which is assumed to have ended in mid-2009; cf. `http://www.nber.org/cycles.html`; accessed on 1st May 2016).

of balance sheet and income statement data. Due to limited data availability, the sample decreases to 13,030 firm-years. Next, I/B/E/S is used to obtain forecast data.

Table 5.2: Sample Selection and Sample Composition by Industry

Panel A: Sample Selection

	Firm-Years
Initial sample of U.S. SEC registrants with audit-related data for fiscal years 2010, 2011, 2012, 2013 or 2014 in Audit Analytics.	42,745
Sample used to compute client importance and auditor industry specialization	**42,745**
Less: firms (firm-years respectively) not covered by Datastream, Worldscope or I/B/E/S, or firm-years with inconsistent data.	23,408
	19,337
Less: firm-years with SIC codes 6000–6999.	4,442
	14,895
Less: firm-years with no data in Datastream.	1,159
	13,736
Less: firm-years with no data in Worldscope.	706
	13,030
Less: firm-years with no data in I/B/E/S, with a negative one-year-forward mean earnings forecast, or with negative earnings forecast growth.	5,714
	7,316
Less: firm-years referring to penny stocks, i.e., the price is less than $1.	9
	7,307
Less: firm-years with fewer than three analysts following.	558
	6,749
Less: firm-years with non-Big 4 auditors.	731
Final sample	**6,018**

Panel B: Sample Composition by Industry

SIC	**Division**	**Sample (%)**
100–999	Agriculture, Forestry, And Fishing	0.28
1000–1499	Mining	5.32
1500–1799	Construction	1.83
2000–3999	Manufacturing	45.49
4000–4999	Transportation, Communications, Electric, Gas, And Sanitary Services	12.13
5000–5199	Wholesale Trade	3.84
5200–5999	Retail Trade	10.22
7000–8999	Services	20.89
Total		**100**

Note: This table outlines the sample selection procedure and the sample composition by industry.

Because I/B/E/S has a large firm bias and the sample has to be constrained to firms with non-negative one-year-forward mean earnings forecasts and non-negative

earnings growth forecasts to calculate the ex ante cost of equity capital, 5,714 firm-years are lost. Subsequently, 567 firm-years are excluded. On the one hand, this concerns penny stocks, and it should protect the sample against biased return data (i.e., price anomalies; e.g., Bhardwaj and Brooks 1992, 553–554). On the other hand, earnings forecasts are only employed if at least three analyst estimates are available in I/B/E/S. This should ensure that forecasts approximate market opinion (e.g., Barron et al. 2002, 829). Finally, 731 firm-years of non-Big 4 clients are deleted to control for brand name effects (e.g., Craswell et al. 1995, 310) and to avoid auditor self-selection biases (e.g., Khurana and Raman 2006, 1010). Moreover, Ghosh et al. (2009, 374) posit that measures of client importance for the Big 4 are systematically different from those of non-Big 4 firms. The final sample consists of 1,776 different 10-K-filers or 6,018 firm-years. Finally, Table 5.2, Panel B, p. 110, illustrates the sample composition by industry. Firms from the manufacturing industry represent the largest part of the sample (45.49%).

5.4 Model Specification and Results

5.4.1 Earnings Response Coefficient

5.4.1.1 Earnings Response Coefficient—Model Specification

High (perceived) audit quality may be interpreted "as greater assurance of high financial reporting quality." (DeFond and Zhang 2014, 279) Therefore, the objective of an audit is not a self-purpose but to ensure that the financial report is sufficiently credible. Consequently, prior studies show that shareholders' perceptions of EFRQ are influenced by perceived audit quality (Francis 2004, 360). Furthermore, the objective of financial reports is to provide decision-useful information (FASB 1978, Para. 16; FASB 2010, Para. QC5). The qualitative characteristics of decision-useful information are relevance and reliability, which, inter alia, can be measured by the ERC (Dechow et al. 2010, 366–367; Holthausen and Verrecchia 1988, 83–87; Lev 1989, 186–187; Kormendi and Lipe 1987, 325-334). Thus, the ERC represents a proxy for perceived EFRQ as well as indirectly for perceived audit quality and, thus, perceived auditor independence (e.g., DeFond and Zhang 2014, 288).

Although the ERC metric is a common measure of perceived audit quality and perceived auditor independence (e.g., Balsam et al. 2003; Francis and Ke 2006; Higgs and Skantz 2006; Krishnan et al. 2005; Teoh and Wong 1993), there is lit-

tle direct evidence concerning whether shareholders have a negative perception of the economic importance of the client, defined as the proportion of (certain) client fees to the auditor's total revenues. One exception is Ghosh et al. (2009, 377), who show that higher levels of client importance measured at the audit firm-level are related to lower ERCs.[79] In contrast to the study of Ghosh et al. (2009), this analysis measures a client's economic importance at the audit office-level. This might be more appropriate because contracts with clients and decisions are (still) made at the office-level (e.g., Craswell et al. 2002, 254; Francis 2006, 756; Francis et al. 1999, 186–198; Reynolds and Francis 2000, 376; Wallman 1996, 78).[80] In summary and following the reasoning in the hypothesis development section, the ERC is expected to be lower for economically important clients.

Based on this line of argument, the following returns-earnings model is tested:

$$\begin{aligned} CAR_{it} = {} & \alpha_0 + \alpha_1 SURP_{it} + \alpha_2 TFCTFAO_{it} + \alpha_3 TFCTFAO_{it} \times SURP_{it} \\ & + \sum_{j=1}^{11} \alpha_{j+3} CONTROL_{jit} \times SURP_{it} + \sum_{k=1}^{7} \alpha_{k+14} IND_{kit} \\ & \times SURP_{it} + \sum_{l=1}^{4} \alpha_{l+21} YR_{lit} \times SURP_{it} + \sum_{j=1}^{11} \alpha_{j+25} CONTROL_{jit} \\ & + \sum_{k=1}^{7} \alpha_{k+36} IND_{kit} + \sum_{l=1}^{4} \alpha_{l+43} YR_{lit} + \varepsilon_{it} \end{aligned} \tag{5.2}$$

The variable being explained (CAR) represents a stock's cumulative excess return over the Russell 3000's return calculated for the 3-day window (-1 day to +1 day)

[79] Further research regarding client importance is presented in the studies of Lim and Tan (2008) and Lim and Tan (2010) analyzing independence in fact and in appearance. However, the first study uses non-audit fees and client importance measures at the audit firm-level to examine the impact of industry expertise on the relationship between fee dependence and (perceived) auditor independence. The primary focus of the latter is audit tenure considering industry specialization and client importance as moderating effects.

[80] Chen et al. (2010) examine client importance at the individual audit partner-level and its effect on audit quality in a Chinese setting.

relative to the earnings reporting date.[81] The first independent variable SURP denotes the earnings surprise for a respective fiscal year; it equals the reported earnings for a fiscal year minus the mean earnings forecast for that fiscal year one week before the earnings reporting date, scaled by the firm's stock price two trading days before the earnings reporting date.[82] This variable plays an important role because the ERC is determined by SURP and its interaction terms. Hence, if one is interested in whether economic dependence on the client is associated with the ERC, one must examine the interaction of the proxy for the economic importance of the client with SURP. Moreover, a set of variables (CONTROL) is introduced to control for additional auditor and firm characteristics. The analysis controls for city-level industry specialization because the results of Krishnan et al. (2013, 680, 682) imply that auditor specialization at the city-level is associated with shareholders' perceptions of EFRQ. Moreover, to guard against possible confounding city effects (DeFond et al. 2015, 3–4, 21), two dummies and a continuous variable are introduced: SEC equals one if the client is located in the same core-based statistical area (CBSA) as an SEC office and zero otherwise. PCOAB equals one if the audit office is located in the same CBSA as a PCAOB office and zero otherwise. The natural logarithm of the total population in the audit office's CBSA is represented by the variable POPULATION. Ultimately, variables control for the following firm characteristics: size (MVE; e.g., Balsam et al. 2003, 76), growth opportunities (MB and MBNEG; e.g., Higgs and Skantz 2006, 7), capital structure (LEV; e.g., Baber et al. 2014; Francis and Ke 2006, 502), systematic risk (BETA; e.g., Collins and Kothari 1989, 157), negative earnings surprises (SURPNEG; e.g., Basu 1997, 23; Krishnan et al. 2005, 118), and pre-disclosure environment (ANALYST; e.g., Teoh and Wong 1993, 359, 364).

[81] The CAR is calculated using the market model, which is estimated over the 180-day window ending 21 trading days before the earnings reporting date. This event window (-1 day to +1 day) is chosen because it has to be sufficiently long to capture the market's price response to earnings' surprises while remaining as short as possible to mitigate the influence of potential confounding events (e.g., Bergh and Gibbons 2011, 552; McWilliams and Siegel 1997, 636). Nonetheless, sensitivity checks using different event windows, i.e., -2 days to +2 days and -3 days to +3 days relative to the earnings reporting date, are performed, and qualitatively similar results are observed. However, the one-tailed p-value of the interaction of AFCTFAO with SURP ranges between 0.145 and 0.095 for the full sample and the "non-safe" sub-sample. Moreover, none of the outcomes are altered if the Dow Jones Industrial Average or the Standard and Poor's 500 Composite is chosen instead of the Russell 3000 as the benchmark index to calculate CAR.

[82] All results remain qualitatively unchanged if median earnings forecasts instead of mean earnings forecasts are used.

