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Are Big 4 audit firms more accurate than non-Big 4 audit firms in 2010s?

I would like to thank Dr. Yu and Jeroen Suijs for their comments and guidance and my family for supporting me throughout all these years.

Abstract: Reviewing prior studies that focused on audit quality, I was intrigued to examine what affects audit accuracy. My study focuses on measuring the Type I and Type II errors[1] to examine whether the going concern modified opinions issued by the Big 4 (Deloitte, Ernst & Young, KPMG, PwC) audit firms were more accurate than the rest audit firms and consequently what contributed to the audit accuracy during the 2010s. My results are consistent with prior literature, as they indicate less committed Type I errors, by Big 4, but are keener on making Type II errors.

Keywords: audit accuracy; GCO; bankruptcy; audit reporting; type I error; type II error.

[1] Type I errors are the false positive, in this case issuing a GCO to an entity, which subsequently does not go bankrupt. Type II errors are the false negative, in this case not issuing a GCO to an entity, which subsequently failed.

1. Introduction

Prior research suggests that auditors in large audit firms such as Big 4 (Ernst & Young, PwC, Deloitte, and KPMG) are more committed to independence than those in smaller firms, which often means higher quality and accuracy in their reporting. Additionally, the auditors in large audit firms are more exposed to high risk if the audit is not performed as expected (De Angelo et al., 1981; Chan et al, 2011). Studies that focused on going-concern reporting accuracy and audit firm size like Berglund et al. (2018) conclude that Big N[2] audit firms are less prone to making Type I errors than mid-tier and smaller firms, finding no clues about Type II errors probability. However, an older study done by Geiger et al. (2006), find evidence that the Big N audit firms are less keen on making both Type I and Type II errors. I can only assume that the difference in those papers' findings is related to the time sample they selected, one being 2000 to 2013 and the other from 1990 to 2000, respectively. Thus, one would logically conclude that the relation between audit firm size and audit accuracy is also positive.

In my research, I examine whether the Big 4 audit firms are more accurate in their reporting compared to non-Big 4 audit firms, during the 2010s. A secondary finding of this study is the emerged correlations of audit accuracy.

A modified going concern opinion(from now on referred to as GCO) can be defined when the auditor, after finalizing their report and communicating with the management about their strategies, believes (under their professional judgment) that there is substantial doubt that the entity will continue its operations, then, under SAS No.59, she should issue a GCO along with their report. In the case that the auditor did not collect all available relevant information to conclude her opinion, then it is likely for Type I and Type II errors to occur (Marshall et al. 2006). By observing the clients' state, a year after the GCO was issued, we can conclude whether the auditor was accurate or whether there was a case of Type I error. To examine for Type II errors, I look up to a year prior to the clients' bankruptcy and see whether there was a GCO issuance and if not then the auditor committed a Type II error. Therefore, the appearance of either Type I or Type II errors may indicate low audit accuracy. This could have a lot of effects on a Big 4 audit firm, as Carcello and Neal (2003) report that clients are displeased when receiving a GCO and tend to change their auditor, hurting both audit firm's revenues and reputation. Also, in the opposite case of not issuing a GCO when required, the audit firm will

[2] Prior studies refer to the audit firms are Big N since their number changes through the years. In my research, I am calling them Big 4 audit firms, and when I refer to prior literature I am calling the Big N audit firms.

probably face lawsuits that will cost a heavy price. As I am going to discuss later that problem gets bigger along with the size of the firm.

To empirically test my hypothesis, I examine the Big 4 audit firms for the period 2010 to 2020. I choose a rather recent time sample since other literature that also examined audit accuracy had chosen a sample till 2000 (Geiger and Rama, 2006), and till 2013 (Berglund et al., 2018). The largest full sample consists of 13,384 Big 4 client-years and 10,987 non-Big 4 client-years. I obtained information, such as financial items, in order to construct ratios about those clients from Compustat. As for their state one year after the issuance of a GCO, GCOs and Bankruptcy notifications and fees for audit and non-audit services, the data was collected from Corporate + Legal, Audit Fees and Audit Opinions, contained in Audit Analytics database.

Regarding the measurement of Big 4 audit firms' audit accuracy, I calculate the Type I and Type II errors of Big 4 and non-Big 4 audit firms that are included in the sample. To do so, I assess the audit firms on whether a client that was issued with a GCO is still active up to one year after, calculating for Type I error. Likewise, I will trace the clients up to one year prior to a bankruptcy filing, to examine whether they were issued a GCO, calculate the Type II errors. Finally, I examine the correlation that the independent variables have on audit accuracy, to see which one has the most effect. Consistent with Berglund et al. (2018) and related literature I find that Big 4 audit firms are less likely to commit a Type I error. Surprisingly, my results show a positive relationship between Big 4 and Type II errors, contradicting my initial expectations and the results of Geiger et al. (2006). As for the correlation results, after adding all the control variables and fixed effects I find that the BIG4 variable that indicates whether the auditor is a Big 4 audit firm, has a statistically significant effect on committing fewer Type I errors and more regarding the Type II error. Unexpectedly, most of the control variables were not statistically significant for Type II errors.

My research contributes to auditing literature by examining Big4 audit firms' reporting accuracy, compared to non-Big 4 audit firms in the 2010s, as well as provides evidence on factors of auditing accuracy. While other studies examined audit accuracy, they did not include the combined effect of particular independent variables, as audit and non-audit fees, along with locality as well as that all prior studies did not examine a recent timeline like the one in this study. Regarding the time sample, the economic crisis that took place in 2009, which disturbed the clients' financial health, resulting in destabilizing entities and possibly creating confusion

for the audit firms, is also a parameter that could provide new insights on how accurate the auditors are after a global recession.

This study in my opinion is quite significant as audit accuracy is equally important to audit quality. It is essential for the market, that audit firms report accurately, so as to provide a clear view of the entities to the stakeholders. In due course, analysts can provide more accurate forecasts, and inform the investors, who support financially the market and thus sustain a healthy economic cycle. From the audit firms' perspective, it is vital to preserve their reputation and avoid additional litigation costs (Lennox, 1999). Additionally, the accuracy of the audit assists the regulators to have a clearer view regarding the entities, minimizing their time for investigation and providing useful information. Conclusively, an accurate audit opinion is required at some significant level, as it strengthens the trust between entities and stakeholders, creating a transparent economic environment.

Ex-ante, I believe that my results will be consistent at some level with prior studies regarding both the lower propensity of Type I and Type II errors for Big 4 audit firms, and the correlation between factors and audit accuracy. Due to the more recent time sample of Berglund et al. (2018) and the inclusion of the economic crisis of 2009, my results are going to be quite similar to theirs, meaning that Type I errors from Big 4 audit firms are lower, that those from non-Big 4 audit firms. In that regard, the same will apply to the Type II errors propensity found in Geiger et al. (2006). The samples have the same restrictions, and the models are quite similar, though the difference in the time period might have an effect on how the audits are performed, due to the Sarbanes Oxley Act of 2002 [3] and the SAS No.59[4] enforcement. For the correlation results, I expect them to be also similar to those of prior literature. More specifically Zscore, Market to Book value of Equity, as well as Big 4 coefficients are expected to be statistically significant and high correlated to both Type I and Type II errors.

