The Validity of Publicly Available Measures of Audit Quality.

Evidence from the PCAOB Inspection Data

Abstract

This study investigates the ability of several commonly used measures of audit quality derived from publicly available data to predict an accurate measure of audit process quality derived from audit deficiencies of individual engagements (Part I Findings) identified during the PCAOB inspections process. Using a unique dataset of inspected engagements, I find that several measures of audit quality used in prior literature are predictive of audit deficiencies, consistent with these measures conveying audit quality. However, I also find that going concern opinions positively predict Part I Findings, consistent with a disclaimer effect and not with an argument of higher audit quality used in prior literature. I also find that the collective predictive power of publicly available measures of audit quality on Part I Findings is low, perhaps because most measures are a joint function of financial reporting and audit process quality. Overall, these results provide some guidance to researchers about which measures of audit quality to use and suggest that some results in prior literature may need to be interpreted with caution.

Keywords: Audit Process Quality, PCAOB Inspections, Measures of Audit Quality.

JEL Classification: M42, C80.

1. Introduction

This study provides an empirical assessment of the validity of widely used measures of audit quality based on publicly available data. Multiple proxies have been used in prior audit literature as output measures of audit quality, with little consensus on which measures are best (e.g., DeFond and Zhang, 2014). In a review paper, DeFond and Zhang (2014) qualitatively argue that many of these measures represent valid measurements of audit quality.[1] However, DeFond and Zhang also caution that each measure has some potential weaknesses. This study provides an empirical assessment of each measure in light of a unique and accurate measure of audit process quality, the Public Company Accounting Oversight Board (PCAOB) inspections data.[2]

The PCAOB is a nonprofit corporation established by the Sarbanes-Oxley Act of 2002 (SOX) to oversee the audit of public companies (referred to as issuers in the remainder of this paper) and improve financial reporting. In particular, the PCAOB conducts inspections of public accounting firms that audit issuers. These inspections are annual for firms that regularly provide audit reports for more than 100 issuers, and at least triennial otherwise (see Section 104 of SOX).[3] As part of an inspection, the PCAOB selects specific completed audit engagements for review, and usually sends a team of inspectors, all experienced former auditors, to review the audit work performed.[4] The inspectors spend, on average, approximately one week assessing the work of the engagement team, including by analyzing the audit work papers and frequently interacting with the engagement team (e.g., Fischer, 2006; Riley et al., 2008; Center for Audit

[1] The literature has debated about how to exactly define audit quality (e.g., DeFond and Zhang, 2014). In this paper, I take a process-based view of audit quality, and define a good audit as one that performed sufficient work to support the audit opinion, as defined by relevant audit standards.
[2] Even though the PCAOB, in its publicly released inspection reports, mentions the Part I Findings, the identity of the issuers is masked. Consequently, the dataset of inspected engagements and Part I Findings is not publicly available.
[3] Also see http://pcaobus.org/Inspections/Pages/InspectedFirms.aspx
[4] See Appendix B for the job requirements of an inspector.

Quality, 2012).[5] In the event that the inspection team determines that the work conducted by the audit engagement team was not sufficient to support the audit opinion, the PCAOB issues a Part I Finding. Because the PCAOB inspections are designed to make sure that the engagement team fulfilled its role as an auditor and the PCAOB inspectors are all experienced former auditors who devote a significant amount of effort to the inspection process, a Part I Finding is a strong and precise signal of poor audit process quality for a specific engagement.[6] Perhaps as importantly, because the PCAOB focuses only on whether the engagement team fulfilled its role the determination of a Part I Finding, as a measure of audit process quality, is not confounded by the initial financial reporting quality of the issuer. Consequently, a Part I Finding represents an accurate measurement of poor audit process quality that does not suffer from joint measurements issues of financial reporting and audit quality, an issue commonly encountered when using output measures of audit quality (e.g., DeFond and Zhang, 2014).[7]

To assess the validity of publicly available output measures of audit quality, I use a unique dataset obtained from the PCAOB, that indicates, for each year, which specific engagements were inspected and whether each engagement received a Part I Finding or not. The dataset spans the years 2003 to 2012. I merge this dataset with Compustat and Audit Analytics data to compute publicly available output measures of audit quality and some other variables. I rely on prior literature (e.g., Lim and Tan, 2008; Francis and Yu, 2009; DeFond and Zhang, 2014) to compute several commonly used measures of audit quality, including discretionary accruals, Dechow and Dichev (2002) residuals, the propensity to meet/beat specific earnings benchmarks, the issuance

[5] Additional work reviewing the audit work papers is also often performed at the PCAOB offices (Riley et al., 2008).
[6] Audit firms are also given many opportunities during the inspection process to provide any additional information or perspective about the audit (e.g., PCAOB, 2012; Center for audit quality, 2012), thereby increasing the accuracy of Part I Findings as a signal of poor audit quality.
[7] For example, the PCAOB can still issue a Part I Finding if the inspectors deem that the engagement team did poor work, even if the financial statements of the issuer are clean.

of a going concern opinion, and whether restatements occur or not. I also study less commonly used measures of audit quality based on total accruals and accruals deflated by cash flows from operations (CFO), as in Leuz, Nanda and Wysocki (2003). Because the PCAOB generally inspects only a subset of individual audit engagements conducted by an audit firm for each year in which the firm is inspected, my dataset is reduced to 3,997 issuer-year observations. I then assess whether each output measure of audit quality is predictive of Part I Findings, controlling for a wide range of other factors.