In addition to Equation 5.2, total fees are divided into two components: audit and non-audit fees. This makes it possible to examine whether shareholders perceive client dependence based on audit and/or non-audit fees as a threat to auditor independence. Therefore, a second returns-earnings model is tested, which is—except for the client dependence measure—identical to Equation 5.2.

$$\begin{aligned} CAR_{it} = {} & \beta_0 + \beta_1 SURP_{it} + \beta_2 AFCTFAO_{it} + \beta_3 NAFCTFAO_{it} \\ & + \beta_4 AFCTFAO_{it} \times SURP_{it} + \beta_5 NAFCTFAO_{it} \times SURP_{it} \\ & + \sum_{j=1}^{11} \beta_{j+5} CONTROL_{jit} \times SURP_{it} + \sum_{k=1}^{7} \beta_{k+16} IND_{kit} \\ & \times SURP_{it} + \sum_{l=1}^{4} \beta_{l+23} YR_{lit} \times SURP_{it} + \sum_{j=1}^{11} \beta_{j+27} CONTROL_{jit} \\ & + \sum_{k=1}^{7} \beta_{k+38} IND_{kit} + \sum_{l=1}^{4} \beta_{l+45} YR_{lit} + \varepsilon_{it} \end{aligned} \tag{5.3}$$

5.4.1.2 Earnings Response Coefficient—Descriptive Statistics

Table 5.3, p. 116, contains the descriptive statistics for all variables except the industry and year dummies. The average stock's cumulative excess return over the Russell 3000's return ranges between -0.21 and 0.20 (mean of 0.00). The earnings surprise is approximately 0.00, whether concentrating on the mean or the median. This can be interpreted to mean that, on average, the firms' reported earnings meet the latest analysts' forecasts, and it might indicate that firms attempt to avoid earnings surprises (Dichev et al. 2016, 29). Moreover, approximately 30.72% of all earnings surprises are negative. The untransformed market value of equity of a median firm-year is approximately $2.17 billion. The sample includes firms financing all of their activities from equity and retained earnings (LEV equals 0.00) and indebted firms (maximum of LEV equals 1.44). The variables capturing a firm's growth opportunities—i.e., MB and MBNEG—exhibit the highest skewness and kurtosis, and fewer then 2.80% of all firm-years have negative market-to-book ratios. The median observation of beta equals 1.01. Overall, 57.43% of all observations are classified as "safe" concerning the firm's financial condition as measured by Altman's Z-score. Approximately eleven analysts' earnings forecasts exist for the average firm in the sample. The average sample firm is located in a smaller city if one compares this study's sample with the sample of DeFond et al. (2015, 44) because only 36.79% of all firm-years are located in the same city as an SEC office (versus 0.49), and the city population totals approximately 3,777,262 (versus 5,564,434). In addition,

50.73% of all audit offices are located in the same city as a PCAOB office, which is, in contrast, higher (versus 0.45) than the corresponding figure in the sample of DeFond et al. (2015, 44). Of all firm-years, 67.58% are audited by city-industry specialists; this percentage is very close to the proportion of industry leaders at the city-level in Krishnan et al. (2013, 677). Finally, Table 5.3, p. 116, also illustrates that audit offices are quite dependent on clients on average. Although the median (0.04) of the client dependence measure TFCTFAO is clearly lower than the mean (0.09), losing the median client would mean that an audit office would lose 4% of its total fees. Further, comparing AFCTFAO and NAFCTFAO reveals that losing a client causes a larger decline in an audit office's total fees due to losing revenues from auditing instead of revenues from non-audit services. This might simply reflect that audit fees increased and non-audit fees declined following SOX (e.g., Ghosh et al. 2009, 382; Li 2009, 202).

Table 5.4, p. 117, presents the Pearson product-moment correlation coefficients for the pooled sample. Analyzing all correlation coefficients does not lead to serious concerns regarding potential collinearity problems, except between AFCTFAO and NAFCTFAO.[83]

[83] However, ERC models might be particularly problematic with respect to collinearity because the respective regressions include many interaction terms, and hence, collinearity is present by construction. However, this does not pose a major problem as long as the collinear variables are significant and one rejects the null hypothesis that all coefficient estimates are jointly zero (e.g., Brambor et al. 2006, 70–71; Eilifsen and Knivsfla 2013, 92).

Table 5.3: Summary Statistics

	Mean	**Std. Dev.**	**25%**	**50%**	**75%**	**Min.**	**Max.**
CAR	0.004	0.071	-0.032	0.005	0.043	-0.213	0.202
SURP	0.000	0.006	-0.001	0.000	0.002	-0.028	0.019
COEC	0.108	0.043	0.081	0.098	0.125	0.036	0.271
ALTZS	0.574	0.494	0.000	1.000	1.000	0.000	1.000
TFCTFAO	0.093	0.155	0.014	0.036	0.093	0.002	0.897
AFCTFAO	0.075	0.124	0.012	0.030	0.076	0.002	0.724
NAFCTFAO	0.016	0.033	0.001	0.004	0.015	0.000	0.200
SPECIALIST	0.676	0.468	0.000	1.000	1.000	0.000	1.000
SEC	0.368	0.482	0.000	0.000	1.000	0.000	1.000
PCAOB	0.507	0.500	0.000	1.000	1.000	0.000	1.000
POPULATION	15.145	0.877	14.485	15.116	15.638	13.305	16.816
MVE	21.626	1.497	20.526	21.497	22.615	18.661	25.709
MB	3.567	4.047	1.560	2.400	3.870	0.000	28.330
MBNEG	0.028	0.164	0.000	0.000	0.000	0.000	1.000
LEV	0.346	0.286	0.110	0.327	0.511	0.000	1.443
BETA	1.076	0.673	0.610	1.013	1.431	-0.215	3.385
RET	0.196	0.370	-0.035	0.148	0.361	-0.531	1.619
SURPNEG	0.307	0.461	0.000	0.000	1.000	0.000	1.000
ANALYST	2.509	0.588	2.079	2.565	2.996	1.386	3.664
n	6,018						

Note: This table presents the summary statistics for the pooled data for fiscal years 2010 to 2014. All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. Variable definitions: CAR represents a stock's cumulative excess return over the Russell 3000's return calculated for the 3-day window, i.e., -1 day to +1 day relative to the earnings reporting date. The calculation is based on the market model estimated over the 180-day window ending 21 trading days before the earnings reporting date. SURP equals reported earnings for a respective fiscal year minus the mean earnings forecast for that fiscal year one week before the earnings reporting date, scaled by the firm's stock price two trading days before the earnings reporting date. COEC represents the client-specific ex ante cost of equity capital based on the PEG ratio-model by Easton (2004). ALTZS is a dummy variable that equals one if a firm's Altman's Z-Score $\geq$ 2.99 and zero otherwise. TFCTFAO represents total fees paid by the client to the auditor divided by the total fees of the audit office. AFCTFAO denotes audit fees paid by the client to the auditor divided by total fees of the audit office. NAFCTFAO represents non-audit fees paid by the client to the auditor divided by the total fees of the audit office. SPECIALIST is a dummy variable that equals one if an auditor's two-digit SIC-industry share is top-ranked at the city-level (based on the client's CBSA) and zero otherwise. SEC is a dummy variable that equals one if the client is located in the same CBSA as an SEC office and zero otherwise. PCAOB is a dummy variable that equals one if the audit office is located in the same CBSA as a PCAOB office and zero otherwise. POPULATION is defined as the natural logarithm of the total population in the audit office's CBSA. MVE is the natural logarithm of the market value of equity. MB represents market-to-book value, defined as the market value of common equity divided by the balance sheet value of common equity. Negative values are replaced with zeros. MBNEG is a dummy variable that equals one if a firm has a negative market-to-book value and zero otherwise. LEV represents leverage, defined as long-term debt plus short-term debt plus current portion of long-term debt divided by total capital plus short-term debt plus the current portion of long-term debt. BETA is the beta factor from the market model regression, which is calculated over the 180-day window ending 21 days before the earnings reporting date. RET denotes the recent fiscal-year ex post realized stock return. SURPNEG is a dummy variable that equals one if a firm has a negative earnings surprise (SURP) and zero otherwise. ANALYST is the natural logarithm of one plus the number of earnings per share estimates made by analysts.

