Master Thesis (program Accounting & Auditing)

Use of Component Auditors and Audit Outcomes: Evidence from Form AP filings

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Abstract

This thesis examines the effect of the use of component auditors on audit outcomes. Qualitative research showed that U.S. lead auditors of global group audits frequently regard the work of component auditors as insufficient, not communicated on time and not compliant with regulations of the U.S. These issues might affect audit outcomes, but little research has been done regarding this question. Due to PCAOB Rule 3211 it is now possible to empirically examine this research question. When investigating the global group audits of U.S. public firms with Form AP filings with fiscal year-ends between December 2016 and December 2019, it becomes clear that the mere use of component auditors is associated with lower audit quality (i.e. higher total accruals and discretionary accruals) and higher audit fees. Furthermore, the extent of involvement of component auditors is associated with lower audit quality (higher total accruals and discretionary accruals) and higher audit fees. In conclusion, the involvement of component auditors affects audit outcomes. This makes the information in the required disclosures relevant for the users of financial statements to assess the quality of an audit. The PCAOB could expand the required disclosures regarding the use of component auditors to increase transparency for stakeholders and responsibility of component auditors.

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Abbreviations

IAASB: International Auditing and Assurance Standards Board

ISA: International Standards on Auditing

PCAOB: Public Company Accounting Oversight Board

SEC: Securities and Exchange Commission

1. Introduction

The globalization of U.S. firms listed on the U.S. stock exchange led to a growth in the use of other auditors (from now on called "component auditors"[1]) by lead auditors in the U.S. in countries where their clients have substantial operations (Burke, Hoitash & Hoitash, 2019). Due to Rule 3211[2] that the PCAOB issued, auditors now must disclose information in Form AP about other audit firms that have engaged in the audit of public firms in the U.S. Prior to this rule, lead U.S. auditors were not required to do this and, therefore, there was only limited information regarding the use of component auditors. In Form AP, stakeholders can now find if component auditors were used in a U.S. audit, and to what extent they were involved. The PCAOB states that the required information will enhance transparency for stakeholders of U.S. firms and the responsibility of firms that participate in the group audits (PCAOB, 2015).

Downey and Westermann (2019) did a survey and interviews and found that U.S. lead auditors of global group audits frequently regard the work of component auditors as insufficient, not communicated on time and not compliant with regulations of the U.S. These issues might affect audit outcomes and the information disclosed in Form AP displays these issues (Downey & Bedard, 2019). However, there has only been done one research that uses the Form AP disclosures of component auditors to study this and existing literature shows mixed evidence regarding the effect on audit quality (e.g., Burke et al., 2019; Carson, Simnett, Thuerheimer, Vanstraelen & Trompeter, 2019). This leads to the following research question:

"Does the use of component auditors for the global group audit of U.S. public firms affect audit outcomes?"

This thesis aims to answer the main research question by looking at the effect of both the incidence and the extent of the use of component auditors on audit quality and audit fees through OLS regressions. The extent of the use of component auditors is measured by the number of component auditors used and the percentage of total audit hours that can be ascribed to component auditors. For audit quality, multiple proxies are used, namely 1) total accruals

[1] To stay consistent with previous research, that have called these other audit firms "component auditors" (e.g., Burke et al., 2019; Carson et al., 2019); Downey and Bedard 2019), these audit firms will also be addressed as component auditors in this thesis.
[2] PCAOB Rule 3211. Auditor Reporting of Certain Audit Participants

deflated by lagged total assets, 2) total accruals deflated by cash flow from operations, and 3) restatements in the main tests. As additional tests, a) a subsample of firms with significant multinational operations is used, b) the two measures of the extent of the use of component auditors are divided into quartiles, and c) the absolute value of discretionary accruals is used as a proxy of audit quality. For this research a sample of 9775 firm-year observations is used for the mere use of component auditors and 2508 firm-year observations for the extent of the use of component auditors. The sample period contains U.S. publicly listed firms with Form AP filings with fiscal year-ends between December 2016 and December 2019.

The findings showed that the use and the extent of the use both significantly affected audit outcomes. The use of component auditors is associated with higher absolute value of total accruals deflated by cash flow from operations and with higher audit fees. Furthermore, the extent of the use of component auditors is associated with a higher absolute value of total accruals deflated by lagged total assets and with higher audit fees. Most additional tests showed support for the main results. Based on these results, the answer to the main research question is that the use of component auditors significantly negatively affects audit outcomes.

This thesis provides a number of scientific contributions. Firstly, Dee, Lulseged and Zhang (2015) were the first to research the use of component auditors in U.S. group audits. However, the authors only examined small companies that were not a lead auditor to any SEC issuers, which means their knowledge in auditing U.S. public firms is limited. These small audit firms are obliged to record all audits in which they performed a significant role, meaning 20% or more of the total audit hours or fees, in Form 2. Furthermore, a small sample size was used and only auditor disclosure was examined, but not the amount of work performed by the component auditors due to the fact that this information was not available before Rule 3211. This thesis also examines component auditors to which less than 20% of total audit hours is ascribed to, uses a large sample size and also examines the effect of the amount of work performed by component auditors on audit outcomes. In contrast to Dee et al. (2015), this research found a positive and significant association between the use of component auditors and audit fees. Secondly, Carson et al. (2019) examined the effect of the use of component auditors on audit quality. However, this setting is different from the U.S. setting, because a) Australian auditors follow IAASB standards instead of PCAOB standards, b) the identity and location of the component auditor are not made public, c) Australian auditors, in contrast to U.S. auditors, tend to use component auditors that are not part of the global audit firm network (GAFN) and are

not part of the Big-4, and d) the extent of involvement is measured by the percentage of total audit fees that are ascribed to the component auditor, instead of total audit hours. Thirdly, Burke et al. (2019) also examined the effect of the use of component auditors on audit outcomes. For their research, the authors also used the Form AP filings and this thesis expands on their research by using other proxies for audit quality. In contrast to Burke et al. (2019), this research does find a significant association between the mere use of component auditors and audit outcomes.

Furthermore, this thesis provides a societal contribution. Having found a significant effect between the use of component auditors and audit outcomes, makes the requirement for U.S. lead auditors to disclose information in Form AP about the use of component auditors valid and the required disclosures could even be expanded more to increase transparency for stakeholders and the responsibility of firms that participate in the group audits. Users of financial statements can better assess the quality of an audit if even more information regarding the use of component auditors is disclosed, since an effect on audit outcomes is found.

The remainder of this research will be as follows. Firstly, this thesis will discuss some theory in Section 2. Afterwards, previous literature regarding the use of component auditors and audit quality will be analyzed and discussed. Secondly, in Section 3 the hypotheses are developed based on the literature review. Thirdly, Section 4 will explain the data collection and sample procedure. Furthermore, this section also explains the research design for the main tests and the additional tests that is used to be able to answer the hypotheses and, in the end, the main research question. Section 5 displays and interprets the results of the descriptive statistics, the main tests and the additional results. Based on the results, the hypotheses will be rejected or not. Finally, in Section 6 the main research question of this thesis will be answered and limitations and options for future research will be given.

2. Theoretical background

In this section, group audits and the regulations regarding the use of component auditors will be discussed in paragraph 2.2. This paragraph explains how component auditors can be used, what the advantages and disadvantages of using component auditors are, and what the rules are regarding the use of component auditors. Secondly, in paragraph 2.3 the agency theory will be explained. Thirdly, audit quality and its proxies will be explained in paragraph 2.4. Finally, previous literature regarding the use of component auditors and audit quality will be discussed in paragraph 2.5 and a summary of the previous literature and this section will be given in paragraph 2.6.

2.1 Group audits and regulations

2.1.1 Group audits

When auditing the financial statements of a multinational group, this group is composed of a number of related entities or components. These components could be, for instance, shared service centers, but also firms where the group holds a substantial percentage of stakes or firms where the group is the controlling company (Sunderland & Trompeter, 2017; IAASB, 2007). A component auditor conducts work on financial information of a component as requested by the lead auditor (Carson, Simnett, Vanstraelen & Trompeter, 2016). The kind of work and extent of the work can be as little as testing a certain account balance to conducting review procedures or even doing a full audit of the separate financial statements of a subsidiary of the audit client.

The group audit firm can either divide the responsibilities of the group audit with itself and the audit firm that audits the component or the group auditor can choose to not refer to the component auditor in the audit opinion. The first option can be used in instances where the lead auditor does not have sufficient time to assess the component audit work. The lead auditor is still subject to litigation, but making known which firm audited the component may give the component audit firm an incentive to make a greater effort in providing high audit quality. The second option is generally used when the group auditor had adequate time to assess the component audit work and deems the quality to be sufficient (Czerney, Schmidt & Thompson, 2014). Considering that referring to the component auditor potentially has an effect on the

behavior of the component auditor, this thesis solely focuses on audits where the group auditor did not disclose the name of the component audit firm.

Global group audits are commonly executed by companies that are global audit firm networks (GAFNs), who work in an international umbrella structure. For instance, PricewaterhouseCoopers (PwC) has more than 150 firms, located in different places of the world. If PwC in the U.S. uses the work of PwC in, for instance, Albania, this is regarded as using a component auditor. The component auditors that are used are often of the group auditor's GAFN, which is beneficial to the group auditor since the GAFN usually use the same work method globally. However, a non-GAFN affiliate might also be used, because, for instance, 1) the GAFN does not have a GAFN member located where the audit of the component has to be executed, 2) the GAFN affiliate might not have enough resources to finish the audit on time for the fee that the group auditor offers to pay (which means it might be better to use a non-GAFN affiliate if that firm can finish the audit on time), 3) the equity method investment of the parent company is audited by a different accounting firm, or 4) the audit client (the parent company), wants a particular audit firm to audit firm to audit the component (Carson et al., 2016). Communication and coordination problems also occur in GAFN affiliates, despite being part of the GAFN (Downey & Bedard, 2019). Therefore, this thesis will research both GAFN and non-GAFN affiliates.

Using component auditors brings some advantages. Component auditors are familiar with regulations regarding, amongst others, tax. Furthermore, language barriers and other obstacles due to inadequate knowledge of the regional business etiquette between the auditor and the audit client are reduced. Moreover, if the component auditor is a GAFN affiliate, there may be even more advantages due to the comparable training, work method and software of these GAFN affiliates (Dowling & Leech, 2014). However, there are also complications when component auditors are used. For example, the local audit firm that executes the component audit also has its own audit clients. The group auditor therefore needs to make sure that enough adequately trained auditors are appointed to the component audit, and that the appointed senior managers and partners have enough time to supervise and review the work of these auditors. Another disadvantage is that issues regarding communication and coordination might affect the effectiveness and efficiency of the audit (Burke et al., 2019; Downey & Westermann, 2019; Sunderland & Trompeter, 2017).

2.1.2 Regulations PCAOB and IAASB

The rules related to the use of component auditors are published by the PCAOB and the IAASB. The PCAOB is a non-profit organization that monitors audit firms that audit U.S. firms listed on the U.S. stock exchange and was created by the Sarbanes-Oxley (SOX) Act of 2002 (Aobdia, 2019). The PCAOB enforced PCAOB Rule 3211 *Auditor Reporting of Certain Audit Participants*. Due to this rule, auditors now must disclose information in Form AP about other audit firms that have engaged in the audit of public firms in the U.S. of which the audit report is published after June 30th of 2017. In Form AP, stakeholders can now find if component auditors were used in a U.S. audit, and to what extent they were involved. The PCAOB states that the required information will enhance transparency for stakeholders of U.S. firms and the responsibility of firms that participate in the group audits (PCAOB, 2015). However, empirical research shows mixed evidence regarding the effect of using component auditors on audit quality, which will be discussed in paragraph 2.5.

The IAASB published the standard ISA 600 *Using the Work of Another Auditor*. The standard discusses, amongst others, the responsibility of the lead auditor for the group audit and how to guarantee the quality of the component audit work (IAASB, 2007). The revision of ISA 600 requires lead auditors to be more engaged in the component audit work. Carson et al. (2016) examined this revision in an Australian setting and found an improvement in the effort of group auditors and a decrease in the use of component audit firms, since the group auditors now have more costs due to the revised standard ISA 600. The researchers also found an improvement in audit quality for both the audits where a component auditor was used and where it was not used. Therefore, the improvement in audit quality that can be ascribed to the revision of ISA 600 is not evident. This might be due to the way the extent of the use of component auditors is measured, namely the percentage of total audit fees that are ascribed to the component auditor. The fee is generally higher for Big-4 audit firms compared to non-Big-4 audit firms, because these firms have a higher audit quality, not due to a higher degree of involvement. In the Form AP filings, the degree of involvement is measured by the percentage of total audit hours that can be ascribed to the component audit firm, which paints a better picture of the involvement of the component auditor.

2.2 Agency theory

The agency theory applies to the relationship between the group auditor and the component auditor. The agency theory centers on the issues that occur in this agency relationship, where the agent conducts services for one or more principals. When there is a conflict of interest between two parties where one party, the agent, is expected to behave in favor of the other party, the principal, this is called an agency problem (Eisenhardt, 1989). Both parties wanting to fulfill their own needs will likely lead to the agent not acting in favor of the principal. The agent is able to behave this way due to information asymmetry; the agent possesses more information than the principal. The principal has the desire to minimize cases where the agent deviates from the principal's wishes.

Regarding the use of component auditors by lead auditors, the group auditor is the principal and the component auditor is the agent. These group auditors request the component auditor to conduct a part of the group audit and wants the component auditor to deliver sufficient audit quality. However, the U.S. lead audit firm is fully subject to litigation and therefore the incentive of the component audit firm to lower litigation risk by delivering higher audit quality is likely lower than the incentive of the group auditor. As mentioned before, the component auditor also has its own audit clients. The component audit firm might spend more time focusing on its own audit clients, which may result in the senior managers and partners not having enough time to supervise and review the work of the staff conducting the component audit (Downey & Westermann, 2019). Moreover, communication issues due to language barriers might unintentionally result in higher information asymmetry lower audit quality (Burke et al., 2019; Hanes, 2013). Furthermore, larger geographic barriers make it complicated for the group auditor and component auditor to be able to communicate when issues occur. In addition, the greater the geographical distance between the component auditor and the U.S. lead auditor may result in the component auditor knowing less about the environment in which the client operates (Burke et al. 2019). A group auditor can provide the component auditor with detailed instructions and guidelines to obtain the desired audit quality. However, to ensure that these are followed it is necessary that the group auditor checks the component audit work (Carson et al., 2016).