In the first set of tests, I find that many of the output measures of audit quality used in prior literature are predictive of Part I Findings. Specifically, unsigned discretionary accruals, the propensity to meet/beat the zero earnings threshold, and restatements positively predict the issuance of a Part I Finding. In particular, a restatement increases the probability of a Part I Finding by 11%, the propensity to meet/beat the zero earnings threshold by 7%, and an increase of one standard deviation in discretionary accruals by 2%. These numbers are reasonably large, especially for restatements and the propensity to meet/beat the zero earnings thresholds, in light of the sample average probability of a Part I Finding, equal to 27%. I also find that unsigned total accruals or unsigned total accruals deflated by CFO, measures that are not commonly used in prior literature, are also predictive of Part I Findings. I do not find any association between signed accruals, Dechow and Dichev residuals, or the propensity to meet/beat last year's earnings with the issuance of a Part I Finding. In contrast to several claims in prior literature that argue that issuance of a going concern opinion is a measure of good audit quality, I actually find a positive association between the issuance of a going concern opinion and audit deficiencies as measured by inspection Part I Findings. This result is consistent with a disclaimer role of the going concern opinion, suggesting that the engagement team reduces the amount of work

performed during the audit, because of the perceived or actual lessened litigation risk afforded by the going concern opinion (Mutchler, 1984; Carcello and Palmrose, 1994; Kaplan and Williams, 2013).[8] This result is also consistent with recent findings in an experimental setting by Kachelmeier, Schmidt and Valentine (2014), and in an empirical setting by Czerney, Schmidt and Thompson (2014), and Czerney (2015), that suggest that the inclusion of non-standard wording in the audit opinion acts as a disclaimer role of the audit.[9]

When including all the measures of audit quality that predicted the issuance of a Part I Finding in "kitchen sink" regressions, I still find an association with Part I Findings for each of them. This result suggests that each of these measures represents an independent assessment of audit quality, controlling for the other ones, and is consistent with the arguments presented in DeFond and Zhang (2014). However, I find that the explanatory power of publicly available output measures of audit quality on Part I Finding is relatively limited.[10] Collectively, these measures explain only between 6% and 15% of the likelihood of issuance of a Part I Finding, perhaps because they are a joint function of financial reporting and audit quality.[11]

In further tests, I find that both positive and negative discretionary accruals are predictive of Part I Findings, consistent with results in prior literature that indicates that auditors constrain both positive and negative accruals (Myers, Myers and Omer, 2003; Francis and Yu, 2009). Focusing on signed discretionary accruals, I find that they are predictive of Part I Findings when

[8] Such an idea is consistent with the analytical model of Dye (1993), who shows that the audit effort is dependent on the risk of litigation in case of audit failure.
[9] This finding is also consistent with distressed issuers having very poor accounting or internal control systems, which could affect the engagement team's ability to conduct the audit.
[10] Note that because inspections focus on specific areas of selected engagements, this could result in a lower predictive power of overall measures of audit quality. Consequently, it could still be the case that measures of audit quality based on publicly available variables are reasonably explanatory of the true underlying audit quality, but that the power of my tests is reduced because PCAOB inspections focus on specific areas of the audit.
[11] The 6% is computed from a model including several control variables. When control variables are excluded, the predictive power of the publicly available measures of audit quality is, collectively, as high as 15%.

restricting the sample to engagements that meet or slightly beat the zero earnings threshold, consistent with the use of signed accruals being appropriate when an appropriate incentive to manipulate earnings upwards can be found (e.g., Dechow et al., 2010). Collectively, this set of results suggest that, in the absence of restrictions on the sample based on management incentives, unsigned accruals is a more appropriate measure of audit quality than signed accruals, consistent with the arguments advanced in Reynolds and Francis (2000) and Hribar and Nichols (2007). However, signed discretionary accruals are still useful when the researcher can identify the proper management incentives to increase earnings.

Because the engagements selected by the PCAOB for inspections are not randomly chosen, but risk-based (e.g., Olson, 2008; Hanson, 2012; Church and Shefchik, 2012), I conduct a robustness test using a bivariate probit model with selection (Van de Ven and Van Pragg, 1981).[12] I identify two exclusion restrictions, based on internal discussions at the PCAOB, and still find that the results hold when attempting to control for selection bias.

Overall, this study contributes to the literature by providing some guidance to researchers about which output measures of audit quality, for U.S. listed issuers, are predictive of PCAOB Part I Findings. In particular, this study extends DeFond and Zhang (2014) who provide a qualitative assessment about these measures. I find that several output measures of audit quality are actually predictive of Part I Findings, while the issuance of a going concern opinion goes in the opposite direction. Consequently, this study provides some validity to prior auditing literature that relies on these measures. Based on the economic significance, and excluding going concern opinions (which direction is problematic), the most promising measures appear to be the issuance of a restatement and the propensity to meet/beat the zero earnings threshold. A note of caution is

[12] This model is similar to the Heckman (1979) model, but with binary dependent variables in the second stage.

that the predictive power of publicly available measures of audit quality on Part I Findings appears low. This suggests that many unobservable or nonpublic factors influence audit quality, and calls for additional research on finding stronger measures of audit quality. Taking a different perspective, my results also suggest that a poorly conducted audit based on relevant standards, and identified as deficient by the PCAOB, is associated with worse reporting outcomes, including higher accruals and a higher probability of restatements. Thus, to a certain extent, these results also speak of the value, from a financial reporting standpoint, of a properly conducted audit.