Table 5.4: Pearson Product-moment Correlation Coefficients

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(1)	1.000																		
(2)	0.233	1.000																	
	(0.000)																		
(3)	0.006	-0.055	1.000																
	(0.645)	(0.000)																	
(4)	0.026	0.062	-0.196	1.000															
	(0.046)	(0.000)	(0.000)																
(5)	-0.002	0.013	-0.028	-0.098	1.000														
	(0.878)	(0.322)	(0.032)	(0.000)															
(6)	-0.003	0.008	-0.023	-0.102	0.984	1.000													
	(0.806)	(0.523)	(0.072)	(0.000)	(0.000)														
(7)	0.005	0.025	-0.043	-0.067	0.812	0.713	1.000												
	(0.671)	(0.050)	(0.001)	(0.000)	(0.000)	(0.000)													
(8)	-0.014	-0.014	-0.015	-0.027	0.179	0.181	0.147	1.000											
	(0.262)	(0.288)	(0.258)	(0.036)	(0.000)	(0.000)	(0.000)												
(9)	-0.002	0.001	-0.059	0.002	-0.237	-0.242	-0.179	-0.213	1.000										
	(0.888)	(0.950)	(0.000)	(0.848)	(0.000)	(0.000)	(0.000)	(0.000)											
(10)	-0.013	-0.032	-0.004	-0.021	-0.338	-0.343	-0.261	-0.142	0.540	1.000									
	(0.322)	(0.014)	(0.781)	(0.103)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)										
(11)	-0.020	-0.013	-0.022	0.006	-0.424	-0.431	-0.318	-0.186	0.475	0.764	1.000								
	(0.115)	(0.302)	(0.093)	(0.630)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)									
(12)	-0.016	0.033	-0.348	0.044	0.264	0.253	0.275	0.117	0.054	0.057	0.072	1.000							
	(0.226)	(0.009)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)								
(13)	0.014	-0.012	-0.148	0.134	-0.031	-0.038	0.000	-0.029	0.107	0.015	0.031	0.193	1.000						
	(0.280)	(0.359)	(0.000)	(0.000)	(0.016)	(0.003)	(0.995)	(0.025)	(0.000)	(0.257)	(0.018)	(0.000)							
(14)	0.003	0.012	0.083	-0.101	-0.003	-0.000	-0.011	-0.037	0.036	0.034	0.037	-0.006	-0.148	1.000					
	(0.835)	(0.358)	(0.000)	(0.000)	(0.828)	(0.991)	(0.375)	(0.004)	(0.006)	(0.008)	(0.004)	(0.630)	(0.000)						
(15)	-0.007	-0.045	0.093	-0.491	0.122	0.121	0.112	0.072	0.019	0.050	0.037	0.142	0.129	0.510	1.000				
	(0.608)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.149)	(0.000)	(0.004)	(0.000)	(0.000)	(0.000)					
(16)	0.030	0.008	0.379	-0.144	0.012	0.018	-0.015	0.012	-0.082	-0.044	-0.057	-0.224	-0.112	0.049	0.061	1.000			
	(0.019)	(0.530)	(0.000)	(0.000)	(0.336)	(0.152)	(0.252)	(0.342)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)				
(17)	0.024	0.058	-0.178	0.098	-0.017	-0.019	-0.015	-0.005	0.027	-0.004	-0.003	0.077	0.189	0.017	-0.005	0.051	1.000		
	(0.060)	(0.000)	(0.000)	(0.000)	(0.182)	(0.151)	(0.253)	(0.696)	(0.038)	(0.736)	(0.835)	(0.000)	(0.000)	(0.178)	(0.682)	(0.000)			
(18)	-0.249	-0.560	0.113	-0.100	0.013	0.015	0.004	0.023	-0.023	0.029	0.012	-0.088	-0.038	0.015	0.063	0.050	-0.068	1.000	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.319)	(0.255)	(0.769)	(0.079)	(0.070)	(0.025)	(0.342)	(0.000)	(0.003)	(0.233)	(0.000)	(0.000)	(0.000)		
(19)	-0.005	0.034	-0.171	0.035	0.136	0.132	0.140	0.057	0.019	0.024	0.029	0.734	0.148	0.017	0.081	-0.128	-0.037	-0.083	1.000
	(0.692)	(0.009)	(0.000)	(0.007)	(0.000)	(0.000)	(0.000)	(0.000)	(0.138)	(0.063)	(0.024)	(0.000)	(0.000)	(0.176)	(0.000)	(0.000)	(0.004)	(0.000)	

Table 5.4: Pearson Product-moment Correlation Coefficients (continued)

Note: This table presents the Pearson product-moment correlation coefficients for the pooled data for fiscal years 2010 to 2014. The numbers in parentheses below the correlation coefficients indicate p-values (two-tailed test). All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. Variable definitions: (1) CAR represents a stock's cumulative excess return over the Russell 3000's return calculated for the 3-day window, i.e., -1 day to +1 day relative to the earnings reporting date. The calculation is based on the market model estimated over the 180-day window ending 21 trading days before the earnings reporting date. (2) SURP equals reported earnings for a respective fiscal year minus the mean earnings forecast for this fiscal year one week before the earnings reporting date, scaled by the firm's stock price two trading days before the earnings reporting date. (3) COEC represents the client-specific ex ante cost of equity capital based on the PEG ratio-model by Easton (2004). (4) ALTZS is a dummy variable that equals one if a firm's Altman's Z-Score $\geq$ 2.99 and zero otherwise. (5) TFCTFAO represents total fees paid by the client to the auditor divided by the total fees of the audit office. (6) AFCTFAO denotes audit fees paid by the client to the auditor divided by the total fees of the audit office. (7) NAFCTFAO represents non-audit fees paid by the client to the auditor divided by the total fees of the audit office. (8) SPECIALIST is a dummy variable that equals one if an auditor's two-digit SIC-industry share is top-ranked at the city-level (based on the client's CBSA) and zero otherwise. (9) SEC is a dummy variable that equals one if the client is located in the same CBSA as an SEC office and zero otherwise. (10) PCAOB is a dummy variable that equals one if the audit office is located in the same CBSA as a PCAOB office and zero otherwise. (11) POPULATION is defined as the natural logarithm of the total population in the audit office's CBSA. (12) MVE is the natural logarithm of the market value of equity. (13) MB represents market-to-book value, defined as the market value of common equity divided by the balance sheet value of common equity. Negative values are replaced with zeros. (14) MBNEG is a dummy variable that equals one if a firm has a negative market-to-book value and zero otherwise. (15) LEV represents leverage, defined as long-term debt plus short-term debt plus current portion of long-term debt divided by total capital plus short-term debt plus the current portion of long-term debt. (16) BETA is the beta factor from the market model regression, which is calculated over the 180-day window ending 21 days before the earnings reporting date. (17) RET denotes the recent fiscal-year ex post realized stock return. (18) SURPNEG is a dummy variable that equals one if a firm has a negative earnings surprise (SURP) and zero otherwise. (19) ANALYST is the natural logarithm of one plus the number of earnings per share estimates made by analysts.

5.4.1.3 Earnings Response Coefficient—Multivariate Analysis

To analyze whether an auditor's economic dependence on a client is related to shareholders' perception of EFRQ (*H1*), one must consider the first derivative of the ERC with respect to the proxy for economic dependence on the client; in other words, the coefficient of the interaction term between SURP and the proxy for economic dependence on the client.

Table 5.5, column (1), p. 120, presents the results if client dependence is measured as the client-specific total fees to the total fees from all clients of an audit office. The estimated coefficient of the interaction of TFCTFAO with SURP is negative (coefficient of -2.30), and the null hypothesis can be rejected (p-value of 0.060, one-tailed test). Moreover, it is of further interest whether this relationship is not only statistically significant but also economically relevant. Therefore, the ERC is computed for two cases: (1) for the 25th percentile (0.01) of TFCTFAO for an average firm, representing low client importance, and (2) for the 75th percentile (0.09) of TFCTFAO for an average firm, representing high client importance. Comparing the two ERCs reveals that the ERC for the average firm changes from 2.886 (low client importance) to 2.705 (high client importance), a decrease of 6.27%. Thus, the association of TFCTFAO with the ERC is also of economic interest. There seems to be evidence that shareholders perceive the economic importance of the client as a threat to auditor independence. If total fees are divided into audit and non-audit fees, column (1) of Table 5.6, p. 123, reveals that only the earnings surprise interaction with AFCTFAO is significantly different from zero (p-value of 0.046, one-tailed test) and has a negative coefficient of 3.54. An increase by the inter-quartile range (25th to 75th percentile) of AFCTFAO for an average firm decreases the ERC by 7.84%. This outcome suggests that shareholders' negative perceptions of client dependence might be driven by audit fee dependence. The two following arguments could explain this finding: First, auditor independence is primarily of interest to shareholders if the auditor provides audit services rather than non-audit services. This reasoning is also consistent with the experimental study conducted by Gul (1991, 168) indicating that audit fees are the driver of bankers' perceptions of auditor independence. Second, there is some evidence that non-audit services decreased after the implementation of SOX (e.g., Ghosh et al. 2009, 382; Li 2009, 202), and hence, the importance of non-audit fees plus their relative contribution to client dependence issues is also expected to decline.