2.3 Audit quality

2.3.1 Definition audit quality

DeAngelo (1981) defines audit quality as "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." This definition pertains to capabilities, objectivity and level of effort of an auditor (Bell, Causholli & Knechel, 2015). Low capabilities or level of effort lowers the chance of an auditor discovering an issue and if an auditor is not objective the chance of reporting an issue is lowered. However, is quite difficult to know what the actual delivered audit quality is and therefore indirect measures are used to measure audit outcomes (Defond & Zhang, 2014); Knechel, Pevzner, Shefchik & Velury, 2013). In previous research several input- and output-based proxies are used for audit quality. Input-based measures looks at inputs of the audit procedure that can be observed, whereas output-based measures seek to assess the actual delivered quality of the audit by looking at outputs of the audit procedure (Defond & Zhang, 2014). However, these proxies also have their flaws.

2.3.2 Input-based proxies

Defond and Zhang (2014) placed the input-based measures in two categories, namely audit firm characteristics and auditor-client contracting features.

2.3.2.1 Audit firm characteristics

Examples of audit firm characteristics are audit firm size and industry specialization. Larger audit firms are predicted to have higher motives and capabilities to deliver a higher quality of an audit (DeAngelo, 1981). The same is predicted for audit firms that are specialized in a certain industry. An advantage is that audit firm size has a link to nearly all the proxies of audit quality and industry specialization shows the differences in quality within audit firms with the same size. A disadvantage is that these measures assume that the audit quality is the same within audit firms and within industry specialization (Defond & Zhang, 2014).

2.3.2.2 Auditor-client contracting features

Audit fees are an example of auditor-client contracting features. These fees reflect the level of effort from an audit firm and are therefore taken as proxy for the quality of an audit. An advantage of this measure is that it can detect small changes in audit quality due to the measure being continuous. A big disadvantage is that other factors than audit effort, such as risk premia

and efficiency of the audit, also have an effect on audit fees, which means that audit quality does not necessarily increase if audit fees increase (Defond & Zhang, 2014).

2.3.3 Output-based proxies

Output-based measures are also placed in categories by Defond and Zhang (2014), namely material misstatements, auditor communication, financial reporting quality characteristics and perception-based measures.

2.3.3.1 Material misstatements

Restatements and Accounting and Auditing Enforcement Releases (AAERs) are generally used to measure material misstatements. Restatements adjust the misstatements in formerly published financial statements. AAERs are released by the SEC when a violation is committed by a firm, but AAERs do not occur often. The main benefit of these measures is that they commonly provide strong proof of low audit quality. However, it does not mean that the quality of an audit is high if there is no restatement or AAER. Restatements and AAERs occur due to extreme audit failures, but less extreme earnings management is not detected (Defond & Zhang, 2014).

2.3.3.2 Auditor communication

The sole way for the audit firm to directly communicate with shareholders of a firm is through the audit opinion. A going concern modified opinion means the audit firm is hesitant if their client can proceed as a going concern. This is not in favor of the client and therefore the client might urge the audit firm to not issue this modified opinion. If the audit firm gives in to the pressure of the client, this harms the independence of the auditor and consequently lowers the quality of the audit. If the audit firm fails to issue a going concern modified opinion where necessary, it clearly shows that the quality of the audit is low. However, similar to restatements and AAERs, this measure also does not detect less extreme cases of earnings management (Defond & Zhang, 2014).

2.3.3.3 Financial reporting quality

Financial reporting quality measures are used, because they capture earnings management. Examples of financial reporting quality measures are meet or beat earnings targets, the Dechow and Dichev (2002) residuals, (discretionary) accruals, and timely loss recognition. These measures are not as direct as going concern opinions and restatements (Defond & Zhang,

2014). The main benefit of using these measures is that audit quality influences the financial reporting quality, because financial statements are produced both by the audit firm and the client and the measures are therefore suitable as proxies for audit quality (e.g. Magee & Tseng, 1990). However, the measurement error of these proxies is quite high (Defond & Zhang, 2014).

2.3.3.4 Perception-based measures

Lastly, perception-based measures are used as a proxy for audit quality. Examples are perceptions of investors, like earnings response coefficients (ERCs), the cost of capital and the reaction of the market, and perceptions of the PCAOB, like PCAOB inspections. An advantage of measures based on the perceptions of investors is that the quality of an audit is captured more thoroughly than the other output measures due to capturing extra dimensions of the quality of an audit. However, these proxies are more indirect compared to the other output measures mentioned before. The perceptions of practitioners of audit quality focus directly on the capabilities, level of effort and objectivity of an auditor (Aobdia, 2019), which is more related to the definition of audit quality given by DeAngelo (1981). Aobdia (2019) used fifteen measures of audit quality and researched which were significantly associated with the assessments of audit quality of the PCAOB and internal inspections. The results for the PCAOB's perception of audit quality showed significant associations with unsigned total accruals, unsigned accruals deflated by cash flows from operations, unsigned discretionary accruals, the propensity to meet or beat the zero earnings threshold, restatements, audit fees, and first-year clients.

2.4 Use of component auditors and audit quality

Dee et al. (2015) conducted the first archival research that investigated group audits in the U.S. due to debates on the PCAOB's proposal to oblige lead auditors to disclose the use of component auditors. However, the authors only examined small companies that were not a lead auditor to any SEC issuers, which means their knowledge in auditing U.S. public firms is limited. Audit firms that are registered with the PCAOB but are not a group auditor to any SEC issuers are obliged to record all audits in which they performed a significant role, meaning 20% or more of the total audit hours or fees, in Form 2. All issuers that were identified in the Form 2 filings between 2010 and 2012 were examined, namely 149 unique issuers and 65 unique component auditors. To measure the effect of using a component auditor on audit quality the authors used three output-based proxies and one input-based proxy for audit quality, namely 1) audit fees, 2) discretionary accruals, 3) the market reaction to issuers that disclose the

involvement of component auditors, and 4) movements in earnings response coefficients (ERCs). Dee et al. (2015) find that using component auditors resulted in lower audit quality when issuers are disclosed as using component auditors for the first time. However, the authors don't find higher or lower audit fees for the audit firms that disclose their use of component auditors.

Furthermore, Carson, Simnett, Trompeter and Vanstraelen (2014) investigated the extent of involvement of component auditors in an Australian setting and made a distinction between component auditors that are from the same audit firm network as the lead auditor and unaffiliated auditors and the type of audit firm. They examined 2719 multinational group audit observations covering 2008-2011. To measure audit quality, the authors used discretionary accruals and the tendency to issue a going concern opinion (GCO) as proxies. The extent of involvement is measured by the percentage of total audit fees that are ascribed to the component auditor. The authors find that audit fees are lower when the extent of involvement of component auditors increases. Next to that, the extent of involvement of network auditors is positively associated with discretionary accruals, meaning a lower audit quality, and that this positive association is carried by Big N auditors. However, there is no significant association between the extent of the use of unaffiliated auditors and discretionary accruals. The authors think the reason for this is that lead auditors are more professionally sceptical when monitoring the work of unaffiliated auditors, while they have the tendency to excessively depend on the work of network auditors. When looking at the tendency to issue a going concern opinion, Carson et al. (2014) find that the likelihood of issuing a GCO is higher when an unaffiliated auditor is used as a component auditor and this association is stronger when large non-Big N auditors are the lead auditors. Furthermore, when the lead auditor is a Big N auditor, the tendency to issue a GCO is lower when a network auditor is used.

Regarding more recent research, Carson et al. (2019) find that, again in the Australian setting, using and the extent of using component auditors results in higher audit fees and lower audit quality. In this research, the proxies used for audit quality were the absolute values of 1) total accruals, and 2) the scaled change in receivables. When making a distinction between network auditors and unaffiliated auditors, the authors find that audits where network auditors are used cost more than when the component auditors are unaffiliated. The Australian setting that is used in the studies of Carson et al. (2014) and Carson et al. (2019) is different from the U.S. setting in several aspects. Firstly, Australian auditors follow IAASB standards instead of

PCAOB standards. Secondly, the identity and location of the component auditor are not made public. Thirdly, Australian auditors, in contrast to U.S. auditors, tend to use component auditors that are non-GAFN affiliates and are not part of the Big-4 (Burke et al., 2019).

Downey and Westermann (2019) seeked to get a better insight into the process of the global group audit and the issues that occur. They conducted a survey with 148 U.S. group auditors and an interview with 14 U.S. group auditors. The results of their qualitative research showed that the work of component auditors is often inadequate, not performed on time and does not conform with the regulations issued in the U.S. This hinders the group auditor in being able to complete the group audit on time, which is what the audit client wishes. The respondents believe these issues occur due to the component auditor not being capable or willing to complete their work on time, or due to the component auditor not understanding or misinterpreting the guidelines that were given by the group auditor. Furthermore, many interviewees saw differences in language as an obstacle in the global group audits. What is noticeable from this research is that the group auditors that were interviewed and surveyed blamed most issues that occur on the component auditor.

Downey and Bedard (2019) undertook a survey with 148 U.S. senior managers that have performed several global group audits. There were two versions of the survey, in which the first asked the respondents if they remember an engagement where major issues were present (challenging engagements) and the second asked if they remember an engagement where the issues they experienced were minimal (non-challenging engagements). The results showed that the challenging engagements were most associated with the size of the audit client and the global structure. Downey and Bedard (2019) also examined strategies for a more efficient global group audit. They found that tacit coordination, meaning more experienced, stable, and knowledgeable component auditors, is the best strategy to minimize the impact of the size of the audit client and the global structure on the probability of issues occurring in the global group audit. Language barriers were not seen as significant in distinguishing the two engagements, which is in contrast with Downey and Westermann (2019).

Finally, Burke et al. (2019) are the first researchers to use the Form AP disclosures to study this effect. The authors' sample contains fiscal year ends that are between April 2017 and April 2019. To measure audit quality, 1) restatements of financial reports, 2) discretionary accruals, and 3) non-timely 10k reporting were used as proxies. The results showed no significant

association between the use of component auditors and the proxies for the quality of an audit, only a positive association with audit fees. However, when looking at the extent of participation of the component auditors, Burke et al. (2019) find a positive association between the number of component auditors involved and audit fees and no association with the audit quality proxies. Next to that, they do find that a higher percentage of audit hours spent by component auditors results in a higher likelihood of misstatements, non-timely 10k reporting and a higher amount of audit fees. However, no association was found between the extent of participation and discretionary accruals, which is different from the study of Carson et al. (2019).

2.5 Summary

This section of the thesis first discussed group audits. An explanation is given on what the component auditor does, what a GAFN is and why/when a GAFN or non-GAFN affiliate is used as component auditor and the advantages and disadvantages of using component auditors. Next the regulations regarding the use of component auditors was discussed. Then audit quality was explained, where a definition of DeAngelo (1981) was used. The two types of proxies (input-based proxies and output-based proxies) were discussed and these were split into subcategories where examples were given. Afterwards, the agency theory and how this theory applies to the use of component auditors by group auditors was described. Finally, previous literature regarding the use of component auditors and audit quality was analyzed. A summary of the relevant literature can be seen in Table 1.

Table 1. Summary relevant prior literature

Authors	**Sample size**	**Time Frame**	**Audit quality proxies**	**Findings**	**Difference from this thesis**
Dee et al. (2015)	149 unique experimental issuers and 65 unique component auditors.	2010-2012	1) Market reaction 2) ERCs 3) Audit fees 4) Discretionary accruals	1) Lower audit quality when issuers are disclosed as using component auditors for the first time 2) No significant effect on audit fees	1) Examines auditor disclosure, but not amount of work performed 2) Small sample size 3) Examines component auditors that do not have SEC issuer clients

					4) Does not examine multinational group audits
Carson et al. (2014)	2719 multinational group audit observations	2008-2011	1) Discretionary accruals 2) The tendency to issue a going concern opinion 3) Audit fees	1) Significant lower audit fees when component auditors are involved 2) Significant lower audit fees when network auditors are used compared to when unaffiliated auditors are used	Australian setting (see text for differences in regulations)
Carson et al. (2019)	4869 firm-year observations of Australian group audits	2006-2013	1) Total accruals 2) The scaled change in receivables 3) Audit fees	1) Significant lower audit quality when extent of involvement increases 2) Significant higher audit fees when extent of involvement increases	Australian setting (see text for differences in regulations)
Burke et al. (2019)	7582 U.S. issuer-years	April 2017 to April 2019	1) Restatements of financial reports 2) Discretionary accruals 3) Non-timely 10k reporting 4) Audit fees	1) Use of component auditors does not significantly affect audit outcomes 2) Lower audit quality and higher audit fees when extent of involvement increases	Other proxies used. Will expand by using other proxies.

3. Hypothesis development

When investigating the research question, this research examines both the use and the extent of the use of component auditors. The effect of the mere use of component auditors on audit quality could go both ways. A reason for a positive effect on audit quality is that the component auditor has more knowledge about the environment in which the company conducts its business in that country (Hanes, 2013; Dowling & Leech, 2014). Furthermore, language barriers and other obstacles due to inadequate knowledge of the regional business etiquette between the auditor and the audit client are reduced. A reason for a negative effect on audit quality is differences in cultures and locations that can result in troubles with communication and coordination, which might affect the effectiveness and efficiency of the audit (Burke et al., 2019; Downey & Westermann, 2019; Sunderland & Trompeter, 2017; Hanes, 2013). Furthermore, the agency problem as explained in Section 2 can also result in lower audit quality. The reason for a positive effect on audit fees is that the use of component auditors likely means that more work is required, which increases audit fees. This effect was also found by Carson et al. (2019) and Burke et al. (2019).

The extent of the involvement can be measured by looking at the number of component auditors used, but also by the percentage of total audit hours that can be ascribed to component auditors, which need to be reported in the Form AP filings by the U.S. lead auditor. The results of the questionnaire of Downey and Bedard (2019) showed that using more component auditors can result in more troubles relating to coordination and communication. Carson et al. (2019), finds a lower audit quality when the extent of involvement increases. Burke et al. (2019) find this as well for two of the proxies used, but not for the accrual-based measure. Furthermore, increasing the extent of involvement of component auditors likely means that more work is required for the audit, which increases audit fees. Therefore, a positive association between the extent of the use of component auditors and audit fees is expected. Carson et al. (2019) and Burke et al. (2019) found similar effects.