The remainder of this paper is structured as follows. Section 2 provides some background on the PCAOB inspections and commonly used measures of audit quality; Section 3, the data; Section 4, the main empirical tests; and Section 5, several additional tests. Section 6 concludes.

2. Background on PCAOB inspections and measures of audit quality

2.1 PCAOB Inspections

2.1.1 Background

Prior to SOX, audit firms were self-regulated through, among other things, the AICPA's peer review program, started in the 1970s (e.g., Hermanson, Houston and Rice, 2007; Lennox and Pittman, 2010). This changed following several well-known accounting scandals at Enron, WorldCom and elsewhere (e.g., Hanson, 2012). As part of SOX, Congress established independent oversight of the accounting profession by the PCAOB for audits of issuers. Since its creation, the PCAOB has, each year, conducted hundreds of inspections of registered public accounting firms that audit issuers. These inspections are annual for firms that regularly provide audit reports for more than 100 issuers, and at least triennial otherwise (Section 104 of SOX).

One element of the inspections program involves the selection of specific engagements for review. Given its limited resources, the PCAOB cannot inspect all the engagements of a particular audit firm every year and uses a risk-based approach to select the engagements that will be inspected. The PCAOB then notifies the audit firm, and, after an initial data request (e.g., Eskow, 2004; Fischer, 2006; Center for Audit Quality, 2012), sends a team of inspectors, all experienced former auditors (see Appendix B for the current job requirements of an entry-level inspector), who conduct fieldwork at the audit firm's office involved with the engagement.[13] This fieldwork lasts approximately one week, although inspections can finish in four business days or take as long as two weeks (e.g., Riley et al., 2008; Johnson, Keune and Winchel, 2014).[14] During the fieldwork, the PCAOB inspectors dissect the audit work papers, interact frequently with the engagement team to strengthen their understanding of the work completed during the audit, and determine whether the work performed by the engagement team is sufficient to support the audit opinion. In the event that it is not, the PCAOB issues a Part I Finding for that specific engagement. Part I Findings are made public in the inspection reports of individual audit firms, disclosed by the PCAOB. However, the name of the issuer is masked in the public reports. Further, the specific engagements selected for inspection are not publicly disclosed. Consequently, an important part of the inspection process is not disclosed to the public and only aggregate inference can be made with publicly available data.

2.1.2 Advantages and potential issues of using PCAOB inspection data as a measure of audit process quality

There are several advantages of using PCAOB inspection data as a measure of audit process quality. First, because a PCAOB inspection focuses on whether regulatory auditing standards are

[13] For smaller audit firms all the inspection fieldwork may take place in one of the PCAOB offices (PCAOB Annual Report, 2005).
[14] In many instances, additional work is also conducted within the PCAOB offices outside of the one-week fieldwork window (e.g., Riley et al., 2008).

being met, the inspection results are based on a clearly established, standards-based definition, of audit quality. Specifically, a Part I Finding indicates that the engagement team did not perform sufficient work to support its audit opinion, as defined by current auditing standards, and is a clear signal of poor audit process quality in that engagement.

Second, the PCAOB spends a considerable amount of effort conducting inspections, suggesting that the Part I Findings are a precise signal of poor audit process quality. In particular, the PCAOB inspection teams are all composed of experienced and knowledgeable former auditors (PCAOB, 2011; Carcello et al., 2011). For example, Lennox and Pittman (2012) report that inspectors average 12 years of public practice experience, an observation corroborated by the current job requirements for inspectors, detailed in Appendix B.[15] Many of the PCAOB inspectors previously worked for the Big 4 firms at the manager level or above, audited publicly traded companies, and have extensive knowledge of auditing practices. Further, they are independent from the public accounting profession (Lennox and Pittman, 2010; PCAOB, 2011; Carcello et al., 2011). The inspectors spend a significant amount of time conducting fieldwork, analyzing the work papers of the inspected engagement, and interacting with the audit engagement team to refine their understanding of the particular engagement, the mindset, and the procedures conducted by the engagement team. Notably, audit firms are given many opportunities during the inspection process to provide any additional information or perspective about the audit (e.g., PCAOB, 2012; Center for Audit Quality, 2012), thereby increasing the accuracy of Part I Findings. Survey evidence also suggests that PCAOB inspectors have the proper qualifications to conduct their role and that their fieldwork is appropriate. For example,

[15] Also see the PCAOB Annual Report for 2006 that mentions that the inspection team leaders for large inspections have an average of 25 years of relevant work experience, and all other inspection team members average 14 years of relevant work experience.