Table 5.5: OLS Regressions—Earnings Response Coefficient and Economic Importance of the Client Proxied by TFCTFAO

	Dependent Variable = CAR								
	(1) Full Sample			(2) Financial Condition: "Safe"			(3) Financial Condition: "Non-Safe"		
Variable	**Coefficient**	**Robust Standard Error**	**p-value**	**Coefficient**	**Robust Standard Error**	**p-value**	**Coefficient**	**Robust Standard Error**	**p-value**
SURP	9.6225	6.4414	0.135	2.9327	12.0980	0.809	14.4534	7.2638	0.047
TFCTFAO	-0.0003	0.0070	0.969	0.0059	0.0100	0.553	-0.0058	0.0096	0.545
TFCTFAO×SURP	-2.3011	1.4755	0.119	-0.7630	3.0016	0.799	-3.5206	1.7994	0.051
SPECIALIST×SURP	0.4511	0.4561	0.323	1.2558	0.8314	0.131	0.1933	0.5097	0.705
SEC×SURP	0.0920	0.4682	0.844	0.1777	0.8750	0.839	0.1306	0.5111	0.798
PCAOB×SURP	-0.1844	0.6295	0.770	-2.6472	1.2667	0.037	0.5130	0.6977	0.462
POPULATION×SURP	-0.0174	0.3780	0.963	1.4142	0.6584	0.032	-0.5222	0.4477	0.244
MVE×SURP	-0.2539	0.2049	0.216	-0.7751	0.4125	0.060	-0.1195	0.2304	0.604
MB×SURP	0.0434	0.0618	0.483	0.1663	0.0716	0.020	-0.0115	0.0596	0.847
MBNEG×SURP	2.0227	1.2567	0.108	-7.5068	3.2534	0.021	1.8466	1.3168	0.161
LEV×SURP	-2.9941	0.8956	0.001	-0.5078	1.8804	0.787	-2.5716	1.1586	0.027
BETA×SURP	0.0533	0.2594	0.837	-0.2263	0.6416	0.724	0.1481	0.2947	0.616
SURPNEG×SURP	-1.3753	0.5411	0.011	-2.2725	0.9348	0.015	-1.0520	0.6784	0.121
ANALYST×SURP	1.1454	0.5054	0.024	1.2281	0.9891	0.215	1.2596	0.5944	0.034
SPECIALIST	-0.0012	0.0021	0.576	-0.0029	0.0029	0.316	0.0005	0.0030	0.862
SEC	-0.0005	0.0024	0.835	-0.0023	0.0035	0.509	0.0018	0.0033	0.581
PCAOB	0.0031	0.0030	0.288	0.0072	0.0042	0.085	-0.0011	0.0041	0.792
POPULATION	-0.0024	0.0017	0.157	-0.0040	0.0023	0.088	-0.0012	0.0023	0.616
MVE	-0.0007	0.0011	0.494	-0.0010	0.0016	0.510	-0.0005	0.0015	0.723
MB	0.0003	0.0003	0.238	-0.0001	0.0003	0.872	0.0008	0.0004	0.046
MBNEG	-0.0010	0.0068	0.885	0.0027	0.0121	0.827	0.0030	0.0087	0.728
LEV	0.0040	0.0044	0.361	0.0060	0.0069	0.384	0.0017	0.0078	0.830
BETA	0.0017	0.0015	0.263	0.0027	0.0024	0.262	0.0018	0.0020	0.372

Table 5.5: OLS Regressions—Earnings Response Coefficient and Economic Importance of the Client Proxied by TFCTFAO (continued)

	Dependent Variable = CAR								
	(1) Full Sample			(2) Financial Condition: "Safe"			(3) Financial Condition: "Non-Safe"		
SURPNEG	-0.0257	0.0024	0.000	-0.0256	0.0033	0.000	-0.0257	0.0034	0.000
ANALYST	-0.0005	0.0025	0.852	0.0016	0.0035	0.648	-0.0025	0.0036	0.489
INTERCEPT	0.0670	0.0294	0.023	0.0721	0.0390	0.065	0.0840	0.0411	0.041
Industry Dummies:	Yes			Yes			Yes		
Year Dummies:	Yes			Yes			Yes		
Clustered by:	Firm			Firm			Firm		
n	6,018			3,456			2,562		
Adjusted R^2	0.088			0.085			0.100		
$Prob > F$	0.000			0.000			0.000		

Note: This table presents the results of three pooled OLS regressions based on the data for fiscal years 2010 to 2014. Standard errors and t-statistics are adjusted and clustered by firm; p-values are based on two-tailed tests. The regressions include a set of interactions between SURP and industry (IND), as well as year dummies (YR), which are omitted from the table. The variables with "×" are interaction terms. All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. The following regression model is tested: $CAR_{it} = \alpha_0 + \alpha_1 SURP_{it} + \alpha_2 TFCTFAO_{it} + \alpha_3 TFCTFAO_{it} \times SURP_{it} + \alpha_4 SPECIALIST_{it} \times SURP_{it} + \alpha_5 SEC_{it} \times SURP_{it} + \alpha_6 PCAOB_{it} \times SURP_{it} + \alpha_7 POPULATION_{it} \times SURP_{it} + \alpha_8 MVE_{it} \times SURP_{it} + \alpha_9 MB_{it} \times SURP_{it} + \alpha_{10} MBNEG_{it} \times SURP_{it} + \alpha_{11} LEV_{it} \times SURP_{it} + \alpha_{12} BETA_{it} \times SURP_{it} + \alpha_{13} SURPNEG_{it} \times SURP_{it} + \alpha_{14} ANALYST_{it} \times SURP_{it} + \sum_{k=1}^{7} \alpha_{k+14} IND_{kit} \times SURP_{it} + \sum_{l=1}^{4} \alpha_{l+21} YR_{lit} \times SURP_{it} + \alpha_{26} SPECIALIST_{it} + \alpha_{27} SEC_{it} + \alpha_{28} PCAOB_{it} + \alpha_{29} POPULATION_{it} + \alpha_{30} MVE_{it} + \alpha_{31} MB_{it} + \alpha_{32} MBNEG_{it} + \alpha_{33} LEV_{it} + \alpha_{34} BETA_{it} + \alpha_{35} SURPNEG_{it} + \alpha_{36} ANALYST_{it} + \sum_{k=1}^{7} \alpha_{k+36} IND_{kit} + \sum_{l=1}^{4} \alpha_{l+43} YR_{lit} + \varepsilon_{it}$, where CAR represents a stock's cumulative excess return over the Russell 3000's return calculated for the 3-day window, i.e., -1 day to +1 day relative to the earnings reporting date. The calculation is based on the market model estimated over the 180-day window ending 21 trading days before the earnings reporting date. SURP equals reported earnings for a respective fiscal year minus the mean earnings forecast for this fiscal year one week before the earnings reporting date, scaled by the firm's stock price two trading days before the earnings reporting date. TFCTFAO represents total fees paid by the client to the auditor divided by the total fees of the audit office. SPECIALIST is a dummy variable that equals one if an auditor's two-digit SIC-industry share is top-ranked at the city-level (based on the client's CBSA) and zero otherwise. SEC is a dummy variable that equals one if the client is located in the same CBSA as an SEC office and zero otherwise. PCAOB is a dummy variable that equals one if the audit office is located in the same CBSA as a PCAOB office and zero otherwise. POPULATION is defined as the natural logarithm of the total population in the audit office's CBSA. MVE is the natural logarithm of the market value of equity. MB represents market-to-book value, defined as the market value of common equity divided by the balance sheet value of common equity. Negative values are replaced with zeros. MBNEG is a dummy variable that equals one if a firm has a negative market-to-book value and zero otherwise. LEV represents leverage, defined as long-term debt plus short-term debt plus current portion of long-term debt divided by total capital plus short-term debt plus the current portion of long-term debt. BETA is the beta factor from the market model regression, which is calculated over the 180-day window ending 21 days before the earnings reporting date. SURPNEG is a dummy variable that equals one if a firm has a negative earnings surprise (SURP) and zero otherwise. ANALYST is the natural logarithm of one plus the number of earnings per share estimates made by analysts.

In addition, the regressions in Tables 5.5, p. 120, and 5.6, p. 123, address the question of whether the economic dependence hypothesis applies irrespective of the client's financial condition (*H2*). Therefore, the sample is divided into two sub-samples based on the client's financial condition: firms classified as "safe" and firms classified as "non-safe" according to Altman's Z-score.[84]

The regressions for the firms in sound financial health are shown in column (2) of Tables 5.5, p. 120, and 5.6, p. 123. Analyzing those firms with Altman's Z-score values greater than or equal to 2.99, no significant association between client dependence and the ERC can be observed, neither for the total fee proxy nor for the audit and non-audit fee proxies. An interpretation of this result might be that shareholders are not concerned about possible independence issues due to stronger economic bonds between the client and the auditor if the client is in a "safe" financial condition. Moreover, there is empirical evidence that economic dependence on the client is negatively associated with the shareholders' perceptions of EFRQ if the client is more likely to be financially distressed. The estimates of the respective interactions ($TFCTFAO \times SURP$, $AFCTFAO \times SURP$, $NAFCTFAO \times SURP$) in column (3) of Tables 5.5, p. 120, and 5.6, p. 123, are qualitatively similar to those obtained from the full sample.

In summary, client importance is related to shareholders' perceptions of EFRQ and, hence, perceived audit quality and perceived auditor independence. This relationship can be observed for client importance measures based on a client's total fees or audit fees divided by the audit office's total fees. Moreover, shareholders' concerns about client dependence are primarily observed for firms that are more likely to be in financial distress. Overall, the empirical evidence provides support for *H1* and for *H2*, and it demonstrates that shareholders' concerns about auditor independence might be conditional on the client's circumstances—such as the client's financial condition. Finally, the analysis complements recent studies suggesting that SOX seems to mitigate (perceived) threats to auditor independence only to a certain extent (Hollingsworth and Li 2012; Kao et al. 2014).

[84] ALTZS is also included in the regressions of the full sample, and the results are qualitatively similar to those obtained when not including ALTZS as an independent variable. In addition, an alternative approach is used as another robustness check; the sample is divided at the median of Altman's Z-score. The results are qualitatively unchanged except for the coefficient of NAFCTFAO in the "non-safe" sub-sample for the ex ante cost of equity capital model, which is on the edge of significance (p-value of 0.112, one-tailed test).