Mixed evidence was found for both audit quality and audit fees as mentioned in Section 2 (Dee et al., 2015; Carson et al., 2014; Carson et al., 2019; Burke et al., 2019). Based on prior literature, the following hypotheses are formulated:

H1: The use of component auditors has no association with audit quality.

H2: The extent of the use of component auditors has a negative association with audit quality.

H3: The use of component auditors has a positive association with audit fees.

H4: The extent of the use of component auditors has a positive association with audit fees

4. Research Design

In this section, the methodology of the empirical research will be explained in paragraph 4.2, describing which proxies for audit quality will be used, which test variables will be used and which control variables will be used. The regression models that will be used to answer the hypotheses will also be shown and additional tests that will be undertaken will be explained. Finally, in paragraph 4.3 the sample selection will be explained, describing which steps were taken to obtain the final sample for the hypotheses.

4.1 Methodology

4.1.1 Ordinary Least Squares (OLS) regression and logistic regression

The research question will be examined by conducting archival research. The predictive validity framework ("Libby boxes") is displayed in Appendix A. The use of component auditors will be measured as a dummy variable, which is 1 if the principal audit firm makes use of at least one component auditor and zero otherwise. The extent of involvement is measured in two ways, namely 1) the number of component auditors used, and 2) the percentage of total audit hours that are attributed to the component auditors. The PCAOB database AuditorSearch shows two kind of component auditors, namely 1) the component auditors to which individually less than five percent of the total audit hours can be ascribed to and 2) the component auditors that individually have performed more than five percent of the total audit hours. To compute the variables of extent of involvement, the total of the number of component auditors and the total of the percentage of total audit hours are taken. For instance, if there are two component auditors to which individually less than five percent of the total audit hours can be ascribed to and five auditors that have performed more than five percent of the total audit hours, the total number of component auditors will be seven for that group audit.

The percentage of audit hours is shown in ranges for almost all observations (for example "20 to less than 30 percent"). To calculate the total percentage of total audit hours that can be attributed to component auditors, the middle number of the range will be used. For example, if there is a component auditor that has performed 20 to less than 30 percent of total audit hours and a component auditor that has performed 30 to less than 40 percent, the numbers that will be accumulated for the test variable are 25 and 35, resulting in 60 percent.

To measure the audit outcomes, multiple dependent variables will be used. Firstly, like Burke et al. (2019), misstatements and audit fees will be used. Furthermore, Burke et al. (2019) used discretionary accruals as a proxy for audit quality. To expand on their study, this research also uses two other accrual-based measures as proxies for audit quality based on the scientific paper of Leuz, Nanda and Wysocki (2003). All four dependent variables in this research are significantly associated with the PCAOB's perception of audit quality as mentioned in Section 2. Total accruals are measured in three ways for this research, which are as follows (Aobdia, 2019; Reichelt & Wang, 2010; Kothari, Leone & Wasley, 2005; Leuz et al., 2003; Dechow, Sloan & Sweeney, 1995):

$$\begin{aligned} &ACCRUALS1 \\ &= Earnings\ before\ extraordinary\ items \\ &- Net\ cash\ flow\ from\ operations\ excluding\ extraordinary\ items \\ &\qquad and\ discontinued\ operations \end{aligned} \tag{1}$$

$$\begin{aligned} ACCRUALS2 = {} & \Delta Current\ assets - \Delta Cash\ and\ ST\ investments \\ & - \Delta Current\ liabilities \\ & + \Delta ST\ debt\ included\ in\ current\ liabilities \\ & - Depreciation\ and\ amortization \end{aligned} \tag{2}$$

$$\begin{aligned} ACCRUALS3 = {} & \Delta Current\ assets - \Delta Cash - \Delta Current\ liabilities \\ & + \Delta ST\ debt\ included\ in\ current\ liabilities \\ & + \Delta Income\ taxes\ payable - Depreciation\ and\ amortization \end{aligned} \tag{3}$$

To test the hypotheses for this research, OLS regression models will be used for the accrual-based proxies and audit fees and a logistic regression will be used for restatements. The models are as follows:

$$ABS\left(\frac{ACCRUALS_{i,t}}{TA_{i,t-1}}\right) \; or \; ABS\left(\frac{ACCRUALS_{i,t}}{CFO_{i,t}}\right) = \alpha + \beta_1 * COMPONENT\_D_{i,t} + \beta_2 * SIZE_{i,t} + \beta_3 * FOREIGN\_OP_{i,t} + \beta_4 * LOSS_{i,t} + \beta_5 * LEV_{i,t} + \beta_6 * EXTERNAL\_FIN_{i,t} + \beta_7 * GROWTH_{i,t} + \beta_8 * CAP\_INTENSITY_{i,t} + \beta_9 * INV_{i,t} + \beta_{10} * BUS\_SEG_{i,t} + \beta_{11} * GEO\_SEG_{i,t} + \beta_{12} * FOREIGN\_SALES_{i,t} + \beta_{13} * BIG4_{i,t} + \beta_{14} * MTB_{i,t} + \beta_{15} * ACCELERATED_{i,t} + \beta_{16} * FCA_{i,t} + \varepsilon_{i,t} \quad (4)$$

$$ln\left(\frac{P(RESTATEMENT_{i,t}=1)}{1-P\left(RESTATEMENT_{i,t}=1\right)}\right) = \alpha + \beta_1 * COMPONENT\_D_{i,t} + \beta_2 * SIZE_{i,t} + \beta_3 * FOREIGN\_OP_{i,t} + \beta_4 * LOSS_{i,t} + \beta_5 * LEV_{i,t} + \beta_6 * EXTERNAL\_FIN_{i,t} + \beta_7 * GROWTH_{i,t} + \beta_8 * CAP\_INTENSITY_{i,t} + \beta_9 * INV_{i,t} + \beta_{10} * BUS\_SEG_{i,t} + \beta_{11} * GEO\_SEG_{i,t} + \beta_{12} * FOREIGN\_SALES_{i,t} + \beta_{13} * BIG4_{i,t} + \beta_{14} * MTB_{i,t} + \beta_{15} * ACCELERATED_{i,t} + \beta_{16} * FCA_{i,t} + \varepsilon_{i,t} \quad (5)$$

$$LAF_{i,t} = \alpha + \beta_1 * COMPONENT\_D_{i,t} + \beta_2 * SIZE_{i,t} + \beta_3 * FOREIGN\_OP_{i,t} + \beta_4 * LOSS_{i,t} + \beta_5 * LEV_{i,t} + \beta_6 * EXTERNAL\_FIN_{i,t} + \beta_7 * ROA_{i,t} + \beta_8 * CAP\_INTENSITY_{i,t} + \beta_9 * INV_{i,t} + \beta_{10} * BUS\_SEG_{i,t} + \beta_{11} * GEO\_SEG_{i,t} + \beta_{12} * FOREIGN\_SALES_{i,t} + \beta_{13} * BIG4_{i,t} + \beta_{14} * ACCELERATED_{i,t} + \beta_{15} * GCO_{i,t} + \beta_{16} * FCA_{i,t} + \varepsilon_{i,t} \quad (6)$$

The first two models will be used for hypotheses 1 & 2 and the third model will be used to test hypotheses 3 and 4. To test the extent of the use of component auditors (hypotheses 2 and 4), the variable COMPONENT_D will be replaced for COMPONENT_N and COMPONENT_PCT.

COMPONENT_D is an indicator variable, which equals 1 if at least one component auditor is used and zero otherwise, COMPONENT_N displays the number of component auditors involved in the group audit, and COMPONENT_PCT is the percentage of audit hours that are ascribed to component auditors. LAF shows the natural log of audit fees. For misstatements, an indicator variable will be used, named RESTATEMENT, which equals 1 for issuers that have had to restate their financial report due to misstatements. ABS(ACCRUAL/TA_{t-1}) is the absolute value of total accruals divided by beginning assets and ABS(ACCRUALS/CFO) is the absolute value of total accruals divided by cash flow from operations.

Based on the research of Burke et al. (2019) and Defond and Zhang (2014), control variables will be included in the regression model to control for factors that have a correlation with either the variables of interest, the dependent variables, or both. To control for the size of a firm (SIZE), the natural logarithm of total assets is added to all regression models. To control for the operations of the firms outside the U.S. several variables are used for all regression models, including how many business and geographic segments the firm has (BUS_SEG & GEO_SEG), the amount of foreign sales of the firm (FOREIGN_SALES), an indicator variable which equals 1 if the firm has foreign pretax income (FOREIGN_OP), and an indicator variable that equals 1 if the firm has a foreign currency adjustment (FCA). To control for the financial performance, variables that are used in all regression models are an indicator variable which equals one if the firm incurred a net loss (LOSS), the leverage of a firm (LEV), the inventories of a firm deflated by total assets (INV), the capital intensity of a firm (CAP_INTENSITY), and an indicator variable which equals 1 if the change in number of outstanding shares compared to the year before is greater than 10% (EXTERNAL_FIN). Two control variables that are also included in all models are an indicator variable which equals 1 if the U.S lead auditor is a Big 4 auditor (BIG4), and an indicator variable which equals 1 if the issuer is an accelerated filer (ACCELERATED). Two control variables that are added in the regression models for restatements and the accrual-based measures, are the sales growth of a firm compared to the year before (GROWTH), and the market-to-book ratio of a firm (MTB). Two control variables that are added to the regression models for audit fees are the return on assets of a firm (ROA) and an indicator variable which equals 1 if the group auditor issued a negative going concern opinion (GCO).[3] All regression models also include 2-digit SIC industry and fiscal year fixed effects.

4.1.2 Additional tests

First, a firm having significant multinational operations is the main factor for using a component auditor and have a high likelihood of needing a multinational audit. Therefore, a subsample of firms with significant multinational operations is used for hypotheses 1 and 3 as an additional test to check if the significant results remain the same. In this research, firms with zero pretax foreign income, no foreign currency adjustments, no foreign sales and where no component auditor is used for the group audit are viewed as firms without significant multinational operations and are therefore dropped.

[3] The definitions of all variables are presented in Appendix B.

Second, when calculating the percentage of total audit hours that can be ascribed to component auditors, the middle number of the range is used. As an additional test, the number of component auditors and the percentages will be divided into quartiles (see Table 2) to see if the results change.

Table 2. Division of the number of component auditors and percentage of total audit hours into quartiles

Quartile	COMPONENT_N	COMPONENT_PCT
1	1	0-5%
2	2-3	5-10%
3	4-6	10-20%
4	>=7	>=20

Lastly, another proxy for audit quality will be used, namely the absolute value of discretionary accruals. This proxy is also significantly associated with the PCAOB's perceptions of audit quality (Aobdia, 2019). Discretionary accruals will be estimated using the modified Jones model (Dechow et al., 1995). The model is as follows[4]:

$$\frac{ACCRUALS_{i,t}}{ASSETS_{i,t-1}} = \alpha + \beta_1 * \frac{1}{ASSETS_{i,t-1}} + \beta_2 * \frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{ASSETS_{i,t-1}} + \beta_3 * \frac{PPE_{i,t}}{ASSETS_{i,t-1}} + \varepsilon_{i,t} \quad (7)$$

The regressions will be run for the full sample, the sample of firms with significant multinational operations and the sample where at least one component auditor is used. Furthermore, for this last sample the regression will also be run for the quartiles of the number of component auditors and percentages.

4.2 Sample selection

For this research, the PCAOB database and databases within the Wharton Research Data Services (WRDS) system are used. First, the PCAOB database contains all the information regarding the use and the extent of the use of component auditors by U.S lead auditors. Second, the Audit Analytics database contains information regarding audit fees, misstatements, and auditor characteristics. Third, Compustat includes the financial information of the audit clients

[4] The definitions of the variables can be found in Appendix B.

and client characteristics. Finally, for some control variables Compustat Segment file will be used.

Two sample procedures are undertaken. One for restatements, audit fees and the first total accruals measure and one for the other two total accruals measures. This is done, because observations are dropped for the other two total accruals measures, which leads to less total observations when merging the datasets. Table 3 shows the first sample procedure. The sample period starts with U.S publicly listed firms with Form AP filings with fiscal year-ends between December 2016 and December 2019. In this research, only group audits where the principal auditor has full responsibility and is located in the U.S., where the issuing country is located in the U.S. and where the component audit firms are located outside the U.S. will be examined. Therefore, firm-year observations where the lead auditor divides responsibility or is located outside the U.S., where the issuing country is located outside the U.S. or where the component auditor is located inside the U.S., are dropped. After dropping these observations, firm-year observations without a CIK code, which is unique for each firm, or a duplicate CIK code are dropped. Then the datasets are merged, which leads to a full sample of 9775 firm-year observations and 2825 unique firms for hypotheses 1 and 3. A firm having significant multinational operations is the main factor for using a component auditor and have a high likelihood of needing a multinational audit. Therefore, a sample of firms with significant multinational operations is used for hypotheses 1 and 3 as an additional test. In this research, firms with zero pretax foreign income, no foreign currency adjustments, no foreign sales and where no component auditor is used for the group audit are viewed as firms without significant multinational operations and are therefore dropped. This leads to a sample of 5850 firm-year observations and 1609 unique firms with significant multinational operations. For hypotheses 2 and 4, 2508 firm-year observations and 578 unique firms are used with use of at least one component auditor. In Appendix C the sample selection for the other two total accrual measures are shown. The full sample has 8546 firm-year observations (2448 unique firms), the sample with significant multinational operations has 5189 firm-year observations (1411 unique firms), and the sample with use of at least one component auditor has 2225 firm-year observations (505 unique firms). The sample selection for the discretionary accruals proxy is also displayed in Appendix C. All continuous regression variables are winsorized at the 1st and 99th percentile.