Houston and Stefaniak (2013), in a survey of 107 partners of large auditing firms, find that partners are in agreement with the following statements: that the PCAOB inspections are very detailed within the areas inspected, that the inspectors concentrate on assessing sufficiency of evidence gathered, concentrate on assessing judgments made during substantive testing, concentrate on assessing audit documentation, and concentrate on assessing internal control evaluations. Further survey evidence from triennially inspected audit firms also shows that these firms agree that the inspectors possess adequate technical knowledge, exercise appropriate professional conduct, and that their focus on audit work paper documentation and substantive audit procedures is appropriate (Daugherty and Tervo, 2010).[16]

Third, survey data finds that PCAOB inspections are unpredictable (Houston and Stefaniak, 2013). Specifically, the partners of large audit firms indicate that they cannot predict in advance which of their audits and which year they will be chosen for a PCAOB inspection. This suggests that the engagement team is unable to strategically improve quality on their audit in anticipation of an inspection. Such strategic actions may have the potential to distort the relationship between publicly available measures of audit quality and the inspection results.

Last but not least, the PCAOB inspections primary focus is on the quality of the audit, not on the quality of the client's financial reporting.[17] Consequently, a Part I Finding can be issued in

[16] An argument has been made in the literature (e.g., Palmrose, 2006; Glover et al., 2009; Lennox and Pitman, 2010) that there is a trade-off for the PCAOB inspectors between expertise and independence. In particular, because the PCAOB inspectors are not currently conducting audits, they may be unable to keep up with the latest developments in the profession. However, this claim goes contrary to survey evidence that indicates that the PCAOB inspectors are qualified (Daugherty and Tervo, 2010). Further, each PCAOB inspector is involved with the review of many engagements every year, in contrast to auditors, who only focus on a handful of clients. Thus, one argument could be made that the PCAOB inspectors, by encountering many different types of audits each year and specializing in the inspection process, actually build experience faster than practicing auditors (e.g., Carcello et al., 2011).

[17] The PCAOB inspectors may observe the quality of the client's financial reporting and internal controls in conducting the inspection. For example, when the inspectors find issues with the financial statement of a specific issuer, the usual practice is for them to report that information to the SEC (see for example the inspection report of

case the engagement team did a poor audit job, even if the financial statements of the issuer are clean. This is a major improvement over most publicly available measures of audit quality, that can only measure a joint event of poor financial statement quality combined with poor audit quality (DeFond and Zhang, 2014).

There are also some potential drawbacks in using PCAOB inspections data. The most obvious one is sample loss resulting from the limited number of inspections the PCAOB is able to conduct every year. Further, because the number of engagements selected for inspection is limited, the probability that a given engagement is selected several times over the sample period is low, and this results in the lack of availability of time-series data. Consequently, all the results of this paper are relevant mostly for studies that focus on cross-sectional analyses.[18] An additional issue comes from the fact that a Part I Finding is a zero-one outcome. Even though a Part I Finding is a powerful signal of poor audit process quality, no information is available on the audits that passed the inspection, especially how close they were to the failure threshold. Last but not least, the PCAOB inspections focus on limited areas of the engagement, often those that appear to the inspectors to be the most critical for the audit (Hanson, 2012; PCAOB, 2012; Center for Audit Quality, 2012). Even though, interestingly, surveyed audit partners of large firms neither agree nor disagree with the statement that a PCAOB inspection touches on all audit areas in an engagement (Houston and Stefaniak, 2013), suggesting that in practice the inspectors do focus on the most critical areas of the audit, the PCAOB focus on sub-areas of the audit indicates that, for a given engagement, not all audit deficiencies may be identified by the PCAOB. This might introduce noise in the measure that could lower the power of the tests

Deloitte for 2013, p20, footnote 3). However, the inspectors' primary focus is on the actions taken by the engagement team in light of the client's financial reporting and existing internal controls.

[18] Many papers in auditing use cross-sectional identification designs, and consequently the results of this study are applicable to them. However, a handful of papers, including Gul et al. (2012) and Aobdia et al. (2015) use time-series identification.

conducted in the empirical analyses, and could at least partially explain the low explanatory power of the regressions used in this paper.

2.2 Measures of audit quality

Most publicly available measures of audit quality, except for the going concern opinion, are jointly determined by the issuer's initial financial reporting quality and the work of the auditor performed. Specifically, most of the measures will not be able to differentiate a bad audit from a good audit when initial financial reporting quality of the issuer is good. The following measures are widely used in auditing literature as measures of audit quality.

2.2.1 Going Concern opinions

An auditor issues a going concern opinion when there is substantial doubt about the issuer's ability to continue as a going concern for a reasonable period of time, not to exceed one year beyond the date of the financial statements being audited (PCAOB, AU Section 341).[19] Prior literature has argued that the issuance of a going concern opinion is a measure of good audit quality, from an auditor independence standpoint, because issuers have incentives to pressure auditors to issue clean opinions (DeFond and Zhang, 2014). Consistent with this idea, the issuance of a going concern opinion leads to an increased probability of auditor switching (Chow and Rice, 1982; Krishnan, 1994). However, prior literature also finds evidence that the issuance of a going concern opinion reduces both the perceived and actual risk of auditor litigation (e.g., Mutchler, 1984; Carcello and Palmrose, 1994), and the settlement amount in case the auditor is still named in a lawsuit (Kaplan and Williams, 2013). Similarly, recent evidence in both experimental (Kachelmeier et al., 2014) and empirical settings (Czerney et al., 2014; Czerney, 2015) also suggest that the inclusion of non-standard wording in the audit opinion acts

[19] See http://pcaobus.org/Standards/Auditing/Pages/AU341.aspx

as a “disclaimer” of the audit. This may leave the door open to auditors to conduct poor quality audits and issue going concern opinions as disclaimers, in an effort to shield themselves from liability in case something goes wrong. This argument is consistent with the analytical model of Dye (1993), who, using a moral hazard setting, shows that the effort conducted by the auditor is dependent on the liability faced in case of audit failure.