Table 5.6: OLS Regressions—Earnings Response Coefficient and Economic Importance of the Client Proxied by AFCTFAO and NAFCTFAO

	Dependent Variable = CAR								
	(1) Full Sample			(2) Financial Condition: "Safe"			(3) Financial Condition: "Non-Safe"		
Variable	**Coefficient**	**Robust Standard Error**	**p-value**	**Coefficient**	**Robust Standard Error**	**p-value**	**Coefficient**	**Robust Standard Error**	**p-value**
SURP	10.0419	6.4640	0.120	2.6094	12.1268	0.830	15.0846	7.4354	0.043
AFCTFAO	-0.0063	0.0109	0.564	-0.0094	0.0161	0.560	-0.0022	0.0150	0.885
NAFCTFAO	0.0260	0.0328	0.428	0.0786	0.0456	0.085	-0.0321	0.0491	0.513
AFCTFAO×SURP	-3.5433	2.1074	0.093	-2.7691	4.0360	0.493	-4.5946	2.6136	0.079
NAFCTFAO×SURP	5.0604	8.0578	0.530	9.7378	17.9087	0.587	3.4198	9.5487	0.720
SPECIALIST×SURP	0.4520	0.4548	0.320	1.2605	0.8315	0.130	0.1876	0.5090	0.712
SEC×SURP	0.1124	0.4684	0.810	0.1383	0.8810	0.875	0.1609	0.5129	0.754
PCAOB×SURP	-0.1805	0.6269	0.773	-2.6414	1.2658	0.037	0.5098	0.6951	0.463
POPULATION×SURP	-0.0252	0.3774	0.947	1.4005	0.6596	0.034	-0.5326	0.4493	0.236
MVE×SURP	-0.2753	0.2081	0.186	-0.7528	0.4158	0.070	-0.1483	0.2397	0.536
MB×SURP	0.0423	0.0620	0.495	0.1624	0.0708	0.022	-0.0130	0.0599	0.828
MBNEG×SURP	2.0436	1.2550	0.104	-7.4528	3.2664	0.023	1.8950	1.3147	0.150
LEV×SURP	-3.0445	0.9048	0.001	-0.5809	1.8892	0.759	-2.6155	1.1643	0.025
BETA×SURP	0.0640	0.2595	0.805	-0.1985	0.6473	0.759	0.1602	0.2951	0.587
SURPNEG×SURP	-1.3366	0.5467	0.015	-2.2745	0.9357	0.015	-1.0032	0.6903	0.146
ANALYST×SURP	1.1823	0.5136	0.021	1.2899	0.9909	0.193	1.2814	0.6030	0.034
SPECIALIST	-0.0012	0.0021	0.580	-0.0029	0.0029	0.304	0.0005	0.0030	0.862
SEC	-0.0005	0.0024	0.825	-0.0022	0.0035	0.520	0.0018	0.0033	0.586
PCAOB	0.0032	0.0030	0.284	0.0073	0.0042	0.081	-0.0011	0.0041	0.786
POPULATION	-0.0024	0.0017	0.159	-0.0040	0.0023	0.087	-0.0011	0.0023	0.629
MVE	-0.0008	0.0011	0.462	-0.0012	0.0016	0.456	-0.0005	0.0015	0.751
MB	0.0003	0.0002	0.236	-0.0001	0.0003	0.874	0.0008	0.0004	0.045
MBNEG	-0.0010	0.0068	0.888	0.0029	0.0121	0.811	0.0026	0.0087	0.769

Table 5.6: OLS Regressions—Earnings Response Coefficient and Economic Importance of the Client Proxied by AFCTFAO and NAFCTFAO (continued)

	Dependent Variable = CAR								
	(1) Full Sample			(2) Financial Condition: "Safe"			(3) Financial Condition: "Non-Safe"		
LEV	0.0040	0.0044	0.371	0.0057	0.0069	0.412	0.0021	0.0079	0.788
BETA	0.0017	0.0015	0.260	0.0028	0.0024	0.245	0.0017	0.0020	0.385
SURPNEG	-0.0258	0.0024	0.000	-0.0254	0.0033	0.000	-0.0257	0.0034	0.000
ANALYST	-0.0004	0.0025	0.869	0.0017	0.0035	0.622	-0.0025	0.0036	0.493
INTERCEPT	0.0683	0.0294	0.020	0.0750	0.0389	0.054	0.0828	0.0413	0.045
Industry Dummies:		Yes			Yes			Yes	
Year Dummies:		Yes			Yes			Yes	
Clustered by:		Firm			Firm			Firm	
n		6,018			3,456			2,562	
Adjusted R^2		0.088			0.085			0.100	
$Prob > F$		0.000			0.000			0.000	

Note: This table presents the results of three pooled OLS regressions based on the data for fiscal years 2010 to 2014. Standard errors and t-statistics are adjusted and clustered by firm; p-values are based on two-tailed tests. The regressions include a set of interactions between SURP and industry (IND), as well as year dummies (YR), which are omitted from the table. The variables with "×" are interaction terms. All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. The following regression model is tested: $CAR_{it} = \beta_0 + \beta_1 SURP_{it} + \beta_2 AFCTFAO_{it} + \beta_3 NAFCTFAO_{it} + \beta_4 AFCTFAO_{it} \times SURP_{it} + \beta_5 NAFCTFAO_{it} \times SURP_{it} + \beta_6 SPECIALIST_{it} \times SURP_{it} + \beta_7 SEC_{it} \times SURP_{it} + \beta_8 PCAOB_{it} \times SURP_{it} + \beta_9 POPULATION_{it} \times SURP_{it} + \beta_{10} MVE_{it} \times SURP_{it} + \beta_{11} MB_{it} \times SURP_{it} + \beta_{12} MBNEG_{it} \times SURP_{it} + \beta_{13} LEV_{it} \times SURP_{it} + \beta_{14} BETA_{it} \times SURP_{it} + \beta_{15} SURPNEG_{it} \times SURP_{it} + \beta_{16} ANALYST_{it} \times SURP_{it} + \sum_{k=1}^{7} \beta_{k+16} IND_{kit} \times SURP_{it} + \sum_{l=1}^{4} \beta_{l+23} YR_{lit} \times SURP_{it} + \beta_{28} SPECIALIST_{it} + \beta_{29} SEC_{it} + \beta_{30} PCAOB_{it} + \beta_{31} POPULATION_{it} + \beta_{32} MVE_{it} + \beta_{33} MB_{it} + \beta_{34} MBNEG_{it} + \beta_{35} LEV_{it} + \beta_{36} BETA_{it} + \beta_{37} SURPNEG_{it} + \beta_{38} ANALYST_{it} + \sum_{k=1}^{7} \beta_{k+38} IND_{kit} + \sum_{l=1}^{4} \beta_{l+45} YR_{lit} + \varepsilon_{it}$, where CAR represents a stock's cumulative excess return over the Russell 3000's return calculated for the 3-day window, i.e., -1 day to +1 day relative to the earnings reporting date. The calculation is based on the market model estimated over the 180-day window ending 21 trading days before the earnings reporting date. SURP equals reported earnings for a respective fiscal year minus the mean earnings forecast for this fiscal year one week before the earnings reporting date, scaled by the firm's stock price two trading days before the earnings reporting date. AFCTFAO denotes audit fees paid by the client to the auditor divided by the total fees of the audit office. NAFCTFAO represents non-audit fees paid by the client to the auditor divided by the total fees of the audit office. SPECIALIST is a dummy variable that equals one if an auditor's two-digit SIC-industry share is top-ranked at the city-level (based on the client's CBSA) and zero otherwise. SEC is a dummy variable that equals one if the client is located in the same CBSA as an SEC office and zero otherwise. PCAOB is a dummy variable that equals one if the audit office is located in the same CBSA as a PCAOB office and zero otherwise. POPULATION is defined as the natural logarithm of the total population in the audit office's CBSA. MVE is the natural logarithm of the market value of equity. MB represents market-to-book value, defined as the market value of common equity divided by the balance sheet value of common equity. Negative values are replaced with zeros. MBNEG is a dummy variable that equals one if a firm has a negative market-to-book value and zero otherwise. LEV represents leverage, defined as long-term debt plus short-term debt plus current portion of long-term debt divided by total capital plus short-term debt plus the current portion of long-term debt. BETA is the beta factor from the market model regression, which is calculated over the 180-day window ending 21 days before the earnings reporting date. SURPNEG is a dummy variable that equals one if a firm has a negative earnings surprise (SURP) and zero otherwise. ANALYST is the natural logarithm of one plus the number of earnings per share estimates made by analysts.

5.4.2 Ex Ante Cost of Equity Capital

5.4.2.1 Ex Ante Cost of Equity Capital—Model Specification

Another measure of perceived EFRQ and, hence, perceived auditor independence is the cost of equity capital (e.g., DeFond and Zhang 2014, 288; Lambert et al. 2007, 410). Thanks to the auditor's ability to mitigate agency problems caused by information asymmetries between managers and shareholders (Jensen and Meckling 1976, 338–339), the cost of equity capital should decrease with higher (perceived) audit quality, which is a result of more credible financial information and, thus, reduced information risk. Indeed, several studies show that, for instance, auditor size (e.g., Khurana and Raman 2004, 485) or auditor industry specialization (e.g., Krishnan et al. 2013, 680) are related to the cost of equity capital. As noted above, Khurana and Raman (2006, 995) find a positive relationship between economic dependence on the client and the ex ante cost of equity capital, which is consistent with the economic dependence hypothesis. However, Hollingsworth and Li (2012, 118) suggest that shareholders' concerns about auditor independence due to client importance are partly alleviated by the implementation of SOX. Nonetheless, a higher ex ante cost of equity capital is expected if the auditor-client economic bond is stronger.