Table 3. Sample selection restatements, audit fees, and first accrual measure

Sampling procedure	**Firm-year observations (n)**	**Companies**
Companies with information in PCAOB AuditorSearch with fiscal year ends between with December 2016 and December 2019	51563	16017
Minus observations where the group auditor divides responsibility or where no information regarding use is available	(140)	(38)
Minus observations where group auditor or the issuing firm is not located in the U.S.	(4112)	(1369)
Minus observations where the component auditor is located in the U.S.	(72)	(19)
Minus observations without or duplicate CIK code	(7668)	0
Minus observations when merging with Compustat & Audit Analytics	(29796)	(11766)
Full sample (H1 & H3)	**9775**	**2825**
Deleting observations with insignificant multinational operations (no use of component auditors and zero pretax foreign income and no foreign currency adjustments and zero foreign sales)	(3925)	(1216)
Companies with significant multinational operations (H1 & H3)	**5850**	**1609**
Companies where the group auditor uses at least one component auditor (H2 & H4)	**2508**	**578**

5. Results

Now that the data is collected and a sample procedure is conducted, statistical analyses will be undertaken in this section to be able to answer the research question. In paragraph 5.2 (and in the Appendix) the descriptive statistics of the two samples are displayed and addressed. Paragraph 5.3 presents the results of the OLS regressions for the hypotheses. These will be interpreted and, consequently, the hypotheses will be rejected or not. The results for the robustness tests will be displayed and discussed in paragraph 5.4. Lastly, paragraph 5.5 gives a summary of this section.

5.1 Descriptive statistics

Table 4 presents the descriptive statistics for the sample with restatements, audit fees, and the first total accruals measure and in Appendix D the descriptive statistics for the sample with the two other total accruals measures are shown. Panel A displays the descriptive statistics for the test variables. The sample with restatements, audit fees, and the first total accruals measure (the two other total accruals measures) has 2508 (2225) firm-year observations where group auditors make use of a component auditor. This is 25.7 (26.0) percent of the full sample and 42.9 (42.9) percent of the sample with significant multinational operations. On average, for the firm-year observations where a component auditor is used, 4 (4) component auditors are used. Furthermore, an average of 17.1 (17.4) percent of total audit hours can be attributed to component auditors.

Panel B presents the descriptive statistics for the dependent and control variables. The second and third column show the mean and standard deviation for the firm-year observations where a component auditor is used and the fourth and fifth column show the mean and standard deviation for the full sample firm-year observations where no component auditors are used. Two sample t-tests are executed to see if the means of the variables of the two samples significantly differ from each other, which can be seen in the last two columns. It can be seen that for all variables, except for MTB, the means between the two samples significantly differ from each other. Therefore, it is necessary to include all the control variables in the OLS regression. The means of the accrual-based proxies for all three total accrual measures and the restatements are significantly lower for the sample that makes use of a component auditor. This would imply that the audit quality is higher for group audits where a component auditor is used.

Table 4. Descriptive statistics sample with restatements, audit fees, and first total accruals measure

Panel A. Descriptive statistics test variables

Variable	Obs.	Mean	Median	Std. Dev.	25th percentile	75th percentile
Full sample (H1&H3)						
COMPONENT_D	9775	0.257	0.000	0.437	0.000	1.000
Sample with significant multinational operations (H1&H3)						
COMPONENT_D	5850	0.429	0.000	0.495	0.000	1.000
Sample with component auditor use (H2&H4)						
COMPONENT_N	2508	3.559	2.000	3.712	1.000	5.000
COMPONENT_PCT	2508	17.068	15.000	16.219	2.500	25.000

Panel B. Descriptive statistics dependent and control variables

	COMPONENT_D=1 (N=2508)		**COMPONENT_D=0 (N=7267)**			
Variable	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Difference Means**	**P-value**
ABS(ACCRUALS1/TA_{t-1})	0.104	0.380	0.466	1.827	0.362	0.000
ABS(ACCRUALS1/CFO)	1.620	4.175	2.013	5.040	0.394	0.000
RESTATEMENT	0.054	0.226	0.083	0.276	0.030	0.000
LAF	14.668	1.183	13.452	1.535	-1.216	0.000
SIZE	7.406	2.132	5.643	3.041	-1.763	0.000
FOREIGN_OP	0.823	0.381	0.333	0.471	-0.490	0.000
LOSS	0.314	0.464	0.482	0.500	0.168	0.000
LEV	0.302	0.324	0.514	1.368	0.212	0.000
EXTERNAL_FIN	0.127	0.333	0.239	0.426	0.112	0.000
GROWTH	0.161	0.601	0.227	0.985	0.066	0.000
CAP_INTENSITY	0.199	0.208	0.221	0.270	0.021	0.000
INV	0.102	0.117	0.076	0.138	-0.026	0.000
BUS_SEG	4.880	4.453	4.391	4.106	-0.490	0.000
GEO_SEG	8.149	7.793	3.920	5.912	-4.229	0.000
FOREIGN_SALES	0.403	0.370	0.156	0.318	-0.247	0.000
BIG4	0.789	0.408	0.523	0.500	-0.266	0.000
MTB	3.573	10.836	3.139	13.125	-0.433	0.103
ROA	-0.046	0.717	-0.663	2.859	-0.617	0.000
GCO	0.032	0.176	0.155	0.362	0.123	0.000

ACCELERATED	0.890	0.316	0.680	0.470	-0.210	0.000
FCA	0.536	0.499	0.208	0.406	-0.328	0.000

Figure 1 shows the frequency of the total number of component auditors used. The number ranges from 1 to 32. It can be seen that most U.S. lead auditors in this sample use only one component auditor. As the number of component auditors increases, the frequency decreases quickly.

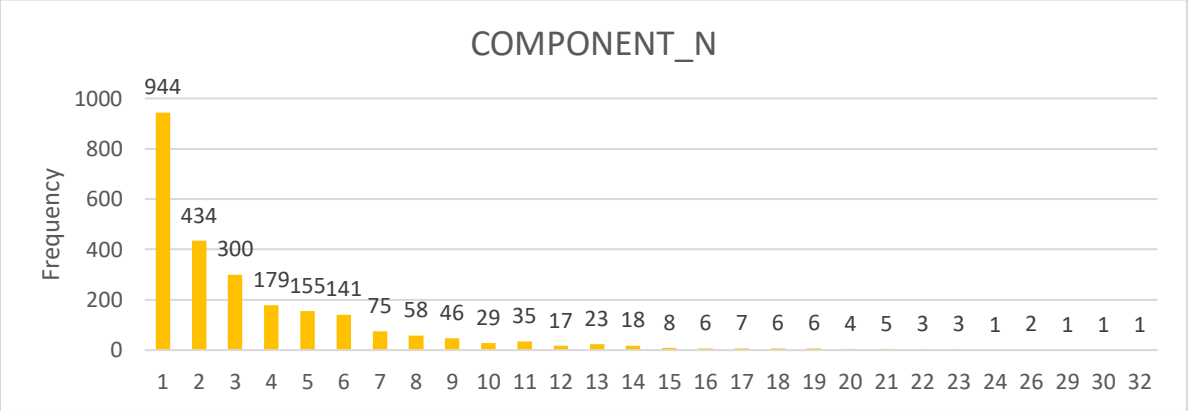

Figure 1. Frequency of number of component auditors used in sample with restatements, audit fees and first total accruals measure

Figure 2 displays the frequency of percentage of audit hours ascribed to component auditors used. It shows clearly that for most group audits the component auditors perform between 0 and 5 percent or between 10 and 20 percent of total audit hours. It does not happen often that component auditors perform more than 40 percent of total audit hours.

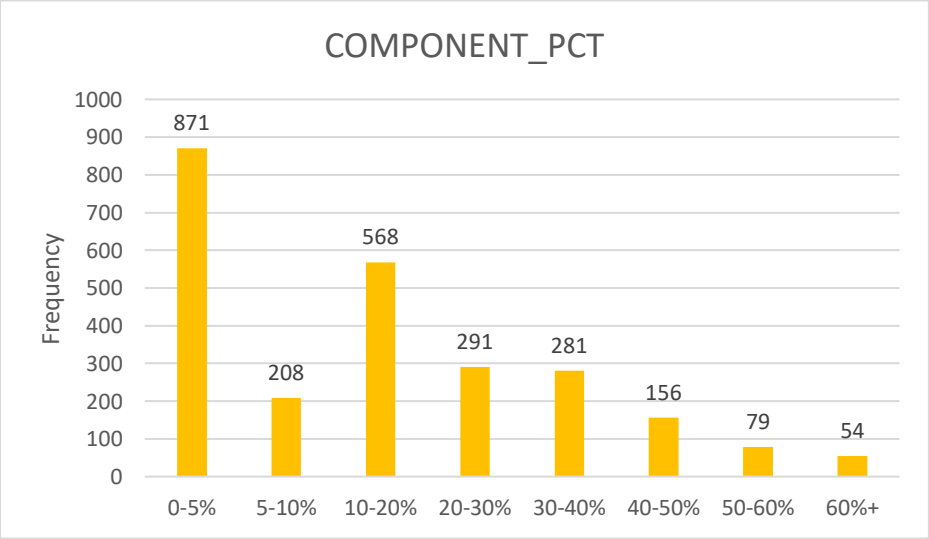

Figure 2. Frequency of percentage of audit hours ascribed to component auditors used in sample with restatements, audit fees and first total accruals measure

The Pearson (below the diagonal) and Spearman (above the diagonal) correlations among the dependent and independent variables are displayed in Appendix D. Almost all correlations are significant due to a high number of observations. The test variables are significantly negatively correlated with both accrual-based proxies for the first total accruals measure. For the other two total accruals measures, the Spearman correlation switches from significantly negative to positive when dividing the total accruals by cash flows from operations instead of total assets. Furthermore, the test variables are significantly negatively correlated with restatements and significantly positively correlated with audit fees.

Lastly, Table 5 shows the number and percentage of component auditors used by division for the first full sample. More than half of all component auditors (56.18%) are used for group audits where the issuer is a manufacturing firm. Furthermore, 17.70% of component auditors are used for auditing firms that provide services. The least component auditors are used for firms in the division "Agriculture, Forestry, & Fishing" and "Non-classifiable Establishments". The number and percentage of component auditors used by major group is shown in Appendix D. It can be seen that most component auditors are used for firms that manufacture chemical & allied products, electronic & other electric equipment, instruments & related products or industrial machinery & equipment or firms that provide business services.

Table 5. Number and percentage of component auditors used by industry for sample with restatements, audit fees and first total accruals measure

SIC	Division	Number	Percentage
0100-0999	Agriculture, Forestry, & Fishing	10	0.40%
1000-1499	Mining	87	3.47%
1500-1799	Construction	25	1.00%
2000-3999	Manufacturing	1409	56.18%
4000-4999	Transportation & Public Utilities	145	5.78%
5000-5199	Wholesale Trade	108	4.31%
5200-5999	Retail Trade	71	2.83%
6000-6799	Finance, Insurance, & Real Estate	199	7.93%
7000-8999	Services	444	17.70%
9900-9999	Non-classifiable Establishments	10	0.40%
		2508	100%

5.2 OLS regressions

5.2.1 Hypotheses 1 and 3

The first hypothesis predicts no association between the mere use of component auditors and audit quality due to mixed evidence and the third hypothesis predicts a positive association between the mere use of component auditors and audit quality. The results of the OLS regressions for these two hypotheses are displayed in Table 6. When looking at this table, it can be seen that there is a very significant positive association between the use of component auditors and the second accrual-based proxy for both the second and third total accruals measure. The average absolute value of total accruals deflated by cash flow from operations, all other variables held constant, is significantly higher (which means lower audit quality) for firms for which a component auditor is used in the group audit. A very significant positive association is also found between the use of component auditors and audit fees. When component auditors are used, the average audit fees are, holding all else constant, around 10% higher. However, no significant association is found between the use of component auditors and restatements.[5]

Based on the results from Table 6, the null hypothesis of H1 is rejected and the alternative hypothesis of H3 is supported. There is a negative association between the use of component auditors and audit quality and a positive association with audit fees. This is in not in line with the first hypothesis, but the results for the third hypothesis are as expected. These results are partly in contrast with Burke et al. (2019). In their research, they did not find any significant effects for the audit quality proxies. However, in this research a significant effect was found for the second accrual-based proxy. This could be due to the fact that Burke et al. (2019) only did the regressions using the sub-sample (their sample size is much smaller) or because discretionary accruals was used as an accrual-based proxy. Therefore, this hypothesis was also tested using the sub-sample and by using discretionary accruals as an audit quality proxy, of which the results will be discussed in paragraph 5.4.

[5] The results showed no significant association between the use of component auditors and the first accrual-based proxy for all three total accruals measures, and the second accrual-based proxy for the first total accruals measure. These results can be found in Appendix E.

Table 6. Results OLS regressions H1 & H3 for full sample – Use of component auditors and audit outcomes

Variable	(1) ABS(ACCRU-ALS2/CFO)	(2) ABS(ACCRU-ALS3/CFO)	(3) RESTATEMENT	(4) LAF
COMPONENT_D	**0.463*** **	**0.493*** **	0.072	**0.099*** **
	(2.940)	**(2.810)**	(0.560)	**(6.820)**
SIZE	-0.425***	-0.488***	-0.044*	0.442***
	(-6.450)	(-6.920)	(-1.840)	(102.560)
FOREIGN_OP	-0.315*	-0.205	-0.390***	0.252***
	(-1.930)	(-1.140)	(-3.330)	(16.610)
LOSS	0.948***	0.883***	-0.040	0.158***
	(4.830)	(4.250)	(-0.410)	(11.850)
LEV	0.003	0.025	-0.023	0.050***
	(0.030)	(0.200)	(-0.660)	(5.760)
EXTERNAL_FIN	0.159	-0.001	-0.082	-0.009
	(0.700)	(-0.000)	(-0.780)	(-0.580)
CAP_INTENSITY	1.069**	1.003*	0.256	-0.334***
	(2.200)	(1.910)	(1.220)	(-9.720)
INV	2.145**	2.100*	-0.054	-0.034
	(2.170)	(1.950)	(-0.140)	(-0.570)
BUS_SEG	0.014	0.019	0.021**	0.016***
	(0.860)	(1.080))	(2.260)	(10.690)
GEO_SEG	-0.006	-0.007	0.013*	0.004***
	(-0.730)	(-0.790)	(1.840)	(4.360)
FOREIGN_SALES	0.436**	0.696**	-0.112	0.181***
	(1.960)	(2.540)	(-0.710)	(8.100)
BIG4	0.099	0.075	-0.147	0.425***
	(0.620)	(0.440)	(-1.360)	(28.310)
ACCELERATED	-0.716***	-0.946***	-0.125	0.137***
	(-2.830)	(-3.480)	(-0.970)	(7.340)
FCA	0.387**	0.239	0.157	0.046***
	(2.550)	(1.500)	(1.430)	(3.370)
GROWTH	0.213	0.193	0.056	
	(1.640)	(1.470)	(1.540)	
MTB	-0.010	-0.010	0.005*	
	(-0.990)	(-0.890)	(1.810)	
ROA				-0.049***
				(-9.840)
GCO				0.135***
				(5.060)
Industry and year fixed effects	Included	Included	Included	Included
Constant	11.340***	11.815***	-1.930***	10.150***

	(4.920)	(4.920)	(-3.870)	(81.540)
Observations	8546	8546	9344	9775
Pseudo/Adjusted R^2	0.083	0.085	0.066	0.887

This table shows the main results of the regressions of the use of component auditors on four dependent variables, which test H1 and H3. Variable descriptions can be found in Appendix B. All regression models include 2-digit SIC industry and fiscal year fixed effects. T-statistics/z-scores are displayed in parentheses. *, **, and *** show the two-tailed statistical significance for 10%, 5%, and 1%, respectively. The sample for the logit model for restatements is smaller than the OLS model for audit fees. This is because for the logit model observations for which any test/control variable perfectly predicts the dependent variable are dropped when running the regression.