2.2.2 Accrual based measures of audit quality

Prior auditing literature widely uses discretionary accruals as a measure of audit quality (e.g. Reynolds and Francis, 2000; Balsam, Krishnan and Yan, 2003; Krishnan, 2003; Myers, Myers and Omer, 2003; Lim and Tan, 2008; Francis and Yu, 2009; Carcello and Li, 2013). The basic idea is that high quality audits constrain opportunistic earnings management, and therefore should have a negative impact on discretionary accruals (DeFond and Zhang, 2014). A major advantage of accruals based measures of audit quality lie in their continuous nature, and the fact that they are also expected to detect within GAAP earnings manipulation. However, little consensus for measurement exists for accruals. Further, the measures can be noisy and even biased in some instances (Dechow et al., 2010).

There are several methods to measure accruals. The first one, based on the Jones (1991) model, is to model a level of normal accruals, based on sales growth and PP&E. The difference between total accruals and normal accruals, the residual of the regression, are the discretionary accruals. As noted in Dechow et al. (2010), the explanatory power of the Jones model is low. Further, the residuals are highly positively correlated with total accruals (Dechow et al., 2003), and discretionary accruals are usually less powerful than total accruals at detecting earnings management in SEC enforcement releases (Dechow et al., 2011), thereby suggesting that total

accruals themselves could be used as a measure of audit quality. For example, Leuz et al. (2003), use two measures of earnings quality based on total accruals.

Both signed and unsigned discretionary accruals are used in the literature. Unsigned accruals are often used in absence of a particular directional prediction (e.g., Hribar and Nichols, 2007), and signed accruals models when an incentive to manage earnings upwards exists (e.g., Dechow, Hutton, Kim and Sloan, 2012).

Accruals can also be measured using the Dechow and Dichev (2002) model, which focuses on the matching of accruals to cash flows and considers the residual of a regression of short-term working capital accruals on current, prior and future cash flows, as a measure of earnings quality. The model is unsigned and only focuses on short-term working capital accruals (Dechow et al., 2010). While the Dechow and Dichev model was originally built as a measure of earnings quality and is extensively used as such for good reasons, it is difficult to assess whether the model can directly be extended as a measure of audit quality. Specifically, the role of the auditor extends beyond short-term working capital accruals. Further, auditors also assess the mapping of accruals to cash flows itself (for example, by auditing the rate of recognition of deferred revenues), which, by construction, is excluded from the measure.

2.2.3 Other measures of audit quality

Restatements are also commonly used as a measure of audit quality because they indicate that the auditor issued an unqualified opinion on financial statements that were misstated. Consequently, a restatement is a strong indication of poor audit quality (DeFond and Zhang, 2014). However, restatements occur reasonably rarely, are subject to whether detection occurs or not, and show poor audit quality only conditional on poor initial financial reporting quality.

Prior literature also uses the propensity to meet/beat specific earnings thresholds as a measure of audit quality (e.g., Francis and Yu, 2009). Survey and empirical evidence confirm that executives care about earnings thresholds and are willing to take actions to meet/beat them (e.g., Burgstahler and Dichev, 1997; Matsumoto, 2002; Graham et al., 2005). Specifically, Graham et al. (2005) survey 401 Chief Financial Officers who indicate, in their vast majority, that meeting or beating earnings benchmarks are important to them. When asked what they would do to meet the desired earnings target in case of a shortfall, 40% indicate that they would book revenues now rather than next quarter (if justified in either quarter), 28% that they would draw down on reserves previously set aside, 21% that they would delay taking an accounting charge, and 8% that they would alter accounting assumptions (such as allowances, pensions, etc.). These areas fall under the purview of the auditor. Consequently, issuers slightly meeting or beating these expectations are likely to be suspect (Roychowdhury, 2006).

3. Data construction

3.1 Sample Construction

I obtain individual PCAOB inspections and Part I Findings data from the PCAOB. These data cover the fiscal years 2003 to 2012 and include the name of the issuer inspected, its Central Index Key (CIK), its auditor and fiscal year inspected, and whether a Part I Finding is issued or not. The data is comprehensive for the firms identified as Global Network Firms by the PCAOB and covers the fiscal years 2007 to 2012 for the other ones.[20] There are 6,640 unique inspection engagement reviews in the dataset. I merge this dataset with Compustat and Audit Analytics to obtain appropriate measures of audit quality and control variables. This reduces the sample size

[20] Current audit firms identified Global Network Firms include the Big 4 audit firms, Grant Thornton and BDO. See http://pcaobus.org/Registration/Firms/Pages/GlobalNetworkFirms.aspx.

to 5,354 observations. I only keep the inspected engagements in the dataset for most analyses, except for the bivariate probit with selection analysis, presented in subsection 5.3. I also restrict the sample to two-digit SIC industries with more than ten observations each year to allow for the computation of the accruals based measures. After inclusion of all control variables, the final sample is restricted to 3,997 inspected engagements.[21] I also use, in the bivariate probit with selection analysis, a larger sample, corresponding to all engagements that took place between 2003 and 2012, derived from the intersection of Audit Analytics and Compustat and restricted to issuer-years that have control variables available. This sample is composed of 55,736 issuer-year observations.