In accordance with the majority of previous mentioned studies, the PEG ratio (price/earnings ratio divided by short-term earnings growth) approach of Easton (2004, 81) is employed. Here, the ex ante cost of equity capital is estimated by calculating the implied expected rate of return on equity capital assuming no future change in abnormal earnings growth and no future dividend.[85]

[85] To check the robustness of the results, the ex ante cost of equity capital is also estimated by calculating the implied expected rate of return on equity capital assuming only no future change in abnormal earnings growth (Easton 2004, 80–81). The sample for the analysis declines to 5,099 firm-years because dividend forecasts are needed for the calculation. For the total fee measure, the results remain unchanged. If total fees are divided into their components, the results are slightly different. The coefficient of AFCTFAO is significant (one-tailed p-value below 0.10) for the respective regression for the full sample and the sub-sample of companies with Altman's Z-score below 2.99; NAFCTFAO is always insignificant. Another approach to estimating the ex ante cost of capital (assuming no abnormal earnings growth) is to use the inverse of the forward price/earnings ratio. If this proxy for the dependent variable is used, the coefficient of TFCTFAO is always significant—irrespective of the firm's financial condition. For both components of total fees, i.e., audit and non-audit fees, results similar to those obtained for TFCTFAO are observed; this does not apply for NAFCTFAO (insignificant) in the "safe" sub-sample. In summary, the main results discussed below are not altered, although the audit fee component of total fees seems to be the trigger for negative perceptions regarding client dependence.

$$COEC_{it} = \sqrt{\frac{EPS2_{it} - EPS1_{it}}{P_{it}}}\,, \tag{5.4}$$

where COEC represents the client-specific ex ante cost of equity capital, EPS1 denotes the one-year-forward mean earnings forecast per share at fiscal year-end, EPS2 is the two-year-forward mean earnings forecast per share at fiscal year-end, and P defines the fiscal year-end price per share.

The following models are examined:

$$\begin{aligned} COEC_{it} = \alpha_0 + \alpha_1 TFCTFAO_{it} + \sum_{j=1}^{10} \alpha_{j+1} CONTROL_{jit} \\ + \sum_{k=1}^{7} \alpha_{k+11} IND_{kit} + \sum_{l=1}^{4} \alpha_{l+18} YR_{lit} + \varepsilon_{it}\,, \end{aligned} \tag{5.5}$$

where the set of control variables (CONTROL) is nearly the same as in Equations 5.2 and 5.3. However, instead of the variables SURP, SURPNEG and ANALYST, this model additionally controls for a firm's total risk measured by its recent fiscal-year ex post realized stock return (RET). Similar to the analysis of the ERC, TFCTFAO is divided into its two components, i.e., AFCTFAO and NAFCTFAO, in Equation 5.6.

$$\begin{aligned} COEC_{it} = \beta_0 + \beta_1 AFCTFAO_{it} + \beta_2 NAFCTFAO_{it} \\ + \sum_{j=1}^{10} \beta_{j+2} CONTROL_{jit} + \sum_{k=1}^{7} \beta_{k+12} IND_{kit} + \sum_{l=1}^{4} \beta_{l+19} YR_{lit} + \varepsilon_{it} \end{aligned} \tag{5.6}$$

5.4.2.2 Ex Ante Cost of Equity Capital—Descriptive Statistics

Because the ERC and the ex ante cost of equity capital regressions are based on the same sample, one may refer to the discussion of the descriptive statics in the ERC section (Table 5.3, p. 116, and Table 5.4, p. 117). However, some further points are in order. The mean of COEC equals 0.11, which is quite similar to the results of prior studies (e.g., Easton 2004, 85; Khurana and Raman 2004, 482; Krishnan et al. 2013, 677). Apart from SPECIALIST and PCAOB, all variables are significantly correlated with COEC. Moreover, RET is positively skewed with a median of 0.15. The sample's average firm-year's ex post return is higher than its implied cost of equity capital for the fiscal year, which might be not surprising because the U.S. market, e.g., Russell 3000, exhibited a notable increase between 2009 and 2013.

5.4.2.3 Ex Ante Cost of Equity Capital—Multivariate Analysis

Referring to Table 5.7, column (1), p. 128, the estimated coefficient of TFCTFAO of 0.01 is significant (p-value of 0.030, one-tailed test). In contrast, the results for AFCTFAO and NAFCTFAO in Table 5.8, column (1), p. 130, are insignificant. Thus, an auditor's economic dependence on the client is positively related to COEC (*H1*) only if it is measured as the percentage of the total fees generated by a client relative to the total fees earned from all clients.

Focusing on TFCTFAO and *H2*, the regression results draw a clear picture (column (2) versus column (3) of Table 5.7, p. 128). Shareholders have a negative perception of client dependence. However, this association can only be observed in the sub-sample of firms that are more likely to be in financial distress (coefficient of TFCTFAO of 0.02; p-value of 0.013, one-tailed test). This finding is identical to the results of the ERC model discussed above. Moreover, AFCTFAO and NAFCTFAO are not related to COEC if the client is in a good financial shape. However, for clients in relatively poor financial condition, the non-audit fee proxy for client dependence is positively (coefficient of 0.05) and significantly (p-value of 0.068, one-tailed test) associated with the firm's ex ante cost of equity capital. This finding seems not to accord with the results of the ERC model and raises the question of whether or why the models provide contradictory evidence.[86] However, as the following additional analyses show, this finding is not entirely robust. The analyses predominantly suggest that audit fee dependence might drive the effect, which is in turn in accordance with the ERC model's results.

[86] The reason for this might be that the ERC—in broad terms—measures shareholders' perceptions of the quality of audited financial reports and does not directly address related issues of non-audit services. In addition, the ERC measures perceptions of the past, e.g., whether auditor independence was maintained during the audit of the financial statement. In contrast, the ex ante cost of equity capital refers to the future. Further, NAFCTFAO might imply that the incumbent auditor provides a high level of non-audit services. A high level of non-audit services might, in turn, indicate that the firm has recently undertaken risky projects (e.g., internal restructuring activities) that affect a firm's future development. Thus, more risky projects can lead to higher non-audit services provided by the auditor and, therefore, higher NAFCTFAO due to the auditor's involvement in project planning and organization. Ultimately, this reasoning may explain why NAFCTFAO is positively related to the ex ante cost of capital.

Table 5.7: OLS Regressions—Ex Ante Cost of Equity Capital and Economic Importance of the Client Proxied by TFCTFAO

	Dependent Variable = COEC								
	(1) Full Sample			(2) Financial Condition: "Safe"			(3) Financial Condition: "Non-Safe"		
Variable	**Coefficient**	**Robust Standard Error**	**p-value**	**Coefficient**	**Robust Standard Error**	**p-value**	**Coefficient**	**Robust Standard Error**	**p-value**
TFCTFAO	0.0084	0.0044	0.059	-0.0000	0.0045	0.999	0.0157	0.0071	0.027
SPECIALIST	0.0003	0.0014	0.820	0.0006	0.0014	0.659	-0.0007	0.0025	0.784
SEC	-0.0002	0.0017	0.914	-0.0016	0.0018	0.381	0.0007	0.0028	0.808
PCAOB	0.0002	0.0023	0.941	0.0034	0.0023	0.148	-0.0034	0.0037	0.365
POPULATION	0.0016	0.0013	0.212	-0.0005	0.0013	0.705	0.0049	0.0022	0.028
MVE	-0.0087	0.0006	0.000	-0.0061	0.0006	0.000	-0.0115	0.0009	0.000
MB	-0.0001	0.0002	0.399	-0.0004	0.0002	0.049	0.0001	0.0003	0.663
MBNEG	0.0046	0.0063	0.466	-0.0032	0.0097	0.745	0.0148	0.0078	0.056
LEV	0.0193	0.0030	0.000	0.0100	0.0038	0.009	0.0092	0.0062	0.137
BETA	0.0162	0.0012	0.000	0.0099	0.0014	0.000	0.0193	0.0017	0.000
RET	-0.0165	0.0015	0.000	-0.0106	0.0018	0.000	-0.0212	0.0027	0.000
INTERCEPT	0.2440	0.0230	0.000	0.2287	0.0210	0.000	0.2482	0.0453	0.000
Industry Dummies:		Yes			Yes			Yes	
Year Dummies:		Yes			Yes			Yes	
Clustered by:		Firm			Firm			Firm	
n		6,018			3,456			2,562	
Adjusted R^2		0.312			0.209			0.371	
$Prob > F$		0.000			0.000			0.000	

Table 5.7: OLS Regressions—Ex Ante Cost of Equity Capital and Economic Importance of the Client Proxied by TFCTFAO (continued)