My study has also certain limitations. To begin with, because I only had complete access to one data source, many observations had to be removed because plenty of values were missing, which frequently constrained me to exclude control variables. Additionally, I do not completely account for other variables that might have an impact on my results during that time

[3] The SOX Act of 2002 is a law enforced by the U.S Congress to prevent corporations from endangering investors. It was implemented due to highly publicized corporations scandals and applied strict laws for auditors accountants and corporate officers, as well as heavier penalties.

[4] According to SAS No. 59, auditors should revise their audit report to reflect any substantial doubt they have regarding a client's ability to continue as a going concern.

in the United States. Finally, I use the assumption that bankruptcy only refers to types 7 and 11, hence many actual bankruptcies were left out of the sample.

2. Literature and Hypothesis Development

2.1 Literature Development

2.1.1 Audit Opinion Accuracy and Quality

A quality audit, as DeFond and Zhang (2014) and Pinello et al. (2019) defined it, is when the auditor can be reasonably sure that the financial statements are free of material misstatements or when recognizing flaws in the firm's internal control. It can be measured with the use of proxies like GCO issuances that DeFond et al. (2002) used, or restatements as Kinney et al. (2004) inserted in his model, or lastly and more common by accrual-based earnings quality that has been used in their research by Becker et al. (1998), Chung and Kallapur(2003), Myers et al. (2003) and Srinidhi and Gul (2007).

An accurate audit, on the other hand, is defined when the auditor has the ability to accurately recognize financial distress and report a modified going concern opinion. It can be measured only by the Type I and Type II errors as Marhsall et al. (2006) and Lennox(1999) have pointed out in their research about audit accuracy.

Audit quality throughout the years has been defined by researchers, relatively to the dimensions of audit quality examined. Lee et al. (1999) express audit quality as the propensity of the auditor not to issue an unmodified opinion for financial statements that are material. Therefore the difference between audit quality and audit accuracy can also be expressed as the difference between the frequency of a GCO and the accuracy of a GCO. The frequency of a GCO is connected with the auditor's independence to provide a quality audit. Thus, more GCO issuances do not mean that the auditors are accurate, but it could be interpreted as that the audit firm's objectivity is not impaired by the amount of fees paid (DeFond et al., 2002).

2.1.2 Audit firm size

Lennox(1999) supports that the accuracy of the signals is directly related to the size of the audit firm, as the firms' fear of their reputation being ruined, "forces" them to report more accurately. Therefore, that research provides evidence that indicates a correlation between audit firm size and audit accuracy. Lennox and Pittman (2010) in their research about fraud and audit quality of the Big N firms, found that even though there were a lot of fraudulent actions in the years 1981-2001, the number of entities that were associated with fraud and were audited by a

Big N audit firm were significantly less than those audited by non-Big N firms, providing evidence, that Big N firms provide higher quality and more accurate audits. As shown in Table 1, Ernst & Young has the biggest portion of the market individually, and theory suggests that the quality and the accuracy of the audit should also be the highest, according to prior literature (Lennox,1999; DeAngelo, 1981; Dye, 1993).

I believe that the differences between the Big 4 audit firms considering audit accuracy are to be insignificant and thus is not examined. However, if you compare their reporting errors to a non-Big 4 audit firm during the same period, there should be a significant difference.

In a Big N firm, there is an intense motivation for quality and accuracy as stakes and expectations are extremely high. Consequently, in the case there is a GCO that was issued to a client and did not subsequently announce bankruptcy after a short period of time, then the possible cost for the audit firm is client loss. Now, in the case, that a client announced bankruptcy and a GCO was not issued by the audit firm, then the potential auditor's costs are litigation costs and loss of prestige regarding the quality of the firm. Thus, it is much more essential for a Big N firm to be accurate to keep their reputation intact (Dye, 1993). According to the deep pockets hypothesis[5] the bigger the firm the more likely it is to have litigation issues when a Type I error occurs, as they have more wealth to lose and thus keener to deep pocket court actions (Lennox, 1999).

Auditor's size is usually positively related to the probability of issuing a GCO according to auditing theory, though that does not guarantee that all the issuances will be correct. Berglund et al. (2018) find that due to increased economic independence, auditors from a Big N firm are more likely to issue a GCO than a mid-tier firm. Considering that Big N firms issue more GCO than the rest as they are bigger firms, then the propensity of litigation cost also rises. Meaning that for the Big N firms the need for audit accuracy is also augmented, as it is more likely to face a legal issue concerning the auditors' modified opinion. According to Numan and Willekens (2012), that relationship is negative as their research on how the level of competitiveness between Big N firms affect the GCO issuances, finds that when competitiveness among the Big N firms increases, there is a lower probability of GCO issuance.

[5] It refers to the idea that the risk of an activity should be borne by a person who is in a relatively good position to handle it.

2.1.3 ***Audit and Non-Audit Fees***

It is also important to review prior literature regarding the effect audit and non-audit fees have on audit quality and of course accuracy. Simunic (1980) examined whether the Big 8 had control of the accounting market and how that affected the audit fees charged. His results indicated that audit fees might have a negative relationship to audit firm size as he found that Big N firms charged lower fees for accounting services than smaller firms. However, there was an exception for one of the Big N firms that charged higher than the rest which was explained by the higher quality of the audit. Choi et al. (2010) find that abnormally high audit fees are negatively associated with the audit firm's audit quality. The reason behind this is that the auditors are becoming less independent as the fees increase, lowering the quality of reporting to protect her payment. Regarding the audit fees, there is a correlation with audit accuracy often positive, and I believe that in the current study the same positive correlation is going to be shown.

The relationship between non-audit fees and reporting accuracy was examined by Geiger et al. (2022), whose results implied that non-audit fees are negatively correlated with the issuance of a going concern modified opinion, but that may be explained by the increase in audit accuracy reducing the Type I error committed by the audit firms of issuing GCO without adequate evidence. On the contrary, DeFond et al. (2002), who tested whether the non-audit fees impair auditors' independence, by measuring the probability of issuing a GCO, found no evidence to support the regulators' concerns, about auditors' independence deterioration. Conclusively, prior literature can be considered contradicted, as their results are often either opposite or uncorrelated. Considering the previous, I cannot be sure what the effect will be of audit and non-audit fees on my study.

2.1.4 ***Auditor Locality***

Little research, to my knowledge, has been done considering the relationship between geographical position and audit quality. Choi et al. (2007) examined whether the location of the auditor in relation with her client, affects the quality of the audit reporting. They found evidence that the auditors that are in the same U.S state with their client, often provide better and more accurate audits, due to the information asymmetry mitigation. I expect that locality in this research is going to have a positive effect in the audit accuracy.

2.2 Hypothesis Development

After the end of the fiscal year, the financial statements are ready to be examined by the auditor. At the end of the audit process, the auditor needs to issue an opinion. If the opinion is unmodified, then the financial statements depict the true state of the entity and are free of material misstatements. On the contrary, if the opinion is modified then it means that the financial statements are either material, pervasive, or both, or the auditor could not find enough evidence to conclude. A GCO falls under the category of modified opinion and the auditor issues it when he believes that the client is going bankrupt in the near future. There are two types of error that can occur during the issuance as mentioned before Type I and Type II error. The auditor reports more conservatively due to the probable costs of those two errors. However, these two errors do not mean necessarily that the auditor did not incorporate fully the evidence available, but sometimes it is seen likewise by the media and the stakeholders (Berglund et al., 2018).