Table 1 presents descriptive statistics on the PCAOB inspections in the sample. Panel A shows the number of inspections by year in the sample. There are approximately 400 inspected engagements each year, with some variation depending on the year inspected. The number of inspections in the dataset increases in 2007 because of increased data coverage after this date. Panel B shows the inspection split by Big 4 / non-Big 4 auditors. Some inspections are available for non-Big 4 auditors prior to 2007, because several of the non-Big 4 firms are considered to be part of the Global Network Firm inspection program. The number of non-Big 4 inspections more than doubles after 2007, consistent with an increase in the data coverage and not necessarily with increased inspections for non-Big 4 auditors starting in 2007.

(Insert Table 1 About Here)

3.2 Measures of Audit Quality

3.2.1 Accruals and Discretionary Accruals

[21] Some studies exclude from the analyses financial sector (SIC codes 60-69) and regulated industries (SIC Codes 44-49). The results are qualitatively unchanged when excluding these industries. Given this result, I keep these industries to increase the sample size.

Following prior literature (e.g., Lim and Tan, 2008; Francis and Yu, 2009; Reichelt and Wang, 2010), I estimate discretionary accruals using the cross-sectional modified Jones model (Dechow, Sloan, and Sweeney, 1995; Kothari, Leone, and Wasley, 2005):

$$TA_t/ASSET_{t-1} = \beta_1(1/ASSET_{t-1}) + \beta_2(\Delta SALES_t)/ASSET_{t-1} + \beta_3 PPE_t/ASSET_{t-1} + \beta_4 ROA_{t-1} + \varepsilon_t, \quad (1)$$

where *TA* is total accruals measured as earnings before extraordinary items (IB) minus net cash flow from operations excluding extraordinary items and discontinued operations (OANCF-XIDOC), *ΔSALES* is change in net sales, *PPE* is gross property, plant, and equipment, and *ROA* is the rate of return on assets. Following Kothari et al. (2005), I control for *ROA* to increase the power of the model. I deflate both the dependent and independent variables by lagged total assets and estimate equation (1) by industry (two-digit SIC code) and year. Discretionary accrual (*DA*) is the residual from the model, ε_t. I use both *DA* and its absolute value, *AbsDA*, as potential measures of audit quality.

Following Leuz et al. (2003), I also consider the two following accrual-based measures of audit quality. *Accruals* equals $TA_t/ASSET_{t-1}$, and *AccrualsCFO* equals total accruals (*TA*) deflated by the absolute value of the issuer's cash flows from operations (OANCF-XIDOC). I take their absolute values, denominated *AbsAccruals* and *AbsAccrualsCFO* in the following analyses.

3.2.2 Dechow and Dichev residuals

I also estimate the Dechow and Dichev (2002) residuals. Although the most frequently used measure of financial reporting quality in auditing is based on the Jones (1991) discretionary accruals model, some prior studies in auditing have measured audit quality using accrual quality measured by the Dechow and Dichev (2002) model (DeFond and Zhang, 2014). I augment the Dechow and Dichev model following McNichols (2002) and Francis et al. (2005).

$$TCA_t = \beta_0+\beta_1 CFO_{t-1} + \beta_2 CFO_t + \beta_3 CFO_{t+1}+ \beta_4 \Delta SALES_t+ \beta_5 PPE_t+ \varepsilon_t, \quad (2)$$

where *TCA* is total current accruals (= Δ Inventories + Δ Account Receivable - Δ Account Payable - Δ Income Tax Payable + Net change in other assets and liabilities, all taken from the cash flow statement), and *CFO* is cash flow from operations (OANCF-XIDOC). All variables are scaled by the average assets during the year. I estimate equation (2) by industry (two-digit SIC code) and year. The absolute value of the residual from equation (2), *AbsDD*, is a potential measure of audit quality.[22]

3.2.3 Other measures of audit quality

Restatements are commonly used as a measure of audit quality. I define *Restatement* as an indicator variable equal to one if the financial statements for the year are restated due to accounting or fraud related reasons. The data are from Audit Analytics.

Going concern opinions are also commonly used as a measure of audit quality. I define *GC* as an indicator variable equal to one if the auditor issued a going concern opinion for the year. The data are taken from Audit Analytics. Because most issuers with going concern opinions do not go bankrupt, I also define *GCNoBankruptcy* as an indicator variable equal to one if the auditor issues a going concern opinion and the issuer does not declare bankruptcy the following year. I use both UCLA Lopucki and SDC databases to determine whether an issuer declares bankruptcy or not.

Several studies have used the propensity to meet/beat earnings thresholds as measures of audit quality. Following prior studies (e.g., Francis and Yu, 2009), I define *SmallProfit* as an

[22] Both Dechow et al. (2010) and Dechow and Dichev (2002) suggest that the absolute value of the residual from the model is an appropriate measure of accrual quality. They also propose using the standard deviation of the residuals. While this measure is fine from an accruals quality standpoint, the main disadvantage, from an audit quality standpoint, is that it is not directly linked with a particular audit anymore, but with a series of audits over the estimation period. Untabulated analyses indicate that the results are unchanged if I take the standard deviation of the residuals over a period of five years, instead of the absolute value of the residuals.

indicator variable equal to one if the *ROA* (income before extraordinary items deflated by beginning assets) is more than 0 and less than 3%.[23] I also define *SmallBeat* as an indicator variable equal to one if the year-on-year change in *ROA* is less than 1%.