Note: This table presents the results of three pooled OLS regressions based on the data for fiscal years 2010 to 2014. Standard errors and t-statistics are adjusted and clustered by firm; p-values are based on two-tailed tests. All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. The following regression model is tested: $COEC_{it} = \alpha_0 + \alpha_1 TFCTFAO_{it} + \alpha_2 SPECIALIST_{it} + \alpha_3 SEC_{it} + \alpha_4 PCAOB_{it} + \alpha_5 POPULATION_{it} + \alpha_6 MVE_{it} + \alpha_7 MB_{it} + \alpha_8 MBNEG_{it} + \alpha_9 LEV_{it} + \alpha_{10} BETA_{it} + \alpha_{11} RET_{it} + \sum_{k=1}^{7} \alpha_{k+11} IND_{kit} + \sum_{l=1}^{4} \alpha_{l+18} YR_{lit} + \varepsilon_{it}$, where COEC represents client-specific ex ante cost of equity capital based on the PEG ratio-model by Easton (2004). TFCTFAO represents total fees paid by the client to the auditor divided by the total fees of the audit office. SPECIALIST is a dummy variable that equals one if an auditor's two-digit SIC-industry share is top-ranked at the city-level (based on the client's CBSA) and zero otherwise. SEC is a dummy variable that equals one if the client is located in the same CBSA as an SEC office and zero otherwise. PCAOB is a dummy variable that equals one if the audit office is located in the same CBSA as a PCAOB office and zero otherwise. POPULATION is defined as the natural logarithm of the total population in the audit office's CBSA. MVE is the natural logarithm of the market value of equity. MB represents market-to-book value, defined as the market value of common equity divided by the balance sheet value of common equity. Negative values are replaced with zeros. MBNEG is a dummy variable that equals one if a firm has a negative market-to-book value and zero otherwise. LEV represents leverage, defined as long-term debt plus short-term debt plus current portion of long-term debt divided by total capital plus short-term debt plus the current portion of long-term debt. BETA is the beta factor from the market model regression, which is calculated over the 180-day window ending 21 days before the earnings reporting date. RET denotes the recent fiscal-year ex post realized stock return.

Table 5.8: OLS Regressions—Ex Ante Cost of Equity Capital and Economic Importance of the Client Proxied by AFCTFAO and NAFCTFAO

	Dependent Variable = COEC								
	(1) Full Sample			(2) Financial Condition: "Safe"			(3) Financial Condition: "Non-Safe"		
Variable	**Coefficient**	**Robust Standard Error**	**p-value**	**Coefficient**	**Robust Standard Error**	**p-value**	**Coefficient**	**Robust Standard Error**	**p-value**
AFCTFAO	0.0059	0.0070	0.395	0.0047	0.0074	0.523	0.0097	0.0110	0.375
NAFCTFAO	0.0236	0.0240	0.326	-0.0222	0.0257	0.387	0.0534	0.0359	0.137
SPECIALIST	0.0003	0.0014	0.822	0.0007	0.0014	0.650	-0.0007	0.0025	0.797
SEC	-0.0002	0.0017	0.920	-0.0016	0.0018	0.377	0.0007	0.0028	0.800
PCAOB	0.0002	0.0023	0.939	0.0034	0.0023	0.148	-0.0034	0.0037	0.367
POPULATION	0.0016	0.0013	0.210	-0.0005	0.0013	0.706	0.0049	0.0022	0.027
MVE	-0.0088	0.0006	0.000	-0.0061	0.0006	0.000	-0.0116	0.0010	0.000
MB	-0.0001	0.0002	0.404	-0.0004	0.0002	0.049	0.0001	0.0003	0.661
MBNEG	0.0047	0.0063	0.454	-0.0032	0.0097	0.740	0.0151	0.0077	0.051
LEV	0.0192	0.0030	0.000	0.0100	0.0038	0.009	0.0090	0.0062	0.145
BETA	0.0162	0.0012	0.000	0.0099	0.0014	0.000	0.0193	0.0017	0.000
RET	-0.0165	0.0015	0.000	-0.0106	0.0018	0.000	-0.0211	0.0027	0.000
INTERCEPT	0.2446	0.0230	0.000	0.2280	0.0210	0.000	0.2501	0.0453	0.000
Industry Dummies:		Yes			Yes			Yes	
Year Dummies:		Yes			Yes			Yes	
Clustered by:		Firm			Firm			Firm	
n		6,018			3,456			2,562	
Adjusted R^2		0.312			0.209			0.371	
$Prob > F$		0.000			0.000			0.000	

Table 5.8: OLS Regressions—Ex Ante Cost of Equity Capital and Economic Importance of the Client Proxied by AFCTFAO and NAFCTFAO (continued)

Note: This table presents the results of three pooled OLS regressions based on the data for fiscal years 2010 to 2014. Standard errors and t-statistics are adjusted and clustered by firm; p-values are based on two-tailed tests. All continuous regression variables are winsorized (1^{st} and 99^{th} percentiles) to mitigate the potential influence of outliers on the results. The following regression model is tested: $COEC_{it} = \beta_0 + \beta_1 AFCTFAO_{it} + \beta_2 NAFCTFAO_{it} + \beta_3 SPECIALIST_{it} + \beta_4 SEC_{it} + \beta_5 PCAOB_{it} + \beta_6 POPULATION_{it} + \beta_7 MVE_{it} + \beta_8 MB_{it} + \beta_9 MBNEG_{it} + \beta_{10} LEV_{it} + \beta_{11} BETA_{it} + \beta_{12} RET_{it} + \sum_{k=1}^{7} \beta_{k+12} IND_{kit} + \sum_{l=1}^{4} \beta_{l+19} YR_{lit} + \varepsilon_{it}$, where COEC represents client-specific ex ante cost of equity capital based on the PEG ratio-model by Easton (2004). AFCTFAO denotes audit fees paid by the client to the auditor divided by the total fees of the audit office. NAFCTFAO represents non-audit fees paid by the client to the auditor divided by the total fees of the audit office. SPECIALIST is a dummy variable that equals one if an auditor's two-digit SIC-industry share is top-ranked at the city-level (based on the client's CBSA) and zero otherwise. SEC is a dummy variable that equals one if the client is located in the same CBSA as an SEC office and zero otherwise. PCAOB is a dummy variable that equals one if the audit office is located in the same CBSA as a PCAOB office and zero otherwise. POPULATION is defined as the natural logarithm of the total population in the audit office's CBSA. MVE is the natural logarithm of the market value of equity. MB represents market-to-book value, defined as the market value of common equity divided by the balance sheet value of common equity. Negative values are replaced with zeros. MBNEG is a dummy variable that equals one if a firm has a negative market-to-book value and zero otherwise. LEV represents leverage, defined as long-term debt plus short-term debt plus current portion of long-term debt divided by total capital plus short-term debt plus the current portion of long-term debt. BETA is the beta factor from the market model regression, which is calculated over the 180-day window ending 21 days before the earnings reporting date. RET denotes the recent fiscal-year ex post realized stock return.

To conclude, the results of the ex ante cost of equity capital model are qualitatively similar to those of the ERC model: shareholders have a negative perception of the economic importance of a client. However, this applies in particular for clients that are more likely to be in financial distress, and these empirical results indicate that shareholders' perceptions of auditor independence are conditional on a client's circumstances. These findings are robust for the measure of the economic importance of the client based on client's total fees provided to an audit office.

5.4.3 Additional Analyses

5.4.3.1 National-level Based Measures of Economic Importance of the Client

The literature suggests the use of office-level measures in audit research because the auditor's office is the decision-making unit (e.g., Francis et al. 1999, 203–204; Wallman 1996, 78, 85). According to this, the appropriate measure of the economic importance of the client should be based on office-level information (e.g., DeFond and Francis 2005, 14–15; Reynolds and Francis 2000, 376). However, to examine whether client dependence at the national-level is also perceived to compromise auditor independence, all regressions are re-estimated using national-level based measures of the economic importance of the client. Regarding the results of the ERC-related regressions, only in one case (non-audit service measure of client importance, sub-sample of "safe" firms) is a significant coefficient (p-value of 0.078, one-tailed test) found.[87] Thus, the empirical evidence does not support that shareholders perceive client importance at the national-level to be an issue of independence if perceptions are measured with the ERC metric, and this contradicts the findings of Ghosh et al. (2009, 377). These results are also in contrast with the results of the ex ante cost of equity capital regressions. The total fee and the audit fee measure of client dependence are always, i.e., irrespective of a firm's financial condition, significantly positively related to COEC, which is not the case for the non-audit fee measure. That client dependence at the national-level is perceived negatively by shareholders accords with other studies' results (Hollingsworth and Li 2012, 114; Khurana and Raman 2006, 996–997). Overall, client importance leads to a higher ex ante cost of capital, and this effect appears to be driven by perceived independence issues caused by audit fees.

[87] For the sake of brevity, all results in this section are not tabulated.

In summary, mixed—i.e., model-dependent—evidence regarding whether shareholders also perceive client importance at the national-level to be a threat to audit independence is found. Therefore, these results might also corroborate the idea that the office-level approach is superior to the national-level approach in audit research because shareholders' concerns regarding economic dependence on the client are primarily observable for office-level measures.

5.4.3.2 Alternative Measures of a Firm's Financial Condition

It is possible that the results are sensitive to the choice of the measure of the firm's financial condition. Thus, all regressions are re-analyzed using two alternative measures of a firm's financial condition.

The first measure of financial distress used in other studies (e.g., Kim and Park 2014, 378, 401; Robin and Zhang 2015, 68) is the Ohlson O-score (Ohlson 1980, 118-121). To examine *H2*, the sample is divided at the median of the Ohlson O-score.[88] Analyzing all regressions leads to the conclusion that the findings are not altered if the Ohlson O-score is employed, except for the coefficient on NAFCTFAO in the "non-safe" sub-sample for the ex ante cost of equity capital model, which is insignificant (p-value of 0.178, one-tailed test).