The decision of a GCO issuance or not depends on the auditor's assessed likelihood of a client going bankrupt (p) and the auditor's indifferent probability of a client going bankrupt. The indifference likelihood of the client's bankruptcy threshold (p^*) at which the auditor will issue a GCO can be stated as a function of the ratio of the cost of making a Type I error (C_I) to the cost of making a Type II error (C_{II}). The following equation shows the relationship that Type I error and Type II error to the indifference probability of a GCO issuance by an auditor.(Raghunandan and Rama 1995; Geiger et al. 2005; Geiger and Rama 2006; Blay, Moon, and Paterson 2016; Berglund et al. 2018)

$$p^* = 1/ [1+(C_{II}/C_I)] \qquad (1)$$

The equation indicates that when the ratio of costs of Type I and Type II errors increases either because C_{II} increases or C_I decreases then the auditor is more prone to issuing a GCO. The cost of Type I error decreases with the increase of the size of the firm because a single client's payment is relatively insignificant to a large audit firm like Big N. The cost of Type II errors increases along with the size of the firm, thus Big N firms that have a lot at stake will have to minimize them, to avoid reputation risk and litigation costs. Summing up, the larger the auditor the more conservatively they report, and thus they are keener on issuing a GCO as

the cost of failing to issue is more significant than the false issuing of a GCO (Berglund et al. 2018).

Hypothesis 1*: The Big 4 firms' propensity for Type I is lower than that of the non-Big 4.*

Hypothesis 2*: The Big 4 firms' propensity for Type II is lower than that of the non-Big 4.*

As mentioned before, the results considering the relationship between audit firm size and audit accuracy, are mixed as on the one side, Lennox(1999) finds no evidence that size is associated with making fewer Type II error, or studies that find no relationship at all between those two (Callaghan, Parkash, and Singhal (2009) and Feldmann and Read (2010)). On the other side, researchers provide results supporting that the Big N firms are less prone to making both false negative and false positive audit reporting opinions, like Geiger and Rama (2006). In my study I expect that Big 4 audit firms will be highly accurate in their audit reporting, considering both qualitative and quantifiable factors, committing both less Type I and Type II errors.

3. Sample Selection and Research Design

3.1 Sample selection

The sample period I chose starts from January the 1st 2010 and ends on December the 31st 2020. The first sample contains financial items and ratios from U.S public entities that are Big 4 clients, which I obtained from Compustat. The second sample includes the rest non-Big 4 audit firms' clients whose information, I also obtained from Compustat. I excluded clients from financial services and utility industries[6], that had SIC Codes from 6000 to 6999 and from 4900 to 4949, respectively. Additionally, I excluded client-years that omitted certain values that were required to construct independent and control variables. Audit reports that were performed by offices outside the U.S were also excluded. Data about auditors' opinions, audit and non-audit fees, and Bankruptcy fillings was obtained from Audit Analytics and more specifically from Audit Opinions, and Corporate & Legal sections. I assume only type 7 and type 11[7] as a bankruptcy. After all the data clearing, my largest sample size is 13,384 client-years observations for the Big 4 clients, while for the non-Big 4 clients concluded to 10,987 client-years observations. The combined sample that is used for testing my hypothesis comes

[6] Financial services industry includes banks, investment houses, lenders, finance companies, real estate brokers, and insurance companies. The utility industry includes fuel extraction, manufacturing, refining, and distribution.

[7] Large corporations frequently employ type 11 (Chapter 11) bankruptcy, a plan of corporate restructuring, to keep operating while making payments to creditors. However, type 7 (Chapter 7) bankruptcy does compel you to liquidate or sell nonexempt assets in order to repay creditors.

up to 24,371 client-years observations. In Table 1 Panel A shows the deductions from the beginning sample of 41,358 observations with omitting necessary data for the construction of variables, and of 12,955 observations that included financial services and utility industries, concluding with the full sample. Panel B presents the sample that contains all the observations with Type I errors, to use for Hypothesis 1 testing. Respectively, Panel C shows the sample that includes all the observations with Type II errors, to use for Hypothesis 2 testing.

[Insert Table 1 here]

For the choice of that sample as well as for the control variables I was inspired by multiple similar studies (Berglund et al. 2018; Choi et al. (2017); Geiger and Rama (2006)). The time sample though was chosen to avoid the economic crisis as an event in 2009, but simultaneously capture the development of the latter decade. Nonetheless, because my sample consists of Big 4 clients, the bankruptcy ratio would be quite low in a normal period, as usually the size of the entities is bigger than average and their financial state healthier. The aftermath of the crisis drove a lot of entities to destabilize, which could provide more evidence to examine Type I and Type II errors.

3.2 Sample Distribution

Table 2 shows the distribution of the market for the audit firms during the period examined. The numbers are calculated by the data matched from Compustat and Audit Analytics. As shown the biggest portion of the market individually is held by EY with 4414 cleints and 18.11% of the total. I discussed ex ante that with regard to prior literature the largest audit firm should also be the most accurate. But, EY has committed 85 Type I errors and 8 Type II errors, which conclusively are more than any other Big 4 audit firm, and many of the rest non-Big 4. All in all, the Big 4 audit firms possess a little less than 55% of the audit market, and has committed only the 7.2% of all the Type I errors, while only the 25% of Type II errors was not committed by a Big 4 audit firm.

[Insert Table 2]

Table 3 shows the Fama & French one-digit industry[8] distribution of the errors committed. Clearly, the one-digit industries 2 and 3 are the ones that the auditors have done the most errors, 1171 and 894, respectively. The first one is defined as durable consumers

[8] Fama and French (1997) create a classification scheme that connects 48 industries to the existing 4-digit SIC categories. Their goal is not to create a brand-new classification scheme. They only show interest in a limited set of industries.

(Cars, TVs, Furniture, etc.) and the second one is defined as manufacturing. On the other hand, the industries 6, 10, 11, 12 are the only ones that the auditors do not commit neither a Type I, nor a Type II error.

[Insert Table 3]

Table 4 shows the yearly distribution of the auditors' errors. Unexpectedly in 2010, one year following the economic crisis there is no error made. This is quite contradictory of what I expected ex-ante. Interestingly, year after year there is a steady increase of false reports, reaching its peak in the year 2020 with 401 errors. Overall, the errors are evenly distributed throughout the period, with no extreme values, except of 2010.