5.2.2 Hypotheses 2 and 4

Table 7 and Table 8 the results for the OLS regressions related to hypotheses 2 and 4. These two hypotheses predicted a negative association between the extent of the use of component auditors and audit quality and a positive association between the extent of the use of component auditors and audit fees respectively. The extent of the use of component auditors is measured in two ways, namely the number of component auditors used (Table 7) and the percentage of total audit hours that can be ascribed to component auditors (Table 8). When looking at the number of component auditors used, a positive and significant association is found with the first accrual-based proxy where the second total accruals measure is used. Furthermore, a positive and very significant association is found with the first accrual-based proxy where the third total accruals measure is used. When the number of component auditors used increases, the average absolute value of total accruals deflated by the lagged total assets significantly increases (which means lower audit quality) for both dependent variables. Lastly, a very significantly positive association is found with audit fees. If one extra component auditor is used, the average audit fees increase by 5%.[6] When looking at the percentage of total audit hours ascribed to component auditors, only a positive and very significant association is found with audit fees and it does not seem to be significantly associated with audit quality.[7] Increasing the percentage of total audit hours ascribed to component auditors by 1 results in an increase of audit fees of 0.7%.

Based on the results of the OLS regressions in Table 7 and Table 8, the alternative hypothesis of H2 and H4 are both supported. There is a negative association between the extent of the use

[6] There is no significant association with the first accrual-based proxy for the first total accruals measure, and with the second accrual-based proxy for all three total accruals measures. These results can be found in Appendix E.
[7] There are no significant results for both accrual-based measures for the second and third total accruals measure. These results can be found in Appendix E.

of component auditors and audit quality and a positive association with audit fees. This is in line with expectations for this research. Where Burke et al. (2019) found no significant associations when looking at the number of component auditors and significant positive associations for the percentage of audit hours ascribed to component auditors, the results in this research are the other way around. In paragraph 5.4 this hypothesis will be tested again by using the sub-sample, by using the quartiles of COMPONENT_N and COMPONENT_P and by using discretionary accruals.

Table 7. Results OLS regressions H2 & H4 – Extent of use (number) of component auditors and audit outcomes

Variable	**(1) ABS(ACCRU-ALS2/TA$_{t-1}$)**	**(2) ABS(ACCRU-ALS3/TA$_{t-1}$)**	**(3) RESTATEMENT**	**(4) LAF**
COMPONENT_N	**0.001****	**0.001*****	-0.063	**0.050*****
	(2.330)	**(2.670)**	(-1.520)	**(16.420)**
SIZE	-0.006***	-0.006***	-0.046	0.402***
	(-4.620)	(-4.790)	(-0.690)	(50.760)
FOREIGN_OP	-0.013**	-0.009**	-0.540**	0.203***
	(-2.520)	(-1.970)	(-2.070)	(6.860)
LOSS	0.003	0.004	-0.230	0.097***
	(0.800)	(1.100)	(-0.950)	(3.560)
LEV	0.018**	0.021***	-0.252	0.120**
	(2.370)	(2.820)	(-0.580)	(2.520)
EXTERNAL_FIN	0.024***	0.024***	-0.814***	-0.015
	(3.470)	(3.600)	(-2.620)	(-0.490)
CAP_INTENSITY	0.033***	0.033***	-0.549	-0.372***
	(3.500)	(3.730)	(-0.770)	(-6.340)
INV	-0.071***	-0.061***	0.374	0.267**
	(-4.630)	(-3.920)	(0.300)	(2.110)
BUS_SEG	-0.000	-0.000	-0.018	0.011***
	(-0.790)	(-0.570)	(-0.820)	(4.860)
GEO_SEG	-0.000	-0.000	0.024**	0.000
	(-0.030)	(-0.330)	(2.350)	(0.390)
FOREIGN_SALES	0.007	0.005	-0.521	0.077**
	(1.350)	(0.950)	(-1.540)	(2.510)
BIG4	-0.008*	-0.008*	-0.326	0.415***
	(-1.830)	(-1.840)	(1.130)	(13.470)
ACCELERATED	-0.015*	-0.021***	-0.224	0.210***
	(-1.870)	(-2.790)	(-0.700)	(5.080)
FCA	0.004*	0.002	0.115	0.034*
	(1.680)	(0.920)	(0.550)	(1.850)

GROWTH	0.016**	0.011	0.354*	
	(2.100)	(1.620)	(1.850)	
MTB	-0.000	-0.000	-0.014	
	(-1.050)	(-0.140)	(-1.360)	
ROA				-0.379***
				(-4.690)
GCO				0.012
				(0.180)
Industry and year fixed effects	Included	Included	Included	Included
Constant	0.138***	0.127***	-0.153	10.820***
	(2.790)	(2.800)	(-0.130)	(49.010)
Observations	2225	2225	2061	2508
Adjusted R^2	0.192	0.194	0.150	0.870

This table shows the main results of the regressions of the extent of the use of component auditors on four dependent variables, which test H2 and H4. Variable descriptions can be found in Appendix B. All regression models include 2-digit SIC industry and fiscal year fixed effects. T-statistics/z-scores are displayed in parentheses. *, **, and *** show the two-tailed statistical significance for 10%, 5%, and 1%, respectively. The sample for the logit model for restatements is smaller than the OLS model for audit fees. This is because for the logit model observations for which any test/control variable perfectly predicts the dependent variable are dropped when running the regression.

Table 8. Results OLS regressions H2 & H4 – Extent of use (percentage) of component auditors and audit outcomes

Variable	**(1) ABS(ACCRU-ALS1/TA_{t-1})**	**(2) ABS(ACCRU-ALS1/CFO)**	**(3) RESTATEMENT**	**(4) LAF**
COMPONENT_PCT	-0.000	-0.002	-0.006	**0.007*** **
	(-0.300)	(-0.370)	(-0.880)	**(9.750)**
SIZE	-0.011***	0.073	-0.078	0.439***
	(-6.060)	(1.390)	(-1.210)	(56.880)
FOREIGN_OP	-0.023***	0.133	-0.534**	0.194***
	(-2.970)	(0.580)	(-2.040)	(6.310)
LOSS	0.055***	2.495***	-0.237	0.094***
	(10.580)	(11.510)	(-0.970)	(3.330)
LEV	0.016	-0.139	-0.273	0.137***
	(1.320)	(-0.390)	(-0.620)	(2.740)
EXTERNAL_FIN	0.038***	0.319	-0.813***	-0.024
	(3.980)	(1.100)	(-2.600)	(-0.730)
CAP_INTENSITY	-0.039***	0.258	-0.431	-0.489***
	(-2.770)	(0.440)	(-0.610)	(-8.090)
INV	-0.128***	-0.017	0.306	0.291**
	(-4.530)	(-0.020)	(0.250)	(2.270)

BUS_SEG	-0.002***	-0.010	-0.020	0.012***
	(-3.970)	(-0.570)	(-0.900)	(5.190)
GEO_SEG	-0.000	0.015	0.023**	0.002
	(-1.180)	(1.370)	(2.300)	(1.400)
FOREIGN_SALES	0.017**	0.183	-0.533	0.070**
	(2.050)	(0.780)	(-1.550)	(2.120)
BIG4	0.013*	-0.638**	-0.322	0.392***
	(1.780)	(-2.460)	(-1.110)	(12.240)
ACCELERATED	-0.021*	0.111	-0.213	0.187***
	(-1.770)	(0.320)	(-0.660)	(4.450)
FCA	0.001	-0.062	0.119	0.030
	(0.120)	(-0.440)	(0.560)	(1.550)
GROWTH	0.042***	-0.455**	0.363*	
	(3.350)	(-2.450)	(1.920)	
MTB	0.001*	-0.005	-0.014	
	(1.820)	(-0.770)	(-1.420)	
ROA				-0.452***
				(-5.340)
GCO				0.056
				(0.810)
Industry and year fixed effects	Included	Included	Included	Included
Constant	0.255***	0.391	-0.045	10.809***
	(4.130)	(0.320)	(-0.040)	(40.750)
Observations	2508	2508	2061	2508
Pseudo/Adjusted R^2	0.312	0.114	0.148	0.860

This table shows the main results of the regressions of the use of component auditors on four dependent variables, which test H2 and H4. Variable descriptions can be found in Appendix B. All regression models include 2-digit SIC industry and fiscal year fixed effects. T-statistics/z-scores are displayed in parentheses. *, **, and *** show the two-tailed statistical significance for 10%, 5%, and 1%, respectively. The sample for the logit model for restatements is smaller than the OLS model for audit fees. This is because for the logit model observations for which any test/control variable perfectly predicts the dependent variable are dropped when running the regression.

5.3. Additional tests

Finally, three additional tests were done. First, the first and third hypothesis were tested again for the results that were significant and for restatements by using a sub-sample, which are the firms with significant multinational operations. Second, the second and fourth hypothesis were tested again for the significant results and for restatements by changing the number of component auditors and the percentage of total audit hours ascribed to component auditors into indicator variables for quartiles. Lastly, the first and third hypothesis were tested again by using the absolute value of discretionary accruals as a proxy for audit quality.

5.3.1 Sub-sample

The results from the OLS regressions where the sub-sample is used is shown in Appendix F. When looking at firms with significant multinational operations, the previous significant results remain significant. The use of component auditors is still positively and very significantly associated with the audit quality proxies and audit fees. These results support the results for the full sample.

5.3.2 Quartiles

The results of making indicator variables for the quartiles of COMPONENT_N and COMPONENT_P and using these as test variables in the OLS regression model of the second and fourth hypothesis are shown in Appendix F. For all quartiles of the number of component auditors, there is a very significant and positive association with the first accrual-based proxy for both the second and third total accruals measure and with audit fees. There is no significant association found with restatements. This is the same for all quartiles of the percentage of total audit hours ascribed to component auditors. The extent of involvement is now significantly positively associated with the audit quality proxies and audit fees for both measures of extent of involvement, whereas this was first only the case for the number of component auditors.

5.3.3 Discretionary accruals

Lastly, another proxy of audit quality was used, namely the absolute value of discretionary accruals. The results of using this proxy as the dependent variable in the regression models is shown in Table 9. Firstly, Panel A displays the results for the test variables COMPONENT_D (for both the full sample and the sub-sample), COMPONENT_N, and COMPONENT_PCT. No significant associations were found between the use of component auditors in the full sample and discretionary accruals, and between the extent of the use of component auditors and discretionary accruals. However, when using the sub-sample, a slightly significant and quite weakly negative association is found between the use of component auditors and discretionary accruals. This is in contrast with Burke et al. (2019), who did not find a significant association. Panel B shows that all quartiles for both measures of the extent of the use of component auditors are significantly positively associated with the absolute value of discretionary accruals. This supports the second hypothesis.

Table 9.

Panel A: Results OLS regressions H1 & H2 – Use and extent of use of component auditors and absolute value of discretionary accruals

Variable	**(1)**	**(2)**	**(3)**	**(4)**
	ABS_DAC	**ABS_DAC**	**ABS_DAC**	**ABS_DAC**
COMPONENT_D	-0.017	**-0.034***		
	(-0.870)	**(-1.800)**		
COMPONENT_N			0.002	
			(1.290)	
COMPONENT_PCT				0.001
				(1.210)
SIZE	-0.136***	-0.049***	-0.011**	-0.010**
	(-8.640)	(-5.550)	(-2.210)	(-2.250)
FOREIGN_OP	-0.003	-0.044	-0.005	-0.005
	(-0.120)	(-1.480)	(-0.220)	(-0.230)
LOSS	-0.185***	-0.127***	-0.051***	-0.050***
	(-6.900)	(-4.760)	(-3.590)	(-3.620)
LEV	0.296***	0.395***	0.032	0.033
	(8.100)	(5.030)	(1.330)	(1.350)
EXTERNAL_FIN	0.159***	0.086**	0.009	0.009
	(3.610)	(2.130)	(0.350)	(0.380)
CAP_INTENSITY	0.138	0.116*	0.234***	0.227***
	(1.400)	(1.870)	(4.720)	(4.570)
INV	-0.427***	-0.003	0.099	0.097
	(-3.040)	(-0.020)	(1.370)	(1.340)
BUS_SEG	0.010***	0.005***	0.003**	0.003**
	(4.900)	(3.320)	(2.440)	(2.380)
GEO_SEG	0.001	0.000	-0.000	-0.000
	(0.700)	(0.320)	(-0.370)	(-0.340)
FOREIGN_SALES	0.146***	0.090*	0.018	0.011
	(3.220)	(1.870)	(0.850)	(0.470)
BIG4	0.037	-0.005	-0.042**	-0.044***
	(1.640)	(-0.370)	(-2.490)	(-2.570)
ACCELERATED	-0.006	-0.046	-0.048	-0.048
	(-0.110)	(-1.590)	(-1.520)	(-1.560)
FCA	0.043	0.059*	0.011	0.009
	(1.510)	(2.710)	(0.890)	(0.800)
GROWTH	0.101***	0.025	0.097**	0.096**
	(3.040)	(1.630)	(2.200)	(2.200)
MTB	-0.001	0.001	0.002	0.002
	(-0.340)	(1.480)	(1.540)	(1.560)
Industry and year fixed effects	Included	Included	Included	Included
Constant	2.084***	0.662***	0.379***	0.381***
	(5.320)	(6.390)	(3.330)	(3.400)

Observations	7638	4644	1973	1973
Adjusted R^2	0.297	0.311	0.297	0.298

Table 9. (continued)

Panel B: Results OLS regressions H2 – Extent of use (quartiles of number and percentage) of component auditors and absolute value of discretionary accruals

Variable	**(1)** **ABS_DAC**	**(2)** **ABS_DAC**
Q1N	**0.394*** **	
	(3.390)	
Q2N	**0.396*** **	
	(3.400)	
Q3N	**0.412*** **	
	(3.470)	
Q4N	**0.433*** **	
	(3.570)	
Q1PCT		**0.381*** **
		(3.370)
Q2PCT		**0.407*** **
		(3.480)
Q3PCT		**0.384*** **
		(3.300)
Q4PCT		**0.418*** **
		(3.480)
SIZE	-0.012**	-0.011**
	(-2.510)	(-2.350)
FOREIGN_OP	-0.005	-0.006
	(-0.230)	(-0.250)
LOSS	-0.051***	-0.049***
	(-3.570)	(-3.560)
LEV	0.030	0.032
	(1.230)	(1.370)
EXTERNAL_FIN	0.009	0.011
	(0.370)	(0.440)
CAP_INTENSITY	0.237***	0.227***
	(4.810)	(4.580)
INV	0.095	0.092
	(1.300)	(1.270)
BUS_SEG	0.003**	0.003**
	(2.290)	(2.320)
GEO_SEG	-0.000	-0.000
	(-0.380)	(-0.380)

FOREIGN_SALES	0.012	0.008*
	(0.570)	(0.340)
BIG4	-0.043**	-0.045***
	(-2.560)	(-2.600)
ACCELERATED	-0.046	-0.047
	(-1.470)	(-1.520)
FCA	0.011	0.008
	(0.840)	(0.710)
GROWTH	0.097**	0.095**
	(2.200)	(2.180)
MTB	0.002	0.002
	(1.540)	(1.590)
Industry and year fixed effects	Included	Included
Observations	1973	1973
Adjusted R^2	0.569	0.570

This table shows the additional results of the regressions of the use and the extent of the use of component auditors on the absolute value of discretionary accruals, which test H1 and H2. Variable descriptions can be found in Appendix B. All regression models include 2-digit SIC industry and fiscal year fixed effects. T-statistics are displayed in parentheses. *, **, and *** show the two-tailed statistical significance for 10%, 5%, and 1%, respectively.