The second alternative proxy for the client's financial condition is the score from Zmijewski (1984, 65), which is also used in studies such as DeFond et al. (2002, 1256).[89] For this study, firms are categorized as more likely to be financially distressed if the Zmijewski score is greater than the sample median. The regression findings from the ERC model are qualitatively similar to the results of the main analyses. However, the results for the ex ante cost of equity capital regression vary in parts. TFCTFAO is significantly positively (p-value of 0.070, two-tailed test) related to COEC in the sub-sample of "safe" firms. Moreover, this effect seems to be

[88] The Ohlson O-score is calculated as follows: $-1.32 - 0.407SIZE_{it} + 6.03\frac{TL_{it}}{TA_{it}} - 1.43\frac{WC_{it}}{TA_{it}} + 0.0757\frac{CL_{it}}{CA_{it}} - 2.37\frac{NI_{it}}{TA_{it}} - 1.83\frac{FFO_{it}}{TL_{it}} + 0.285INTWO_{it} - 1.72OENEG_{it} - 0.521\frac{NI_{it}-NI_{it-1}}{|NI_{it}|+|NI_{it-1}|}$, where SIZE equals the natural logarithm of GNP price-level index deflated total assets (GNP deflator set to 100 in 2009), TL denotes total liabilities, TA represents total assets, WC corresponds to working capital, CL equals current liabilities, CA is current assets, NI denotes net income, FFO means funds from operations, INTWO is a dummy variable that equals one if net income over the last two years is negative and zero otherwise, and OENEG is a dummy variable that equals one if total liabilities are greater than total assets and zero otherwise (Ohlson 1980, 118-121).

[89] The Zmijewski score can be calculated as follows: $-4.336 - 4.513\frac{NI_{it}}{TA_{it}} - 5.679\frac{TL_{it}}{TA_{it}} + 0.004\frac{CA_{it}}{CL_{it}}$, where NI equals net income, TA equals total assets, TL denotes total liabilities, CA represents current assets, and CL denotes current liabilities (Zmijewski 1984, 65).

driven by the audit fee component of total fees because, for those firms, AFCTFAO is also positively and significantly (p-value of 0.037, two-tailed test) associated with COEC.

5.4.3.3 Audit Office Size

The empirical evidence presented in this study might be caused by audit office size effects because prior research suggests a relationship between office size and audit quality (e.g., Francis and Yu 2009, 1549). To address this issue, all regressions are re-estimated while including a variable approximating audit office size. This variable is calculated as the natural logarithm of the sum of the total fees paid by all firms in the sample to an audit office in a respective fiscal year. Referring to the ERC model, significant results are only found for the sample of financially distressed firms, which supports *H2*. Focusing on the ex ante cost of equity capital model, the interpretations of the regressions regarding the client dependence proxy TFCTFAO are not altered. If total fees are divided into audit and non-audit fees, a significantly positive association of AFCTFAO with COEC in the full sample and in the sub-sample of non-financially distressed firms is observable. If a firm is classified as "non-safe", both proxies AFCTFAO (coefficient of 0.02) and NAFCTFAO (coefficient of 0.06) exhibit significant relationships with COEC. Ultimately, it might be of interest that similar to Krishnan et al. (2013, 674), the office size proxy is significantly correlated with the three client dependence proxies (ranging between -0.41 and -0.58). In contrast to Krishnan et al. (2013, 674), for four out of six ex ante cost of equity capital regressions, a significantly positive (p-values less than 0.100, two-tailed tests) relationship between office size and COEC is found.

Indeed, it can be argued that smaller auditors or audit offices are more likely to be economically dependent on a client. As a consequence, shareholders' doubts regarding auditor independence might be greater for smaller audit offices (e.g., Craswell et al. 2002, 270; Li 2009, 223), and the findings above could be driven by those offices. Thus, all regressions are re-estimated while excluding all audit offices with fewer than twelve clients; in other words, the smallest 25% of offices in the sample are dropped. If the respective firm-years are excluded, no significant relationship between all proxies for client dependence and the ERC is found. On the basis of the ERC model, it might be concluded that the observed association between client dependence and shareholders' perceptions of auditor independence is caused by smaller offices. However, a different picture emerges when examining the ex

ante cost of equity capital regressions: TFCTFAO is always significantly positively (p-values less than 0.05, one-tailed tests) related to COEC. Analyzing both components of total fees, i.e., audit and non-audit fees, reveals that, based on the audit-fee measure, shareholders have a negative perception of independence issues. A final remark is in order: if one assumes that the ERC and ex ante costs of equity capital measure the same construct, i.e., shareholders' perceptions, then the mixed evidence might be explained by potential issues of "constructed collinearity"—because of a relatively large number of interaction terms—in ERC regressions, which is more likely to be a problem if the sample size decreases considerably.

5.5 Conclusion and Limitations

The study examines whether and when the Big 4 auditor-client economic bond is perceived as a threat to auditor independence and, hence, reduces perceived EFRQ.

This analysis measures the economic importance of the client by the fees paid by the client to the auditor divided by the total fees of the auditor's office because the office-level approach might be superior to the national-level approach (e.g., Reynolds and Francis 2000, 376). Consistent with the economic dependence hypothesis, a sample of 1,776 different 10-K-filers for the years 2010 to 2014 reveals that an auditor's economic dependence on a client is negatively related to shareholders' perceptions of EFRQ. Moreover, the results show that this relationship applies predominantly for a sub-sample of clients that are more likely to be financially distressed. The findings are insensitive to the proxy employed for shareholders' perceptions, i.e., the ERC or ex ante cost of equity capital. This can be interpreted to mean that shareholders are primarily concerned about the economic importance of clients that are more likely to be in a financially difficult situation.

The study offers interesting insights for when shareholders have a negative perception of an auditor's economic dependence on a client. The findings of a sample covering the five most recent years collectively suggest that shareholders still perceive the economic importance of the client as a threat to auditor independence. Therefore, this study complements Kao et al. (2014), who consider independence in fact, and Hollingsworth and Li (2012), who examine the ex ante cost of equity capital around the implementation of SOX. This study's results suggest that SOX seems to mitigate threats to auditor independence only to a certain extent, and it might be of interest for the regulator to reconsider recent regulation concerning the

economic importance of clients, particularly for financially distressed firms. However, substantial further research regarding an economically reasonable regulatory intervention is required, and it has to be emphasized that this study provides only initial evidence that shareholders' perceptions might be conditional on a client's circumstances. Therefore, the findings could motivate future research to examine other client circumstances, especially because little attention has been devoted to this issue in the context of perceived auditor independence and, hence, perceived audit quality.

This study is subject to some limitations. First, the ERC and the ex ante cost of equity capital are relatively indirect proxies for shareholders' perceptions of EFRQ and, thus, perceived auditor independence because the perceived quality of the financial reporting information is supposed to have a merely second-order effect on the firm's value (Zimmerman 2013, 888-889). However, there are also some major advantages of the perception-based measures used in this study such as their comprehensive and continuous character and the direct relationship between shareholders' perceptions and economic practice (DeFond and Zhang 2014, 289). Second, the ex ante cost of equity capital is estimated by calculating the implied expected rate of return on equity capital, meaning that the study is restricted to firms with positive one-year-forward earnings forecasts and earnings growth forecasts. Future research could address the question of whether shareholders' perceptions of audit-related questions differ for firms with negative earnings growth forecasts and how such differences might be explained. Third, the study's sample is restricted to Big 4 auditors, and further research could address shareholders' perceptions of the client dependence of non-Big 4 auditors, especially because non-Big 4 auditors are usually excluded from analyses. Fourth, the proxies for the economic importance of the client consider the audit office's total fees. However, the sample's total audit office fees cover only the fees of audited listed clients and not those of clients that are not audited but that received non-audit services. Therefore, the audit office's total fees could be downward biased, and the measure of client importance might be upward biased. Fifth, there is a lack of evidence on whether and how shareholders estimate auditor independence in practice, and it is questionable whether they can estimate the ratio of the total fees paid by the client to the total fees of the audit office (cf. also Dickins and Higgs 2005, 101). Nevertheless, the results—shareholders' concerns regarding auditor independence are primarily found at the office-level—support the conclusions that office-level measures are more of interest in audit-related research

(e.g., Francis et al. 1999, 203–204; Wallman 1996, 78, 85). This might also apply to audit studies examining shareholders' perceptions. Finally, this analysis is restricted to shareholders, and additional research regarding the perceptions of other stakeholders would be of interest, especially in a setting of non-listed firms.

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Curriculum Vitae

Jacob Justus Leidner, born in 1986 in Germany, began to study business economics at the Julius-Maximilians-Universität Würzburg in 2005, and six years later, he received his Diplom-Kaufmann. Subsequently, he was a doctoral candidate and worked as a research and teaching assistant at the Chair of Financial Accounting, Auditing and Consulting at Julius-Maximilians-Universität Würzburg for almost six years. Jacob Justus Leidner's previous research was concerned with the audit market for German credit institutions. Current projects are focused on the capital market's perceptions of issues related to financial reporting and audits. He has attended several conferences in Austria, Estonia, Germany, Italy, the Netherlands, Switzerland, the United Kingdom and the United States of America, where he has presented his research. Jacob Justus Leidner's teaching activities include bachelor- and master-level classes concerned with managerial and financial accounting and auditing. Since 2015, Jacob Justus Leidner has been a holder of the right to use the Chartered Financial Analyst® designation.