[Insert Table 4]

3.3 Research Design

As previously mentioned, I want to examine the audit accuracy of the Big 4 audit firms during the period 2010- 2020. To capture that I am going to use two probit models following Berglund et al. (2018) that were inspired by Geiger and Rama (2006), measuring the false positive and false negative reporting errors committed by the auditors:

$$Pr\,(BANKRUPT_{it+1}=1|GCO_{it}=1)=\alpha_0 + \alpha_1\, BIG4_{it}\, ZSCORE_{it} + \alpha_3 LOGSALE_{it} + \alpha_4 DEFAULT_{it} + \alpha_5 NYSE_{it} + Industry\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon_{it} \quad (2)$$

$$Pr\,(GCO_{it}=1\,|BANKRUPT_{it+1}=1)=\theta_0 + \theta_1 BIG4_{it} + \theta_2\, ZSCORE_{it} + \theta_3 LOGSALE_{it} + \theta_4 DEFAULT_{it} + \theta_5 NYSE_{it} + Industry\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon_{it} \quad (3)$$

Model (2) tests whether Big 4 firms are less prone to making less Type I errors than the mid-tier firms(Geiger and Rama,2006). The estimation is done using a sample of clients that received a GCO in year *t*. The subscripts *i* and *t* stand for the client and for the year, respectively. The indicator variable BANKRUPT equals 1 if the client filed bankruptcy within the following 1 year following the GCO, and 0 otherwise. Model (3) tests whether Big 4 firms is less keen on making Type II errors than the rest of the mid-tier firms. The estimation is done using a sample of clients that subsequently filed for bankruptcy. The indicator variable GCO equals 1 if the client has received a going concern audit opinion and 0 otherwise. BIG4 is an

indicator variable that equals 1 if the auditor is one of the Big 4 firms and 0 otherwise. Regarding the ZSCORE variable, it is a bankruptcy score that if it is close to 0 suggests a company might be headed for bankruptcy, while a score closer to 3 suggests a company is in solid financial positioning. The dependent variable NYSE equals 1 if the client is listed in New York Stock Exchange, and 0 otherwise. LOGSALE is the natural logarithm of the client's sales on year t.

Following Berglund et al. (2018) I am going to use two similar probit models to measure audit accuracy:

$$Pr(BANKRUPT_{it+1}=1|GCO_{it}=1)=\alpha_0 + a_1 BIG4 + \alpha_2\, ZSCORE_{it} + a_3 AUF_{it} + a_4 NAUF_i + a_5 NYSE_{it} + a_6 LOC + Industry\ Fixed\ Effects + Year\ Fixed\ Effects + Control\ Variables + \varepsilon_{it} \quad (4)$$

$$Pr(GCO_{it}=1\ |BANKRUPT_{it+1}=1)= \beta_0 + \beta_1 BIG4 + \beta_2 ZSCORE_{it} + \beta_3\, AUF_{it} + \beta_4 NAUF_{it} + \beta_5 NYSE_{it} + \beta_6 LOC + Industry\ Fixed\ Effects + Year\ Fixed\ Effects + Control\ Variables + \varepsilon_{it} \quad (5)$$

In models (4) and (5), LOC is an indicator variable that equals 1 when the state of the client is the same as his auditor's, and 0 otherwise. The independent variable AUF captures the audit service fees, while the NAUF independent variable captures the non-audit service fees. The rest of the variables are as previously defined. For the control variables see Appendix A. As mentioned before, model (4) is being used to estimate the Type I reporting errors committed by the auditors, while model (5) is being used to estimate the Type II reporting errors.

4. Empirical Results

4.1.1 Descriptive Statistics

Table 5 provides descriptive statistics for the dependent variables used for our audit accuracy analysis and correlation matrix. Panel A shows the full sample. From all the entities only 0.2% had bankruptcy filed, while the percentage of GCO is a little over 17.1%. The difference between those two is significant and implies that there are Type I and Type II errors, which is confirmed by the means of B=0|GCO=1, and B=1|GCO=0 of 0.139 and 0.002,

respectively. Considering the ZSCORE variable the average score is 1.114 significantly lower than that in Berglund et al. (2018), indicating that a plethora of clients is close to possible bankruptcy in this period. Furthermore, a little less than 30% percent of the clients is listed in Ney York Stock Exchange (NYSE), while an astonishing 68.1% of clients are in the same state as their auditor. The mean value of BIG4 indicates that more than half of the clients are audited by Big 4 audit firms, which is relatively obvious from the sample selection. Regarding control variables, the mean value of MB is relatively smaller than that of prior literature (Berglund et al., 2018), while the mean value of CASH is quite similar to that of Berglund et al. (2018). CFOSA is the only variable that has a negative mean value.

Panel B shows the Hypothesis 1 sample, for Type I errors, including only clients that received a GCO. As shown only the 0.8% of that sample filed for bankruptcy. The mean of Type I error variable B=0|GCO=1 is 0.686 which means when there is a GCO issuance, 68.6% of them are falsely issued, which is quite high. The mean of Type II error variable B=1|GCO=0 is 0.005, which in this sample is logical since it consists of only GCO=1. The fact that it is not 0, is explained by the time difference of one year between those two variables. The mean of ZSCORE is significantly lower than that of the full sample, being -9.785, meaning that the GCO issuances considering only that score are quite accurate. Another noteworthy reduction is the mean of NYSE, being 0.006, suggesting that the clients listed in the New York Stock Exchange, which were issued a GCO are only 0.6% of the sample, confirming that disclosure of information, and strict restrictions imposed, results to more accurate auditing. Finally, BIG 4 has a mean of 0.084, meaning that only 8.4% of the audit firms that issued a GCO is a Big 4. This is consistent with the fact that Big 4 clients are larger and in a healthier financial state, than those of smaller audit firms, resulting to a lower GCO issuance ratio.

Panel C shows the Hypothesis 2 sample, for Type II errors, including only clients that filed for bankruptcy. As the panel presents the mean of the clients that received a GCO is 0.623, which means that over 60% of the sample received a GCO prior to their filing. That is a rather low percentage, considering the progress the auditing has done to detect and report accurately. The ZSCORE mean(-4.270) is higher than that in Panel B(-9.785), which is surprising considering that this sample consists only of clients that failed. Although it still is lower and closer to 0 than 3, which is an indication that a client will subsequently fail. Finally, the mean of BIG4 is 0.623, which contradicts with what was previous said about the Big 4 clients, because over 60% of them went bankrupt.

[Insert Table 5 here]

4.1.2 Correlation

The correlations between Type I and Type II, and the variables are also something that I examine in Table 6, as it has significant importance to observe what affects the audit accuracy. Therefore, I focus only on the correlations in columns (3) and (4). Our main independent variable BIG4 is statistically significant at $p<0.01$ and negatively correlated with Type I errors, meaning that a Big 4 audit firm is less likely to commit a Type I error, which is consistent to prior literature that examined the GCO issuances and audit firm size positive relationship (Berglund et al., 2018) and literature that studied the audit accuracy(Lennox, 1999). However, BIG4 is statistically significant at $p<0.1$ and positively correlated to Type II errors, meaning that a Big 4 audit firm is more prone to making a Type II error. That result is not accordant with my expectations and disagrees with the positive relationship between audit accuracy and audit firm size, meaning that Big 4 audit firms often report more conservatively (Geiger et.al (2006). Dye (1993), suggests that it is more likely to have litigation costs when audit firms issue inadequately conservative reports, committing Type I errors, rather than being too conservative and committing Type II errors. Thus, it is less costly for the auditor to commit Type II errors than Type I, which agrees with the results of this study. On the other hand, it follows the results of Berglund et al. (2018) ,which shows GCO issuances are positively related to audit firm size.