4. Main Empirical Tests

4.1 Research Design

I estimate whether a given measure of audit quality predicts Part I Findings using the following regression:

$$\textit{Part I Finding}_t = \beta_0 + \beta_1 \textit{Audit Quality Measure}_t + \beta\ \textit{Controls}_t + \varepsilon_t, \quad (3)$$

Part I Finding is an indicator variable equal to one when the PCAOB releases a Part I Finding for a given engagement. Because of the binary nature of the dependent variable, the regression is estimated using a logistic specification. *Audit Quality Measure* is a measure of audit quality, previously defined in Subsection 3.2. *Controls* is a vector of controls variables that prior research has identified as potentially impacting audit fees and quality (e.g., Francis, Reichelt and Wang, 2005; Francis and Yu, 2009; and Reichelt and Wang, 2010). This vector also potentially impacts the issuance of a Part I Finding, and is composed of *Logat*, the natural logarithm of the issuer's assets, to control for issuer size, *ForeignPifo*, the absolute value of pretax income from foreign operations divided by the absolute value of pretax income, *Geoseg*, the number of geographic segments of the issuers, and *Busseg*, the number of business segments of the issuer to control for issuer's complexity. *Decye* is an indicator variable equal to one if the issuer's fiscal year ends in December, to control for the busy season of the auditor. I also include the issuer's leverage ratio, *Leverage*, defined as total debt divided by total debt plus book equity, its book-to-market ratio, *BTM*, *CFOat*, the issuer's cash flows from operations deflated by beginning assets,

[23] Results are qualitatively unchanged when using other numbers, such as 2%, 4% and 5%.

StdCFOat, the standard deviation of *CFOat* computed from years t-3 to year t, and *Salegrowth*, the year-on-year sales growth of the issuer, to control for other business factors that could impact the issuance of a Part I Finding. I measure *CFOat* for the prior year, in order to not create potential issues in the regressions where the issuers' accruals are used as an explanatory variable.[24] Big 4 is an indicator variable equal to one when the audit firm is one of the Big 4. Finally, I include *Weaknesses*, the number of internal control weaknesses in a fiscal year, *HiTech*, an indicator variable equal to one when the issuer is in a hi-tech industry, and *Litigation*, an indicator variable equal to one when the issuer is in a high-litigation industry. Additional details about the explanatory and control variables are provided in Appendix A. All continuous variables are winsorized at the 1st and 99th percentiles to reduce the impact of outliers in the specifications.

4.2 Descriptive Statistics

Descriptive statistics for the inspected engagements are presented in Table 2. Overall, 27% of the inspections result in a Part I Finding. 6% of the inspected engagements received a going concern opinion, while 11% of the issuers' financial statements were eventually restated. 64% of the inspections are for Big 4 audit firms, while 70% of the issuers have December year ends and thus correspond to busy-season audits.

(Insert Table 2 About Here)

Table 3, Panel A, partitions the descriptive statistics between inspections that received no Part I Findings and those that received one. Inspections that received a Part I Finding are much more likely to receive a going concern opinion, at 9% compared with 5%, and the issuer's

[24] Specifically, because earnings equal accruals plus cash flows from operations, this could create mechanical relationships in the regressions. Results are qualitatively unchanged if I measure *CFOat* for the same year.

financial statements are more likely to be restated, at 15% compared with 10%. Further, they are more likely to report small profits, at 17% compared with 13%, and their absolute discretionary accruals, absolute accruals and absolute accruals deflated by cash flows from operations are higher. All of these results are statistically significant at 1% or better using a t-test of difference in means, and at 5% or better when using a Wilcoxon test of differences in distribution. Overall, these initial results suggest that the measures mentioned above are potentially good candidates as measures of audit quality. They also suggest that poor audit process quality, as defined by a Part I Finding, is associated with worse financial reporting outcomes, including higher accruals, an increased probability of restatements, and a higher propensity to meet/beat the zero earnings thresholds, potentially highlighting the role of a high-quality audit as defined by applicable standards. However, the direction of the going concern opinion goes opposite to prior claims in the literature. This result is consistent with a disclaimer effect of the going concern opinion on the audit. Further, there is no significant difference between groups for the signed accruals, the Dechow and Dichev accruals, and the propensity to beat last year's earnings. In terms of control variables, engagements receiving Part I Findings are for smaller issuers, as evidenced by a smaller asset size, have smaller cash flows from operations and higher book to market, and are less likely to belong to a high litigation industry or to be audited by a Big 4 firm. This suggests the need to control for these variables in multivariate specifications, which is the focus of the next subsection.

(Insert Table 3 About Here)

Panel B of Table 3 shows the correlations among the main variables of interest. Overall, the results corroborate the ones shown in Panel A. In particular, the correlations between Part I Finding and *GC*, *GCNoBankruptcy*, *Restatement*, *SmallProfit*, *AbsDA*, *AbsAccruals* and

AbsAccrualsCFO load positively at 5% or better for both Spearman and Pearson correlations. However, the correlations are relatively low, between 3% and 10%, depending on the variable used.