5.4 Summary

This section of the thesis first discussed the results of the descriptive statistics of the two samples. This showed, among other things, that most U.S group auditors use only one component auditor and that for most group audits the component auditors perform between zero and five percent or between 10 and 20 percent of total audit hours. Furthermore, most of the component auditors were used for group audits where the firm is a manufacturing firm. Then the results of the OLS regressions for the main tests were interpreted and discussed. Next, the results of the OLS regressions for the additional tests were interpreted. The results showed a significantly positive association with the accrual-based proxies and audit fees. This is the same case for the extent of the use of component auditors. After having analyzed all the results, it can be said that the use and the extent of the use of component auditors results in lower audit quality and higher audit fees.

6. Conclusion and Limitations

6.1 Conclusion

Surveys and interviews showed that U.S. lead auditors of global groups audits frequently regarded the work of component auditors as insufficient, not communicated on time and not compliant with regulations of the U.S. These issues could affect audit outcomes and, therefore, it is interesting to look at the relationship between using component auditors and audit outcomes. The literature review showed that the use of component auditors had no association with audit quality and a positive association with audit fees, and that the extent of the use was of component auditors is negatively associated with audit quality and positively associated with audit fees when looking at different proxies for audit quality and different settings. This led to the expectations that the use of component auditors is not significantly associated with audit quality and positively associated with audit fees (H1 and H3) and that the extent of the use of component auditors is negatively associated with audit quality and positively associated with audit fees (H2 and H4). Using the results of the main tests and the additional tests, the main research question can now be answered. The main question of this research was as follows:

"Does the use of component auditors for the global group audit of U.S. public firms affect audit outcomes?"

The results showed that the use of component auditors is associated with a higher absolute value of total accruals deflated by cash flow from operations and with higher audit fees. Furthermore, the extent of the use of component auditors is associated with a higher absolute value of total accruals deflated by lagged total assets and with higher audit fees. Most additional tests support the main results. Using the sub-sample, the use of component auditors was still associated with a higher absolute value of total accruals deflated by cash flow from operations and with higher audit fees. When using indicator variables for the quartiles of the measures for the extent of the use, the results showed that all quartiles are associated with a higher absolute value of total accruals deflated by lagged total assets and with higher audit fees. Lastly, all quartiles were also associated with a higher absolute value of discretionary accruals. Concluding, the answer to the main research question is that the use of component auditors does in fact affect audit outcomes. This makes it important for the users of financial statements to have access to this information to be able to better assess the quality of an audit. The required disclosures could even be expanded more to increase transparency for stakeholders and the

responsibility of firms that participate in the group audits. Users of financial statements can better assess the quality of an audit if even more information regarding the use of component auditors is disclosed, since an effect on audit outcomes is found. For example, the identity of the component auditors that individually have performed less than five percent of the total audit hours could be displayed, since this information is currently not available.

6.2 Limitations and future research

This thesis is subject to a number of limitations. Firstly, even though the sample sizes used are relatively large compared to previous studies, the sample period only pertains to fiscal year-ends between December 2016 to December 2019. It might be interesting to investigate if the effects found change over time. Secondly, despite the fact that multiple proxies of audit quality have been used in this research, there is no perfect measure for audit quality. Therefore, in future research other proxies, such as the probability to issue a going concern opinion or an indicator for companies that meet or beat the analysts' earnings forecasts. Thirdly, even though quite a number of control variables have been used in this research to control for factors that have a correlation with either the variables of interest, the dependent variables, or both, the results might still be biased due to omitted variable bias. For instance, there could be a variable that is correlated with both with the use of component auditors and total accruals. This will result in the regression coefficients being biased if this variable is not included in the regression. Lastly, it was difficult to make appropriate quartiles for the additional test. The ranges of the last quartiles were quite large due to the fact that most observations were in the first quartile. Still, the observations for the last quartiles remained relatively low. No information regarding the identity of the component auditors that individually have performed less than five percent of the total audit hours is available. The results of this research might give an incentive to the PCAOB to require more information about these component auditors, but also about the component auditors to which individually more than five percent of the total audit hours can be ascribed. This makes it available to investigate more characteristics of component auditors (than is available now) that lead to more pronounced associations.

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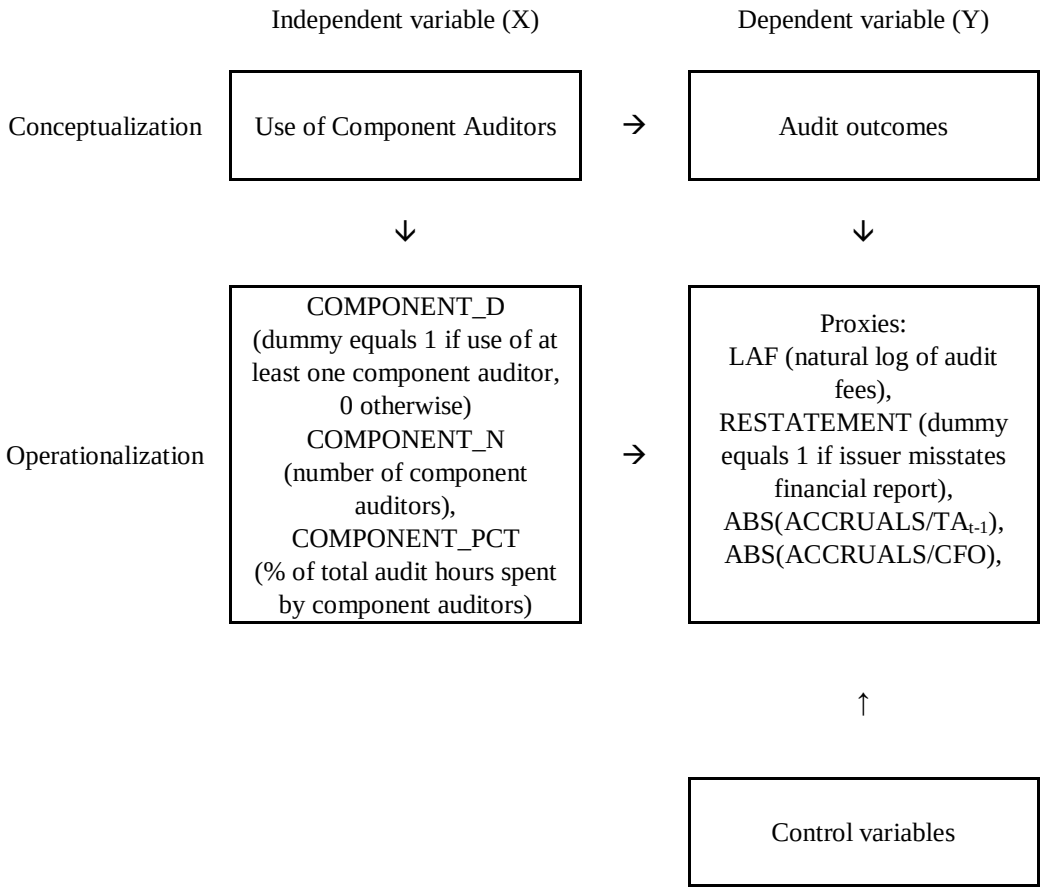
Appendices

Appendix A: Libby Boxes

Table 10. Libby Boxes



Appendix B: Variable definitions

Table 11. Variable descriptions

Test Variables	**Description**	**Source**
COMPONENT_D	Indicator variable, which equals 1 if at least one component auditor is used, zero otherwise	Form AP
COMPONENT_N	Number of component auditors involved in the group audit	Form AP
COMPONENT_PCT	% of audit hours ascribed to component auditors	Form AP
Dependent Variables		
ABS(ACCRUALS/TA_{t-1})	Absolute value of total accruals divided by beginning assets	Compustat
ABS(ACCRUALS/CFO)	Absolute value of total accruals divided by cash flow from operations	Compustat
RESTATEMENT	Indicator variable, which equals 1 for issuers that have had to restate their financial report due to misstatements, zero otherwise	Audit Analytics
LAF	Natural logarithm of the audit fees	Audit Analytics
ABS_DAC	Absolute value of discretionary accruals using the modified Jones model (Dechow et al., 1995)	
Control Variables		
SIZE	Natural logarithm of the issuer's total assets	Compustat
FOREIGN_OP	Foreign operations; Indicator variable, which equals 1 if foreign pretax income of the issuer-year is nonzero, zero otherwise	Compustat
LOSS	Indicator variable, which equals 1 if the issuer incurred a net loss, zero otherwise	Compustat
LEV	Leverage, measured by dividing total liabilities by total assets	Compustat
EXTERNAL_FIN	External financing; Indicator variable, which equals 1 if the change in number of shares	Compustat

	outstanding compared to the year before is greater than 10%, zero otherwise	
GROWTH	Sales growth compared to the year before	Compustat
CAP_INTENSITY	Capital intensity, measured by dividing the net property, plant and equipment by total assets	Compustat
INV	Ratio of inventories to total assets	Compustat
BUS_SEG	The sum of reported business segments	Compustat Segments
GEO_SEG	The sum of reported geographic segments	Compustat Segments
FOREIGN_SALES	The amount of sales reported in non-domestic segments divided by total sales	Compustat Segments
BIG4	Indicator variable, which equals 1 if the U.S. lead auditor is a Big 4 auditor (PricewaterhouseCoopers, Deloitte, Ernst & Young or KPMG), zero otherwise	Audit Analytics
MTB	Market to book ratio, measured by dividing the market value of equity by the stockholder's equity of common shareholders	Compustat
ROA	Return on assets, measured by dividing earnings before extraordinary items by total assets	Compustat
GCO	Indicator variable, which equals 1 if the auditor issued a negative going concern opinion	Audit Analytics
ACCELERATED	Indicator variable, which equals 1 if the issuer is an accelerated filer	Audit Analytics
FCA	Indicator variable, which equals 1 if there is a foreign currency adjustment, zero otherwise	Compustat

Table 12. Definitions of variables used to estimate discretionary accruals

Variable	**Definition**	**Source**
ACCRUALS	Total accruals, which is measured as: change in current assets minus change in cash plus change in short-term debt included in current liabilities plus change in income taxes payable minus depreciation and amortization (Dechow et al., 1995)	Compustat
ASSETS	Total assets	Compustat
REV	Revenues	Compustat
REC	Receivables	Compustat
PPE	Gross value of property, plant and equipment	Compustat

Appendix C: Sample selections

Table 13. Sample selection other two total accruals measures

Sampling procedure	**Firm-year observations (n)**	**Companies**
Companies with information in PCAOB AuditorSearch with fiscal year ends between with December 2016 and December 2019	51563	16017
Minus observations where the group auditor divides responsibility or where no information regarding use is available	(140)	(38)
Minus observations where group auditor or the issuing firm is not located in the U.S.	(4112)	(1369)
Minus observations where the component auditor is located in the U.S.	(72)	(19)
Minus observations without or duplicate CIK code	(7668)	0
Minus observations when merging with Compustat & Audit Analytics	(31025)	(12143)
Full sample (H1 & H3)	**8546**	**2448**
Deleting observations with insignificant multinational operations (no use of component auditors and zero pretax foreign income and no foreign currency adjustments and zero foreign sales)	(3357)	(1037)
Companies with significant multinational operations (H1 & H3)	**5189**	**1411**
Companies where the group auditor uses at least one component auditor (H2 & H4)	**2225**	**505**

Table 14. Sample selection discretionary accruals

Sampling procedure	**Firm-year observations (n)**	**Companies**
Companies with information in PCAOB AuditorSearch with fiscal year ends between with December 2016 and December 2019	51563	16017
Minus observations where the group auditor divides responsibility or where no information regarding use is available	(140)	(38)
Minus observations where group auditor or the issuing firm is not located in the U.S.	(4112)	(1369)
Minus observations where the component auditor is located in the U.S.	(72)	(19)
Minus observations without or duplicate CIK code	(7668)	0
Minus observations when merging with Compustat & Audit Analytics	(31928)	(12370)
Full sample (H1 & H3)	**7643**	**2221**

Deleting observations with insignificant multinational operations (no use of component auditors and zero pretax foreign income and no foreign currency adjustments and zero foreign sales)	(2999)	()940
Companies with significant multinational operations (H1 & H3)	**4644**	**1281**
Companies where the group auditor uses at least one component auditor (H2 & H4)	**1973**	**463**