Noteworthy is also the correlation of ZSCORE that is statistically significant at $p<0.01$ and $p<0.05$ and negatively associated with Type I and Type II errors, respectively, meaning that the higher the Zscore, the lesser the probability of either Type I or a Type II error to occur. I assume that an entity that has a high Zscore is less probable of being issued a GCO, or subsequently fail, as its financial state is more stable. Coefficient LOC is found to be both statistically significant at $p<0.01$ and negatively correlated with Type I errors, and statistically significant at $p<0.1$ and positively correlated with Type II errors. This means that the auditors who are in the same state as their clients, are less prone on committing Type I errors, confirming prior literature results (Choi et al., 2012), but are keener on committing Type II errors, completing prior findings, that auditors are reporting more conservatively. A coefficient of my interest is NYSE, which is found statistically significant at $p<0.01$ and negatively associated with Type I errors, and insignificant to Type II errors. Thus, clients that are listed in the New York Stock Exchange is less keen on being issued a false GCO, which could be explained by

the strict rules of disclosure, mitigating earnings management and information asymmetry, that are imposed to those clients. Finally, the variable that I did not expect to have a strong correlation to my dependent variables is CASH. Nonetheless, CASH is statistically significant at $p<0.01$ and positively correlated to Type I error and negatively associated with Type II error, meaning, that entities that have either high reserves in cash and short-term investments or a small amount of total assets, are more propense on being issued a GCO, which I cannot fully understand or explain.

[Insert Table 6 here]

4.2 Multivariate regression analyses of audit accuracy

Table 7 reports the regression results of audit accuracy analyses. As proxies for audit accuracy, I have set TYPE I (B=0|GCO=1), for testing Hypothesis 1 and TYPE II (B=1|GCO=0), for testing Hypothesis 2 in columns (1), (2), (3), and (4), (5), (6) respectively. In columns (1) and (4) I deploy only BIG4 as an independent variable, while on (2) and (5) I deploy the rest of independent and control variables. Finally in columns (3) and (6) I add Industry and Year fixed effects.

In column (1), the coefficient BIG4 is negative and statistically significant at $p<0.01$, suggesting that the propensity of issuing a GCO, while the client does not subsequently fail is smaller when the auditor is one of the BIG4. However, in column (4), the coefficient BIG4 is positive and statistically significant at $p<0.01$, implying that the probability of not issuing a GCO to a client that will subsequently fail is greater, when the auditor is one of the Big 4. In columns (2) and (3) BIG4 remains negative and statistically significant at $p<0.01$, providing evidence that Big 4 audit firms are less keen on committing Type I errors than non-Big 4 audit firms, even after adding the control variables and the fixed effects. In columns (5) and (6) BIG4 remains positive, but not statistically significant, providing no significant results to conclude whether Big 4 audit firms are indeed keener on committing Type II errors or not, than non- Big 4 audit firms.

Considering, the rest of the variables the coefficient ZSCORE is negatively associated with TYPE I, and statistically significant at $p<0.01$, suggesting that the entities that have higher Zscore are less likely to be issued a false GCO. This comes from the definition of Zscore that the closer the score is to 3 the better and more stable the entity's health is. Additionally, the coefficient CFOSA is statistically significant at $p<0.01$ and positively correlated with TYPE I,

meaning that clients with high operating cash flows are more probable to be issued a false positive report. The explanation could be that entities with higher operating cash flows than its industry are more suspicious of managing earnings, and thus more likely to be issued a GCO. CASH is also statistically significant at $p<0.01$(only in column (3)) and negatively associated with TYPE I, meaning that clients without liquidation problems and high reserves, are less likely to be issued a false positive report. Those two coefficients show that liquidity plays an important role in the state of the entity, and thus the accuracy of reporting. Finally, the coefficient LogAT as a surprise is statistically significant at $p<0.01$ and negatively associated with TYPE I, providing evidence that clients with more total assets are less likely to be issued with a false positive report.

[Insert Table 7 here]

5. Conclusion

This study investigates whether the Big 4 audit firms are more accurate than the rest non-Big 4 audit firms, by measuring the Type I and Type II reporting errors, during the 2010s. My results indicate that the Big 4 are less keen on making Type I errors than the rest of the audit firms but are more prone on making Type II errors. However, the evidence for Type II errors are not significant, and I believe further research is needed. I also find what affects audit accuracy during the same period, providing evidence for certain factors. My results are consistent with prior literature that find that Big 4 are more accurate, considering Type I errors, in their reporting than mid-tier or smaller audit firms. (Lennox (1999); Lennox and Pittman (2010), Berglund et al. (2018)). This study provides evidence about audit accuracy in a period after a global economic crisis, and for a more recent period than prior literature, combining control variables that were examined independently in prior research. Furthermore, I tried to find the main factors of audit accuracy, which in my opinion should be of high consideration of both entities and audit firms.

My research though is subject to caveats. First, since I only had full access to only one data source, a lot of observations were excluded due to omitting values, which many times "forced" me to exclude control variables. Second, I do not fully control for external factors that may affect my results during that period in the U.S. Third, an assumption that I make when I define Bankruptcy only as a type 7 and type 11, so many bankruptcies that did happen were not included in the sample.

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Appendix A: Variable Definitions

Variable:	**Definition:**
AUF	The fees paid for audit services (in US $ millions) (Data Source: Audit Analytics).
BANKRUPT	1 if the client files a type 7 or type 11 bankruptcy within 1 year of the fiscal year-end, 0 otherwise (Data Source: Corporate + Legal, Audit Analytics).
BIG4	1 if the auditor is one of the Big 4 audit firms, and 0 otherwise(Data Source: Compustat)
GCO	1 if the client receives a going concern opinion, 0 otherwise (Data Source: Audit Analytics).
LOC	1 if the auditor is located in the same state with the client being audited, and 0 otherwise.(Data source: Compustat, Audit Analytics)
LogSALE	The natural log of the client's sales.(Data source: Compustat)
NAUF	The fees paid for non-audit services (in US $ millions) (Data Source: Audit Analytics).
NYSE	1 if the client is listed on the New York Stock Exchange, 0 otherwise (Data source: Compustat)
ZSCORE	Z-score was published by Altman in 1968 and it determines whether a company is headed for bankruptcy. The closer the Z-score is to 0 the more possible is that a company might be headed for bankruptcy, while a score closer to 3 suggests a company is in solid financial positioning. (Own calculation)
Control Variables under X*:*	
LogAT	Natural log of total assets (in US $ millions) (Data source: Compustat)
MB	Market value of equity divided by book value of equity (Data source: Compustat)
CFOSA	Operating cash flows scaled by total asset (Data source: Compustat)
CASH	Cash and short-term investments scaled by total assets (Data source: Compustat)

Table 1: Sample Selection

Panel A: Big 4 Firm Clients	
Big 4 and non-Big 4 clients on Compustat with auditor data on Audit Analytics for 2010-2020	78,673
Less:	
(-) Omitting necessary data	(41,358)
(-) Excluding Financial services and Utility Industries	(12,955)
Fin Sample	**24,360**
Panel B: Sample for Hypothesis 1	
Full Sample	24,360
Less:	
(-) Observations that do not have Type I errors	(20,961)
Hypothesis 1 Sample	**3399**
Panel C: Sample for Hypothesis 2	
Full Sample	**24,360**
Less:	
(-) Observations that do not have Type II errors	(24,320)
Hypothesis 2 Sample	**40**

Panel A shows the number of observations, that were obtained from Compustat and matched with the ones from Audit Analytics. The figures in the parentheses are the observations excluded from the sample. The first stage is exclusions of observations that did not have the required values to construct the variables. The second and last stage is excluding clients from financial services and utility industries, filtered by the SIC Code (6000-6999) and (4000-4949), respectively, concluding to my final sample.
Panel B shows the number of full sample from Panel A and the exclusions to obtain the sample containing only Type I errors to test Hypothesis 1. The figures in the parentheses are the observations excluded from the sample. Panel C shows the number of full sample from Panel A and the exclusions to obtain the sample containing only Type II errors to test Hypothesis 2. The figures in the parentheses are the observations excluded from the sample.

Table 2: Auditors Distribution

AUDITORS	FREQ	(%)	Type_I	Type_II	avgAUF	avgNAUF
ARTHUR ANDERSEN	1	0	0	0	0.131	0.006
BKD	14	0.06	0	0	0.349	0.013
MOORE STEPHENS	25	0.1	8	0	0.111	0.016
PKF INTERNATIONAL	59	0.24	3	0	0.144	0.03
CROWE HORWATH	85	0.35	7	0	0.366	0.053
PLANTE&MORAN	86	0.35	9	0	0.257	0.046
CHERRY BEKAERT	107	0.44	36	0	0.226	0.04
COHNREZNICK	152	0.62	29	1	0.265	0.04
EISNERAMPER	225	0.92	37	0	0.321	0.027
MOSS ADAMS	261	1.07	30	0	0.488	0.061
RSM	532	2.18	45	0	0.483	0.064
GRANT THORNTON	1136	4.66	48	2	0.904	0.079
BDO INTERNATIONAL	1203	4.94	171	3	0.674	0.068
KPMG	2620	10.75	46	5	2.534	0.451
DELOITTE	2952	12.11	58	10	2.694	0.595
PWC	3398	13.94	56	7	3.416	0.759
EY	4414	18.11	85	8	2.739	0.613
OTHER	7101	29.14	2731	4	0.148	0.022

This table shows the auditors distribution of the sample. The first column, shows the name of the auditors. The second column shows the frequency which the auditor is found in the sample in an absolute number. The third column, shows the frequency percentage that the auditor is found in the sample. The fourth and fifth column show the absolute number of Type I and Type II errors, respectively committed by the auditors. The sixth and seventh columns, show the average fees paid for audit and non-audit services, respectively.

Table 3: Industry Distribution

AUDITORS	ERROR TYPE	1	2	3	4	5	6	7	8	9	10	11	12
BDO INTERNATIONAL	Type I	16	81	49	0	1	0	11	13	0	0	0	0
BDO INTERNATIONAL	Type II	1	0	1	0	1	0	0	0	0	0	0	0
BKD	Type I	0	0	0	0	0	0	0	0	0	0	0	0
BKD	Type II	0	0	0	0	0	0	0	0	0	0	0	0
CHERRY BEKAERT	Type I	0	11	5	0	0	0	18	0	2	0	0	0
CHERRY BEKAERT	Type II	0	0	0	0	0	0	0	0	0	0	0	0
COHNREZNICK	Type I	0	26	1	0	0	0	2	0	0	0	0	0
COHNREZNICK	Type II	0	0	1	0	0	0	0	0	0	0	0	0
CROWE HORWATH	Type I	1	2	4	0	0	0	0	0	0	0	0	0
CROWE HORWATH	Type II	0	0	0	0	0	0	0	0	0	0	0	0
DELOITTE	Type I	2	42	9	1	0	0	4	0	0	0	0	0

DELOITTE	Type II	3	3	1	0	2	0	0	1	0	0	0	0
EISNERAMPER	Type I	2	24	5	0	0	0	6	0	0	0	0	0
EISNERAMPER	Type II	0	0	0	0	0	0	0	0	0	0	0	0
EY	Type I	5	66	12	0	0	0	1	0	1	0	0	0
EY	Type II	4	1	0	0	1	0	0	1	1	0	0	0
GRANT THORNTON	Type I	2	30	10	1	1	0	4	0	0	0	0	0
GRANT THORNTON	Type II	2	0	0	0	0	0	0	0	0	0	0	0
KPMG	Type I	9	22	13	1	0	0	1	0	0	0	0	0
KPMG	Type II	3	1	0	0	1	0	0	0	0	0	0	0
MOORE STEPHENS	Type I	3	1	3	0	0	0	1	0	0	0	0	0
MOORE STEPHENS	Type II	0	0	0	0	0	0	0	0	0	0	0	0
MOSS ADAMS	Type I	5	5	16	0	0	0	4	0	0	0	0	0
MOSS ADAMS	Type II	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	Type I	402	788	735	34	92	0	489	120	71	0	0	0
OTHER	Type II	3	0	0	0	0	0	1	0	0	0	0	0
PKF INTERNATIONAL	Type I	2	0	0	0	0	0	0	1	0	0	0	0
PKF INTERNATIONAL	Type II	0	0	0	0	0	0	0	0	0	0	0	0
PLANTE&MORAN	Type I	3	3	3	0	0	0	0	0	0	0	0	0
PLANTE&MORAN	Type II	0	0	0	0	0	0	0	0	0	0	0	0
PWC	Type I	7	41	8	0	0	0	0	0	0	0	0	0
PWC	Type II	5	1	1	0	0	0	0	0	0	0	0	0
RSM	Type I	1	23	17	0	0	0	1	2	1	0	0	0
RSM	Type II	0	0	0	0	0	0	0	0	0	0	0	0

This tables shows the industry distribution of the errors committed. The first column shows the auditors. The second column shows the type of error committed by the auditor. From the third to the fifteenth column are shown the absolute number of errors per one-digit SIC industries(1-12)(Fama & French).

Table 4: Yearly Distribution

AUDITOR	ERROR TYPE	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BDO INTERNATIONAL	Type I	0	5	8	11	17	17	20	21	27	17	28
BDO INTERNATIONAL	Type II	0	0	0	1	0	0	1	0	1	0	0
BKD	Type I	0	0	0	0	0	0	0	0	0	0	0
BKD	Type II	0	0	0	0	0	0	0	0	0	0	0
CHERRY BEKAERT	Type I	0	1	3	1	3	4	4	3	5	6	6
CHERRY BEKAERT	Type II	0	0	0	0	0	0	0	0	0	0	0