Appendix D: Descriptive statistics

Table 15. Descriptive statistics sample with other two total accruals measures

Panel A. Descriptive statistics test variables

Variable	Obs.	Mean	Median	Std. Dev.	25th percentile	75th percentile
Full sample (H1 & H3)						
COMPONENT_D	8546	0.260	0.000	0.439	0.000	1.000
Sample with significant multinational operations (H1&H3)						
COMPONENT_D	5189	0.429	0.000	0.495	0.000	1.000
Sample with component auditor use (H2&H4)						
COMPONENT_N	2225	3.633	2.000	3.819	1.000	5.000
COMPONENT_PCT	2225	17.413	15.000	16.363	2.500	25.000

Panel B. Descriptive statistics dependent and control variables

	COMPONENT_D=1 (N=2225)		**COMPONENT_D=0 (N=6321)**			
Variable	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Difference Means**	**P-value**
ABS(ACCRUALS2/TA_{t-1})	0.104	1.007	0.745	3.950	0.640	0.000
ABS(ACCRUALS2/CFO)	1.272	4.633	1.903	6.998	0.632	0.000
ABS(ACCRUALS3/TA_{t-1})	0.127	1.300	0.791	4.158	0.664	0.000
ABS(ACCRUALS3/CFO)	1.348	5.211	2.042	7.461	0.694	0.000
SIZE	7.401	2.125	5.606	3.064	-1.795	0.000
FOREIGN_OP	0.827	0.379	0.341	0.474	-0.486	0.000
LOSS	0.312	0.463	0.489	0.500	0.177	0.000
LEV	0.299	0.259	0.534	1.476	0.234	0.000
EXTERNAL_FIN	0.123	0.328	0.238	0.426	0.115	0.000
GROWTH	0.153	0.587	0.223	0.980	0.070	0.000
CAP_INTENSITY	0.204	0.209	0.225	0.270	0.021	0.000
INV	0.103	0.117	0.078	0.140	-0.025	0.000
BUS_SEG	4.895	4.438	4.387	4.095	-0.508	0.000
GEO_SEG	8.216	7.901	4.007	6.080	-4.209	0.000
FOREIGN_SALES	0.406	0.370	0.161	0.323	-0.244	0.000
BIG4	0.789	0.408	0.519	0.500	-0.270	0.000
MTB	3.437	10.048	3.026	12.365	-0.411	0.120

ROA	-0.042	0.613	-0.681	2.913	-0.638	0.000
GCO	0.033	0.178	0.156	0.363	0.123	0.000
ACCELERATED	0.889	0.317	0.675	0.473	-0.214	0.000
FCA	0.542	0.498	0.209	0.407	-0.333	0.000

Table 16. Pearson and Spearman correlations among independent and dependent variables in full sample with restatements, audit fees, and first total accruals measure

	COMPO-NENT_D	COMPO-NENT_N	COMPO-NENT_PCT	ABS(AC-CRUALS1/ TA_{t-1})	ABS(AC-CRUALS1/ CFO)	RESTATE-MENT	LAF
COMPONENT_D	1.000***	0.986***	0..975***	-0.159***	-0.039***	-0.049***	0.358***
COMPONENT_N	0.637***	1.000***	0.981***	-0.173***	-0.048***	-0.053***	0.391***
COMPONENT_PCT	0.672***	0.757***	1.000***	-0.170***	-0.044***	-0.055***	0.387***
ABS(ACCRUALS1/TA_{t-1})	-0.099***	-0.070***	-0.071***	1.000***	0.550***	0.010	-0.361***
ABS(ACCRUALS1/CFO)	-0.036***	-0.036***	-0.039***	0.167***	1.000***	0.009	-0.095***
RESTATEMENT	-0.049***	-0.051***	-0.047***	0.015	0.020**	1.000***	-0.056***
LAF	0.343***	0.379***	0.327***	-0.338***	-0.125***	-0.050***	1.000***

*, **, and *** show the two-tailed statistical significance for 10%, 5%, and 1%, respectively.

Table 17. Pearson and Spearman correlations among independent and dependent variables in full sample with other two total accruals measures

	COMPO-NENT_D	COMPO-NENT_N	COMPO-NENT_PCT	ABS(AC-CRUALS2/ TA_{t-1})	ABS(AC-CRUALS2/ CFO)	ABS(AC-CRUALS3/ TA_{t-1})	ABS(AC-CRUALS3/ CFO)
COMPONENT_D	1.000***	0.986***	0..974***	-0.049***	0.068***	-0.066***	0.056***
COMPONENT_N	0.633***	1.000***	0.981***	-0.051***	0.072***	-0.069***	0.059***
COMPONENT_PCT	0.675***	0.760***	1.000***	-0.053***	0.070***	-0.071***	0.057***
ABS(ACCRUALS2/TA_{t-1})	-0.082***	-0.056***	-0.057***	1.000***	0.642***	0.954***	0.618***
ABS(ACCRUALS2/CFO)	-0.043***	-0.032***	-0.028**	0.534***	1.000***	0.611***	0.972***
ABS(ACCRUALS3/TA_{t-1})	-0.080***	-0.057***	-0.055***	0.965***	0.507***	1.000***	0.643***
ABS(ACCRUALS3/CFO)	-0.044***	-0.035***	-0.029***	0.495***	0.950***	0.530***	1.000***

*, **, and *** show the two-tailed statistical significance for 10%, 5%, and 1%, respectively.

Table 18. Number and percentage of component auditors used by industry for sample with restatements, audit fees and first total accruals measure

SIC	Division & Major group	Number	Percentage
0100-0999	**Agriculture, Forestry, & Fishing**		
1	Agricultural Production – Crops	10	0.40%
		10	0.40%
1000-1499	**Mining**		
10	Metal, Mining	8	0.32%

12	Coal Mining	9	0.36%
13	Oil & Gas Extraction	67	2.67%
14	Nonmetallic Minerals, Except Fuels	3	0.12%
		87	3.47%
1500-1799	**Construction**		
15	General Building Contractors	9	0.36%
16	Heavy Construction, Except Building	11	0.44%
17	Special Trade Contractors	5	0.20%
		25	1.00%
2000-3999	**Manufacturing**		
20	Food & Kindred Products	55	2.19%
22	Textile Mill Products	12	0.48%
23	Apparel & Other Textile Products	16	0.64%
24	Lumber & Wood Products	7	0.28%
25	Furniture & Fixtures	14	0.56%
26	Paper & Allied Products	25	1.00%
27	Printing & Publishing	25	1.00%
28	Chemical & Allied Products	309	12.32%
29	Petroleum & Coal Products	17	0.68%
30	Rubber & Miscellaneous Plastics Products	24	0.96%
31	Leather & Leather Products	11	0.44%
32	Stone, Clay, & Glass Products	21	0.84%
33	Primary Metal Industries	35	1.40%
34	Fabricated Metal Products	63	2.51%
35	Industrial Machinery & Equipment	204	8.13%
36	Electronic & Other Electric Equipment	243	9.69%
37	Transportation Equipment	98	3.91%
38	Instruments & Related Products	204	8.13%
39	Miscellaneous Manufacturing Industries	26	1.04%
		1409	56.18%
4000-4999	**Transportation & Public Utilities**		
40	Railroad Transportation	5	0.20%
41	Local & Interurban Passenger Transit	1	0.04%
42	Trucking & Warehousing	2	0.08%
44	Water Transportation	15	0.60%
45	Transportation by Air	12	0.48%
46	Pipelines, Except Natural Gas	9	0.36%
47	Transportation Services	14	0.56%
48	Communications	58	2.31%
49	Electric, Gas, & Sanitary Services	29	1.16%
		145	5.78%
5000-5199	**Wholesale Trade**		
50	Wholesale Trade – Durable Goods	68	2.71%
51	Wholesale Trade – Nondurable Goods	40	1.59%
		108	4.31%
5200-5999	**Retail Trade**		
52	Building Materials & Gardening Supplies	3	0.12%
53	General Merchandise Stores	5	0.20%
55	Automative Dealers & Service Stations	12	0.48%
56	Apparel & Accessory Stores	2	0.08%
57	Furniture & Homefurnishings Stores	3	0.12%
58	Eating & Drinking Places	15	0.60%
59	Miscellaneous Retail	31	1.24%
		71	2.83%

6000-6799	**Finance, Insurance, & Real Estate**		
60	Depository Institutions	11	0.44%
61	Non-depository Institutions	10	0.40%
62	Security & Commodity Brokers	67	2.67%
63	Insurance Carriers	40	1.59%
64	Insurance Agents, Brokers, & Service	14	0.56%
65	Real Estate	22	0.88%
67	Holding & Other Investment Offices	35	1.40%
		199	7.93%
7000-8999	**Services**		
70	Hotels & Other Lodging Places	12	0.48%
72	Personal Services	3	0.12%
73	Business Services	313	12.48%
75	Auto Repair, Services, & Parking	7	0.28%
78	Motion Pictures	9	0.36%
79	Amusement & Recreation Services	23	0.92%
80	Health Services	21	0.84%
81	Legal Services	2	0.08%
82	Educational Services	11	0.44%
83	Social Services	3	0.12%
87	Engineering & Management Services	40	1.59%
		444	17.70%
9900-9999	**Non-classifiable Establishments**		
99	Non-Classifiable Establishments	10	0.40%
		10	0.40%
		2508	100%

Appendix E: Non-significant results

Table 19. Non-significant results OLS regressions H1 for full sample – Use of component auditors and audit quality

Variable	(5) ABS(ACCRU-ALS1/TA_{t-1})	(6) ABS(ACCRU-ALS1/CFO)	(7) ABS(ACCRU-ALS2/TA_{t-1})	(8) ABS(ACCRU-ALS3/TA_{t-1})
COMPONENT_D	-0.008	0.165	0.075	0.099
	(-0.360)	(1.270)	(1.370)	(1.600)
SIZE	-0.189***	-0.077*	-0.441***	-0.475***
	(-10.990)	(-1.870)	(-9.930)	(-10.160)
FOREIGN_OP	-0.005	0.061	-0.030	-0.024
	(-0.200)	(0.440)	(-0.520)	(-0.380)
LOSS	-0.126***	2.089***	-0.368***	-0.422***
	(-4.970)	(14.900)	(-5.030)	(-5.500)
LEV	0.609***	0.125**	0.497***	0.527***
	(14.100)	(2.050)	(5.350)	(5.410)
EXTERNAL_FIN	0.290***	-0.026	0.482***	0.437***
	(6.490)	(-0.170)	(3.920)	(3.420)
CAP_INTENSITY	-0.173*	0.022	-0.382*	-0.578**
	(-1.790)	(0.060)	(-1.690)	(-2.420)
INV	-1.025***	2.282***	-1.305***	-1.595***
	(-6.250)	(3.320)	(-2.730)	(-3.170)
BUS_SEG	0.011***	0.007	0.021***	0.023***
	(5.290)	(0.640)	(3.720)	(3.810)
GEO_SEG	0.001	0.004	0.009***	0.009***
	(0.920)	(0.320)	(3.090)	(2.730)
FOREIGN_SALES	0.102***	0.439**	0.221***	0.311***
	(3.670)	(2.240)	(2.720)	(3.200)
BIG4	0.086***	-0.181	0.332***	0.350***
	(3.650)	(-1.430)	(5.190)	(5.170)
ACCELERATED	0.113**	-0.437**	0.067	0.036
	(2.350)	(-2.100)	(0.640)	(0.320)
FCA	0.028	0.088	0.024	-0.021
	(1.140)	(0.770)	(0.380)	(-0.310)
GROWTH	0.068**	0.008	0.209***	0.206***
	(2.170)	(0.100)	(2.690)	(2.610)
MTB	-0.000	0.001	-0.009	-0.010
	(-0.090)	(0.260)	(-1.410)	(-1.580)
Industry and year fixed effects	Included	Included	Included	Included
Constant	0.949***	0.266	7.314***	7.570***
	(2.920)	(0.650)	(5.300)	(5.250)
Observations	9775	9775	8546	8546
Adjusted R^2	0.396	0.079	0.200	0.202

This table shows the non-significant main results of the regressions of the use of component auditors on four dependent variables, which test H1. Variable descriptions can be found in Appendix B. All regression models include 2-digit SIC industry and fiscal year fixed effects. T-statistics are displayed in parentheses. *, **, and *** show the two-tailed statistical significance for 10%, 5%, and 1%, respectively.

Table 20. Non-significant results OLS regressions H2 – Extent of use (number) of component auditors and audit quality

Variable	**(5) ABS(ACCRU-ALS1/TA_{t-1})**	**(6) ABS(ACCRU-ALS1/CFO)**	**(7) ABS(ACCRU-ALS2/CFO)**	**(8) ABS(ACCRU-ALS3/CFO)**
COMPONENT_N	0.001	0.011	0.012	0.012
	(1.270)	(0.520)	(0.760)	(0.740)
SIZE	-0.012***	0.061	0.002	-0.016
	(-6.120)	(1.080)	(0.030)	(-0.270)
FOREIGN_OP	-0.023***	0.131	-0.147	-0.078
	(-2.980)	(0.570)	(-0.670)	(-0.330)
LOSS	0.055***	2.500***	1.236***	1.156***
	(10.570)	(11.530)	(6.200)	(5.070)
LEV	0.016	-0.146	0.013	0.048
	(1.290)	(-0.410)	(0.050)	(0.160)
EXTERNAL_FIN	0.038***	0.319	0.480*	0.463
	(3.980)	(1.100)	(1.680)	(1.510)
CAP_INTENSITY	-0.038***	0.271	1.035*	1.066*
	(-2.690)	(0.470)	(1.760)	(1.690)
INV	-0.129***	-0.023	-0.514	-0.784
	(-4.540)	(-0.030)	(-0.720)	(-0.970)
BUS_SEG	-0.002***	-0.011	0.006	0.008
	(-4.050)	(-0.600)	(0.420)	(0.520)
GEO_SEG	-0.000	0.015	0.000	0.000
	(-1.350)	(1.320)	(0.050)	(0.020)
FOREIGN_SALES	0.015*	0.137	0.498*	0.608**
	(1.930)	(0.630)	(1.910)	(2.040)
BIG4	0.013*	-0.642**	-0.711***	-0.718***
	(1.780)	(-2.490)	(-3.010)	(-2.870)
ACCELERATED	-0.020*	0.135	0.106	-0.227
	(-1.680)	(0.390)	(0.330)	(-0.640)
FCA	0.000	-0.073	0.223*	0.169
	(0.020)	(-0.520)	(1.830)	(1.320)
GROWTH	0.042***	-0.455**	-0.297	-0.357*
	(3.350)	(-2.460)	(-1.500)	(-1.780)
MTB	0.001*	-0.005	-0.014	-0.014

	(1.840)	(-0.740)	(-1.490)	(-1.340)
ROA				
GCO				
Industry and year fixed effects	Included	Included	Included	Included
Constant	0.256***	0.400	0.687	0.975
	(4.160)	(0.330)	(0.580)	(0.770)
Observations	2508	2508	2225	2225
Pseudo/Adjusted R^2	0.312	0.114	0.069	0.061

This table shows the non-significant main results of the regressions of the extent of the use of component auditors on four dependent variables, which tests H2. Variable descriptions can be found in Appendix B. All regression models include 2-digit SIC industry and fiscal year fixed effects. T-statistics are displayed in parentheses. *, **, and *** show the two-tailed statistical significance for 10%, 5%, and 1%, respectively.