COHNREZNICK	Type I	0	0	4	3	2	2	3	4	5	3	3
COHNREZNICK	Type II	0	0	0	0	0	1	0	0	0	0	0
CROWE HORWATH	Type I	0	0	0	2	0	1	1	2	0	0	1
CROWE HORWATH	Type II	0	0	0	0	0	0	0	0	0	0	0
DELOITTE	Type I	0	3	2	5	5	5	5	5	6	10	12
DELOITTE	Type II	0	0	1	0	1	1	1	0	1	4	1
EISNERAMPER	Type I	0	0	2	3	3	4	5	3	4	5	8
EISNERAMPER	Type II	0	0	0	0	0	0	0	0	0	0	0
EY	Type I	0	2	4	8	2	3	9	12	12	16	17
EY	Type II	0	0	0	0	0	3	0	1	1	3	0
GRANT THORNTON	Type I	0	2	4	3	5	6	3	9	6	4	6
GRANT THORNTON	Type II	0	0	0	0	0	0	1	0	0	0	1
KPMG	Type I	0	5	3	3	3	4	3	8	7	5	5
KPMG	Type II	0	1	0	0	0	0	1	0	1	1	1
MOORE STEPHENS	Type I	0	0	1	0	0	2	1	2	1	0	1
MOORE STEPHENS	Type II	0	0	0	0	0	0	0	0	0	0	0
MOSS ADAMS	Type I	0	1	2	1	1	2	2	3	4	6	8
MOSS ADAMS	Type II	0	0	0	0	0	0	0	0	0	0	0
OTHER	Type I	0	193	216	289	286	270	282	298	289	298	310
OTHER	Type II	0	0	0	1	1	0	2	0	0	0	0
PKF INTERNATIONAL	Type I	0	0	1	0	0	0	1	0	0	0	1
PKF INTERNATIONAL	Type II	0	0	0	0	0	0	0	0	0	0	0
PLANTE&MORAN	Type I	0	1	1	2	0	0	0	0	0	3	2
PLANTE&MORAN	Type II	0	0	0	0	0	0	0	0	0	0	0
PWC	Type I	0	3	2	2	3	7	7	8	6	8	10
PWC	Type II	0	1	0	0	1	0	0	0	0	1	4
RSM	Type I	0	3	2	4	2	1	4	3	6	11	9
RSM	Type II	0	0	0	0	0	0	0	0	0	0	0

This table shows the yearly distribution of the errors commited. AUDITORS shows the name of each auditor. ERROR TYPE shows the type of errors committed by the auditors(either Type I or Type II error). From the third to the fifteenth column is shown the absolute number of errors per year.(2010-2020)

Table 5: Descriptive Statistics

Panel A: Full Sample

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Median	Pctl(75)	Max
BANKRUPT	24,371	0.002	0.047	0	0	0	0	1
GCO	24,371	0.171	0.377	0	0	0	0	1
B=0| GCO=1	24,371	0.139	0.346	0	0	0	0	1
B=1| GCO=0	24,371	0.002	0.040	0	0	0	0	1
ZSCORE	24,371	1.114	7.984	-17.659	0.214	2.764	5.196	11.501
AUF	24,371	1.714	2.232	0.032	0.174	0.760	2.240	8.230
NAUF	24,371	0.354	0.650	0.000	0.007	0.060	0.323	2.495
NYSE	24,371	0.294	0.455	0	0	0	1	1
LOC	24,371	0.681	0.466	0	0	1	1	1
LogAT	24,371	5.462	2.836	-0.909	3.331	5.707	7.631	12.836
MB	24,371	3.021	5.616	-9.686	0.991	2.178	4.436	18.095
CFOSA	24,371	-0.151	0.506	-1.841	-0.154	0.051	0.113	0.217
CASH	24,371	0.265	0.279	-0.028	0.051	0.152	0.394	1.000
BIG4	24,371	0.549	0.498	0	0	1	1	1

Panel B: Hypothesis 1 Sample (GCO=1)

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Median	Pctl(75)	Max
BANKRUPT	4,179	0.008	0.089	0	0	0	0	1
GCO	4,179	1.000	0.000	1	1	1	1	1
B=0| GCO=1	4,179	0.686	0.464	0	0	1	1	1
B=1| GCO=0	4,179	0.005	0.072	0	0	0	0	1
ZSCORE	4,179	-9.785	9.910	-17.659	-17.659	-17.651	-2.504	11.501
AUF	4,179	0.191	0.484	0.032	0.032	0.072	0.173	8.230
NAUF	4,179	0.025	0.106	0.000	0.000	0.001	0.017	2.495
NYSE	4,179	0.006	0.077	0	0	0	0	1
LOC	4,179	0.380	0.486	0	0	0	1	1
LogAT	4,179	1.654	1.569	-0.909	0.317	1.224	2.631	10.066
MB	4,179	0.548	8.131	-9.686	-4.865	-0.264	3.417	18.095

CFOSA	4,179	-0.893	0.728	-1.841	-1.841	-0.729	-0.208	0.217
CASH	4,179	0.334	0.336	-0	0.04	0.2	0.6	1
BIG4	4,179	0.084	0.278	0	0	0	0	1

Panel C: Hypothesis 2 Sample (BANKRUPTCY=1)

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Median	Pctl(75)	Max
BANKRUPT	53	1.000	0.000	1	1	1	1	1
GCO	53	0.623	0.489	0	0	1	1	1
B=0| GCO=1	53	0.000	0.000	0	0	0	0	0
B=1| GCO=0	53	0.755	0.434	0	1	1	1	1
ZSCORE	53	-4.270	6.796	-17.659	-6.126	-2.104	-0.259	11.501
AUF	53	1.791	1.829	0.032	0.432	1.243	2.328	8.230
NAUF	53	0.368	0.705	0	0.01	0.1	0.2	2
NYSE	53	0.189	0.395	0	0	0	0	1
LOC	53	0.736	0.445	0	0	1	1	1
LogAT	53	5.947	2.566	0.149	5.530	6.720	7.677	9.308
MB	53	0.611	2.121	-3.601	-0.075	-0.007	0.461	10.514
CFOSA	53	-0.216	0.601	-1.841	-0.112	0.00002	0.064	0.211
CASH	53	0.117	0.171	0.0002	0.024	0.056	0.137	0.907
BIG4	53	0.623	0.489	0	0	1	1	1

This table provides descriptive statistics for variables used in the audit accuracy analysis. BANKRUPT is an indicator variable that equals 1 when a client subsequently fails, and 0 otherwise, and GCO is also an indicator variable that equals 1 if the client received a GCO issuance, and 0 otherwise. The subscript for the first one is i for firm and t for the current year, while for the latter is i for firm and t-1 for the previous year. B=0|GCO=1, accounts for the Type I errors committed, while B=1|GCO=0, accounts for the Type II errors. ZSCORE measures the state of the firm using Altman's Zscore, the closer to 0 the score is, the more possible a bankruptcy becomes, while the closer to 3 the better the state of the entity. AUF estimates the fees paid for audit services, and the NAUF estimates the fees paid for non-audit services. NYSE equals 1 if the client is listed in the New York Stock Exchange, and 0 otherwise. LOC equals 1 if the client and the auditor are in the same U.S. state, and 0 otherwise. LogAT is the natural logarithm of the client's total assets, and MB is the market value equity to book value of equity. CFOSA is the operating cash flows scaled by the total assets. CASH is cash and short-term investments scaled by total assets. BIG4 is an indicator that takes the value of 1 when the auditor is one of the Big 4 audit firms, and 0 otherwise. N is the number of observations. Mean is the total value of each observation scaled by the number

of observations. St. Dev is the standard deviation from the mean. Min. is the minimum value of the sample. Pctl(25) is the value of the last observation of the 25% of the sample. Median is the value of the observation that stands in the middle of the sample. Pctl(75) is the value of the last observation of the 75% of the sample. Max is the maximum value of the sample.
Panel A shows the descriptive statistics for the full sample.
Panel B shows the descriptive statistics for the Hypothesis 1 sample (GCO=1)
Panel C shows the descriptive statistics for the Hypothesis 2 sample (BANKRUPTCY=1)