Table 21. Non-significant results OLS regressions H2 – Extent of use (percentage) of component auditors and audit quality

Variable	**(5) ABS(ACCRU-ALS2/TA_{t-1})**	**(6) ABS(ACCRU-ALS2/CFO)**	**(7) ABS(ACCRU-ALS3/TA_{t-1})**	**(8) ABS(ACCRU-ALS3/CFO)**
COMPONENT_PCT	0.000	0.003	0.000	0.004
	(0.740)	(0.770)	(0.660)	(0.780)
SIZE	-0.006***	0.007	-0.005***	-0.011
	(-4.570)	(0.140)	(-4.610)	(-0.200)
FOREIGN_OP	-0.013**	-0.152	-0.009**	-0.084
	(-2.530)	(-0.690)	(-1.980)	(-0.360)
LOSS	0.003	1.244***	0.004	1.165***
	(0.850)	(6.270)	(1.140)	(5.130)
LEV	0.019**	0.018	0.021***	0.054
	(2.400)	(0.060)	(2.850)	(0.170)
EXTERNAL_FIN	0.024***	0.480*	0.024***	0.463
	(3.470)	(1.680)	(3.600)	(1.510)
CAP_INTENSITY	0.031***	0.998*	0.032***	1.026
	(3.360)	(1.690)	(3.590)	(1.620)
INV	-0.071***	-0.515	-0.061***	-0.785
	(-4.630)	(-0.720)	(-3.920)	(-0.970)
BUS_SEG	-0.000	0.006	-0.000	0.008
	(-0.710)	(0.430)	(-0.480)	(0.540)
GEO_SEG	0.000	0.000	-0.000	0.000
	(0.090)	(0.060)	(-0.170)	(0.020)
FOREIGN_SALES	0.007	0.467*	0.005	0.570**

	(1.440)	(1.840)	(1.040)	(1.970)
BIG4	-0.009*	-0.722***	-0.008*	-0.730***
	(-1.870)	(-3.030)	(-1.890)	(-2.890)
ACCELERATED	-0.015*	0.108	-0.022***	-0.223
	(-1.950)	(0.330)	(-2.880)	(-0.620)
FCA	0.004*	0.215*	0.002	0.159
	(1.670)	(1.760)	(0.940)	(1.240)
GROWTH	0.016**	-0.298	0.011	-0.358*
	(2.090)	(-1.500)	(1.610)	(-1.780)
MTB	-0.000	-0.014	-0.000	-0.013
	(-1.020)	(-1.440)	(-0.110)	(-1.300)
Industry and year fixed effects	Included	Included	Included	Included
Constant	0.138***	0.695	0.127***	0.985
	(2.780)	(0.590)	(2.790)	(0.780)
Observations	2225	2225	2225	2225
Adjusted R^2	0.192	0.069	0.193	0.062

This table shows the non-significant main results of the regressions of the extent of the use of component auditors on four dependent variables, which tests H2. Variable descriptions can be found in Appendix B. All regression models include 2-digit SIC industry and fiscal year fixed effects. T-statistics are displayed in parentheses. *, **, and *** show the two-tailed statistical significance for 10%, 5%, and 1%, respectively.

Appendix F: Results additional tests

Table 22. Results OLS regressions H1 & H3 for sub-sample – Use of component auditors and audit outcomes

Variable	(1) ABS(ACCRU-ALS2/CFO)	(2) ABS(ACCRU-ALS3/CFO)	(3) RESTATEMENT	(4) LAF
COMPONENT_D	**0.420*** **	**0.390*** **	0.013	**0.095*** **
	(3.750)	**(3.320)**	(0.090)	**(5.840)**
SIZE	-0.039	-0.081**	-0.076**	0.466***
	(-1.060)	(-2.050)	(-2.340)	(87.800)
FOREIGN_OP	-0.421***	-0.314**	-0.458***	0.213***
	(-2.890)	(-2.050)	(-3.330)	(11.310)
LOSS	1.044***	0.994***	-0.026	0.097***
	(7.080)	(6.850)	(-0.200)	(5.570)
LEV	0.364	0.326	-0.467***	0.117***
	(1.540)	(1.460)	(-2.600)	(3.860)
EXTERNAL_FIN	0.211	0.096	-0.222	0.023
	(1.240)	(0.570)	(-1.460)	(1.120)
CAP_INTENSITY	1.042***	1.211***	-0.156	-0.485***
	(2.770)	(3.140)	(-0.460)	(-11.030)
INV	2.166***	1.983**	-0.359	0.312***
	(2.670)	(2.350)	(-0.570)	(3.750)
BUS_SEG	0.001	0.004	0.006	0.013***
	(0.120)	(0.390)	(0.500)	(7.850)
GEO_SEG	-0.005	-0.007	0.014*	0.005***
	(-0.830)	(-1.160)	(1.940)	(4.560)
FOREIGN_SALES	0.262*	0.469***	-0.166	0.150***
	(1.720)	(2.650)	(-1.100)	(6.870)
BIG4	-0.376***	-0.398***	0.145	0.331***
	(-2.820)	(-2.940)	(0.940)	(17.500)
ACCELERATED	-0.493**	-0.615***	-0.220	0.205***
	(-2.430)	(-2.900)	(-1.200)	(8.140)
FCA	0.256***	0.169*	0.101	0.043***
	(2.700)	(1.730)	(0.910)	(3.190)
GROWTH	-0.111	-0.183***	0.082	
	(-1.300)	(-3.050)	(1.090)	
MTB	-0.001	-0.000	0.007	
	(-0.180)	(-0.020)	(1.140)	
ROA				-0.335***
				(-9.640)
GCO				0.014
				(0.330)

Industry and year fixed effects	Included	Included	Included	Included
Constant	1.308***	1.675***	-0.599	10.409***
	(2.710)	(3.330)	(-0.750)	(71.470)
Observations	5189	5189	5399	5850
Pseudo/Adjusted R^2	0.064	0.068	0.073	0.874

This table shows the additional results (sub-sample) of the regressions of the use of component auditors on four dependent variables, which tests H1 and H3. Variable descriptions can be found in Appendix B. All regression models include 2-digit SIC industry and fiscal year fixed effects. T-statistics/z-scores are displayed in parentheses. *, **, and *** show the two-tailed statistical significance for 10%, 5%, and 1%, respectively. The sample for the logit model for restatements is smaller than the OLS model for audit fees. This is because for the logit model observations for which any test/control variable perfectly predicts the dependent variable are dropped when running the regression.

Table 23.

Panel A: Results OLS regressions H2 & H4 – Extent of use (quartiles of number) of component auditors and audit outcomes

Variable	**(1) ABS(ACCRU-ALS2/TA_{t-1})**	**(2) ABS(ACCRU-ALS3/TA_{t-1})**	**(3) RESTATEMENT**	**(4) LAF**
Q1N	**0.143*** **	**0.131*** **	-0.078	**10.879*** **
	(2.890)	**(2.890)**	(-0.070)	**(47.040)**
Q2N	**0.140*** **	**0.130*** **	-0.272	**11.036*** **
	(2.830)	**(2.860)**	(-0.230)	**(47.260)**
Q3N	**0.150*** **	**0.139*** **	-0.211	**11.140*** **
	(2.990)	**(3.010)**	(-0.170)	**(47.580)**
Q4N	**0.148*** **	**0.138*** **	-0.385	**11.454*** **
	(2.950)	**(2.990)**	(-0.300)	**(48.680)**
SIZE	-0.006***	-0.006***	-0.067	0.407***
	(-4.730)	(-4.900)	(-0.980)	(51.460)
FOREIGN_OP	-0.013**	-0.010**	-0.522**	0.181***
	(-2.530)	(-2.020)	(-1.980)	(6.060)
LOSS	0.003	0.004	-0.224	0.094***
	(0.880)	(1.170)	(-0.920)	(3.440)
LEV	0.018**	0.020***	-0.274	0.101**
	(2.320)	(2.760)	(-0.620)	(2.120)
EXTERNAL_FIN	0.025***	0.024***	-0.807***	-0.015
	(3.550)	(3.670)	(-2.590)	(-0.460)
CAP_INTENSITY	0.033***	0.034***	-0.505	-0.362***
	(3.520)	(3.750)	(-0.710)	(-6.200)
INV	-0.072***	-0.062***	0.430	0.227*
	(-4.660)	(-3.960)	(0.340)	(1.800)

BUS_SEG	-0.000	-0.000	-0.019	0.011***
	(-1.020)	(-0.760)	(-0.880)	(5.140)
GEO_SEG	0.000	-0.000	0.023**	0.001
	(0.070)	(-0.230)	(2.270)	(0.720)
FOREIGN_SALES	0.006	0.004	-0.575*	0.063**
	(1.240)	(0.830)	(-1.670)	(2.090)
BIG4	-0.009*	-0.008*	-0.335	0.395***
	(-1.900)	(-1.920)	(-1.140)	(13.010)
ACCELERATED	-0.014*	-0.021***	-0.185	0.194***
	(-1.840)	(-2.770)	(-0.580)	(4.750)
FCA	0.004	0.002	0.116	0.027
	(1.620)	(0.860)	(0.540)	(1.470)
GROWTH	0.016**	0.011	0.356*	
	(2.120)	(1.630)	(1.850)	
MTB	-0.000	-0.000	-0.014	
	(-1.070)	(-0.150)	(-1.370)	
ROA				-0.412***
				(-5.120)
GCO				0.002
				(0.040)
Industry and year fixed effects	Included	Included	Included	Included
Observations	2225	2225	2061	2508
Pseudo/Adjusted R^2	0.498	0.508	0.149	0.999

Table 23. (continued)

Panel B: Results OLS regressions H2 & H4 – Extent of use (quartiles of percentages) of component auditors and audit outcomes

Variable	**(1) ABS(ACCRU-ALS2/TA_{t-1})**	**(2) ABS(ACCRU-ALS3/TA_{t-1})**	**(3) RESTATEMENT**	**(4) LAF**
Q1PCT	**0.137*** **	**0.126*** **	-0.054	**10.763*** **
	(2.760)	**(2.760)**	(-0.050)	**(40.780)**
Q2PCT	**0.144*** **	**0.133*** **	0.095	**10.849*** **
	(2.880)	**(2.880)**	(0.080)	**(41.330)**
Q3PCT	**0.140*** **	**0.129*** **	-0.473	**10.901*** **
	(2.810)	**(2.830)**	(-0.410)	**(41.460)**
Q4PCT	**0.140*** **	**0.129*** **	-0.160	**11.033*** **
	(2.810)	**(2.820)**	(-0.140)	**(41.830)**
SIZE	-0.006***	-0.005***	-0.083	0.439***
	(-4.590)	(-4.640)	(-1.300)	(57.020)
FOREIGN_OP	-0.013**	-0.010**	-0.490*	0.180***
	(-2.520)	(-2.000)	(-1.800)	(5.780)

LOSS	0.003	0.004	-0.230	0.090***
	(0.860)	(1.160)	(-0.940)	(3.200)
LEV	0.019**	0.021***	-0.228	0.125**
	(2.400)	(2.840)	(-0.520)	(2.470)
EXTERNAL_FIN	0.024***	0.024***	-0.792**	-0.019
	(3.470)	(3.600)	(-2.530)	(-0.600)
CAP_INTENSITY	0.031***	0.032***	-0.448	-0.479***
	(3.370)	(3.590)	(-0.630)	(-7.990)
INV	-0.071***	-0.061***	0.196	0.297**
	(-4.650)	(-3.950)	(0.160)	(2.310)
BUS_SEG	-0.000	-0.000	-0.019	0.012***
	(-0.790)	(-0.570)	(-0.850)	(5.110)
GEO_SEG	0.000	-0.000	0.024**	0.002
	(0.110)	(-0.150)	(2.360)	(1.500)
FOREIGN_SALES	0.007	0.005	-0.591*	0.074**
	(1.510)	(1.080)	(-1.690)	(2.290)
BIG4	-0.009*	-0.008*	-0.333	0.389***
	(-1.890)	(-1.920)	(-1.150)	(12.140)
ACCELERATED	-0.015*	-0.022***	-0.190	0.192***
	(-1.950)	(-2.880)	(-0.590)	(4.570)
FCA	0.004*	0.002	0.125	0.026
	(1.690)	(0.930)	(0.580)	(1.330)
GROWTH	0.016**	0.011	0.339*	
	(2.090)	(1.610)	(1.780)	
MTB	-0.000	-0.000	-0.014	
	(-1.040)	(-0.120)	(-1.380)	
ROA				-0.479***
				(-5.610)
GCO				0.045
				(0.660)
Industry and year fixed effects	Included	Included	Included	Included
Observations	2225	2225	2061	2508
Pseudo/Adjusted R^2	0.497	0.507	0.151	0.999

This table shows the additional results (quartiles of COMPONENT_N and COMPONENT_PCT) of the regressions of the extent of the use of component auditors on four dependent variables, which tests H2 and H4. Variable descriptions can be found in Appendix B. All regression models include 2-digit SIC industry and fiscal year fixed effects. T-statistics/z-scores are displayed in parentheses. *, **, and *** show the two-tailed statistical significance for 10%, 5%, and 1%, respectively. The sample for the logit model for restatements is smaller than the OLS model for audit fees. This is because for the logit model observations for which any test/control variable perfectly predicts the dependent variable are dropped when running the regression.