Table 6: Correlation Table

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
BANKRUPT	1.000													
GCO	**0.056*****	1.000												
B=0| GCO=1	**-0.019****	**0.717*****	1.000											
B=1| GCO=0	**0.869*****	**0.041*****	**-0.016***	1.000										
ZSCORE	**-0.031*****	**-0.621*****	**-0.559*****	**-0.019****	1.000									
AUF	0.002	**-0.310*****	**-0.276*****	0.009	**0.198*****	1.000								
NAUF	0.001	**-0.230*****	**-0.204*****	0.007	**0.152*****	**0.779*****	1.000							
NYSE	-0.011	**-0.287*****	**-0.254*****	-0.004	**0.203*****	**0.538*****	**0.418*****	1.000						
LOC	0.005	**-0.294*****	**-0.256*****	**0.015***	**0.225*****	**0.212*****	**0.142*****	**0.195*****	1.000					
LogAT	0.008	**-0.611*****	**-0.535*****	**0.020****	**0.493*****	**0.773*****	**0.609*****	**0.591*****	**0.333*****	1.000				
MB	**-0.020****	**-0.200*****	**-0.162*****	**-0.016***	**0.346*****	**0.093*****	**0.082*****	**0.042*****	**0.077*****	**0.153*****	1.000			
CFOSA	-0.006	**-0.667*****	**-0.565*****	0.009	**0.658*****	**0.326*****	**0.246*****	**0.310*****	**0.285*****	**0.636*****	**0.204*****	1.000		
CASH	**-0.025*****	**0.113*****	**0.121*****	**-0.026*****	**-0.037*****	**-0.275*****	**-0.214*****	**-0.311*****	**-0.088*****	**-0.340*****	**0.116*****	**-0.350*****	1.000	
BIG4	0.007	**-0.425*****	**-0.386*****	**0.016***	**0.321*****	**0.567*****	**0.443*****	**0.466*****	**0.279*****	**0.730*****	**0.123*****	**0.391*****	**-0.134*****	1.000

*Significance at 10% level; **Significance at 5% level; ***Significance at 1% level. This table shows the correlations between the variables used in the audit accuracy analysis. *BANKRUPT* is an indicator variable that equals 1 when a client subsequently fails, and 0 otherwise, and GCO is also an indicator variable that equals 1 if the client received a GCO issuance, and 0 otherwise. The subscript for the first one is i for firm and t for the current year, while for the latter is i for firm and t-1 for the previous year. *B=0|GCO=1*, accounts for the Type I errors committed, while *B=1|GCO=0*, accounts for the Type II errors. *ZSCORE* measures the state of the firm using Altman's Zscore, the closer to 0 the score is, the more possible a bankruptcy becomes, while the closer to 3 the better the state of the entity. *AUF* estimates the fees paid for audit services, and the *NAUF* estimates the fees paid for non-audit services. *NYSE* equals 1 if the client is listed in the New York Stock Exchange, and 0 otherwise. *LOC* equals 1 if the client and the auditor are in the same U.S. state, and 0 otherwise. *LogAT* is the natural logarithm of the client's total assets, and *MB* is the market value equity to book value of equity. *CFOSA* is the operating cash flows scaled by the total assets. *CASH* is cash and short-term investments scaled by total assets. *BIG4* is an indicator that takes the value of 1 when the auditor is one of the Big 4 audit firms, and 0 otherwise

Table 7: Regression Results

	Sample 1 (GCO=1)			Sample 2 (BANKRUPT=1)		
	Type I (1)	**Type I (2)**	**Type I (3)**	**Type II (4)**	**Type II (5)**	**Type II (6)**
Intercept	**0.897*****	**1.016*****	-24.278	-0.000	-2.250	-8.615
	(0.000)	(0.000)	(0.957)	(1.000)	(0.334)	(1.000)
BIG4	**-1.223*****	**-0.718*****	**-0.711*****	**2.303*****	0.408	-42.707
	(0.000)	(0.000)	(0.000)	(0.002)	(0.765)	(1.000)
ZSCORE		**-0.052*****	**-0.059*****		-0.006	-1.690
		(0.000)	(0.000)		(0.945)	(1.000)
AUF		0.155	0.142		-0.235	44.049
		(0.157)	(0.249)		(0.716)	(1.000)
NAUF		0.086	0.669		2.433	158.866
		(0.833)	(0.153)		(0.494)	(1.000)
NYSE		-0.635	-0.228		16.179	-115.487
		(0.211)	(0.670)		(0.993)	(1.000)
LOC		-0.077	-0.088		0.776	1.354
		(0.313)	(0.313)		(0.499)	(1.000)
LogAT		**-0.223*****	**-0.473*****		0.444	-12.835
		(0.000)	(0.000)		(0.334)	(1.000)
MB		**0.010****	**0.012****		0.277	-28.563
		(0.035)	(0.021)		(0.478)	(1.000)

Table 7: Regression Results

	Sample 1 (GCO=1)			Sample 2 (BANKRUPT=1)		
	Type I (1)	**Type I (2)**	**Type I (3)**	**Type II (4)**	**Type II (5)**	**Type II (6)**
CFOSA		**0.217*****	**0.466*****		-0.171	98.449
		(0.002)	(0.000)		(0.895)	(1.000)
CASH		-0.167	**-0.413*****		-0.456	-705.222
		(0.147)	(0.003)		(0.866)	(1.000)
Industry fixed effects	No	No	Yes	No	No	No
Year fixed effects	No	No	Yes	No	No	Yes
Num. obs.	4179	4179	4179	53	53	53

*Significance at 10% level; **Significance at 5% level; ***Significance at 1% level.
This table shows the regression results for audit accuracy analysis. The values in the parentheses are the p-value. *BANKRUPT* is an indicator variable that equals 1 when a client subsequently fails, and 0 otherwise, and GCO is also an indicator variable that equals 1 if the client received a GCO issuance, and 0 otherwise. The subscript for the first one is i for firm and t for the current year, while for the latter is i for firm and t-1 for the previous year. B=0|GCO=1, accounts for the Type I errors committed, while B=1|GCO=0, accounts for the Type II errors. These two variables are the ones in interest and are depicted as *TYPE I* in columns (1)-(3) and *TYPE II* in columns (4)-(6). In columns (1) and (4) the only variable that is inducted in the regression is *BIG4*. In columns (2),(3),(5), and (6), I add the rest of the control variables and fixed effects. . *BIG4* is an indicator that takes the value of 1 when the auditor is one of the Big 4 audit firms, and 0 otherwise. *ZSCORE* measures the state of the firm using Altman's Zscore, the closer to 0 the score is, the more possible a bankruptcy becomes, while the closer to 3 the better the state of the entity. *AUF* estimates the fees paid for audit services, and the *NAUF* estimates the fees paid for non-audit services. *NYSE* equals 1 if the client is listed in the New York Stock Exchange, and 0 otherwise. *LOC* equals 1 if the client and the auditor are in the same U.S. state, and 0 otherwise. *LogAT* is the natural logarithm of the client's total assets, and *MB* is the market value equity to book value of equity. CFOSA is the operating cash flows scaled by the total assets. *CASH* is cash and short-term investments scaled by total assets.