4.3 Empirical Results

Table 4 presents the results of the main analyses. Panel A presents the results for accruals-based measures. Unsigned Discretionary Accruals (*AbsDA*), Unsigned Scaled Accruals (*AbsAccruals*), and Accruals deflated by CFO (*AbsAccrualsCFO*) load positively in the specifications. On the other hand, signed discretionary accruals (*DA*) and Dechow and Dichev residuals (*AbsDD)* do not predict Part I Findings, as evidenced by an insignificant coefficient. Interestingly, *Big 4* loads negatively in all specifications, consistent with Big 4 auditors receiving fewer Part I Findings than non-Big 4 auditors during the sample period. This result is consistent with the argument made in prior literature of larger auditors being of higher quality (e.g, DeAngelo, 1981; Palmrose, 1988).

(Insert Table 4 About Here)

Table 4 Panel B presents the results for the other variables. Consistent with prior expectations, I find a positive association between *Part I Finding* and both *SmallProfit* and *Restatement*. I do not find any association between *Part I Finding* and *SmallBeat*. I find a positive association between *GC* and *Part I Finding*, indicating that audits where a going concern opinion is issued are more likely to receive a Part I Finding.[25] This result becomes

[25] The results on the going concern opinion are robust to inclusion of control variables for financial distress, such as the Altman Z-score and whether the issuer reports losses during the year. The results are also robust to restricting the sample to issuers that report negative earnings or negative cash flows from operations, as commonly done in the audit literature focusing on going concern opinions (e.g., Reynolds and Francis, 2000; DeFond et al., 2002).

stronger when using *GCNoBankruptcy* as the explanatory variable.[26] Overall, this result suggests that auditors may use the issuance of a going concern opinion as a disclaimer, consistent with the results in Czerney et al. (2014) who look at other atypical language in the audit reports.

(Insert Table 5 About Here)

I conduct "kitchen sink" regressions, using all the explanatory variables that worked in the analysis shown in Table 4, to determine whether the measures of audit quality that are predictive of Part I Findings have independent components from each other. Results are presented in Table 5. Overall, I find that each measure of audit quality still loads significantly when controlling for the other ones.[27] Overall, these results suggest that each measure explains audit quality independently from the other, and are consistent with the arguments presented in DeFond and Zhang (2014). In terms of economic significance, based on the results of Column (2), I find, in untabulated analyses, that one standard deviation increase in *AbsDA* raises the probability of *Part I Finding* by 1.9%, while a restatement, small profit, or going concern not followed by bankruptcy increases this probability by 11.0%, 6.6%, and 16.3%, respectively. Based on the results of Column (3), I find that one standard-deviation increase in *AbsAccrualsCFO* increases this probability by 1.4%. These numbers need to be compared with the average probability of a Part I Finding, equal to 27% according to Table 2. Overall, they suggest that large differences can be found in terms of these audit quality variables when an inspection results in a Part I Finding, especially for engagements with restatements, small profits, or going concern opinions.

[26] Untabulated analyses indicate that only *GCNoBankruptcy* loads when including both *GCNoBankrutpcy* and *GC* as explanatory variables. Consequently, I use this variable in the regressions onwards.
[27] I do not run the regressions including both unsigned discretionary accruals and unsigned accruals, because these two measures are substitutes for each other by definition.

I use the Receiver Operating Characteristic (ROC) curves to estimate the predictive power of the regressions. The ROC curve is a parametric plot of the probability of detection versus the false positive rate (e.g., Schmidt, 2012). Specifically, I compute the area under the curve (AUC), a measure of fit of the model, and present this statistic under the Pseudo R-square of each regression. A value of 0.5 of this statistic corresponds to a random model, while a value of 1.0 means perfect predictive power of the explanatory variables. Column (1)'s AUC, without including the explanatory variables, equals 0.586, indicating that the initial model is not good at predicting Part I Findings. Inclusion of all the measures of audit quality that work only increase the model AUC to 0.613, or an increase of 0.03. This increase is significant at 1% in an untabulated chi-square test. This result suggests that, collectively, all measures of audit quality included together have an incremental explanatory power on the probability of a Part I Finding. However, they only explain approximately 6% of the probability of a Part I Finding, arguably a low number.[28] Consequently, this suggests that publicly available measures of audit quality lack power as proxies of audit quality. One caveat, though, is that individual PCAOB inspections delve into specific areas. Consequently, the lack of power may also be driven by noise introduced in the inspection process itself and the Part I Finding measure of audit quality.

5. Additional tests

5.1 Positive and negative discretionary accruals

Even though *DA*, the signed discretionary accruals, does not load significantly in Table 4, it is still possible that only large positive discretionary accruals could be correlated with Part I Findings. Consequently, following prior studies (e.g., Myers, Myers and Omer, 2003; Francis

[28] This number is computed as (0.613-0.586)/(1-0.5). If I exclude all control variables from the specification but the five measures of audit quality, the ROC of this specification equals 0.576. Consequently, without inclusion of the control variables an argument can be made that, collectively, publicly available measures of audit quality explain up to 15% [computed as (0.576-0.5/(1-0.5)]of the Part I Findings.

and Yu, 2009), I rerun the specifications partitioning the sample into a positive discretionary accruals subsample and a negative discretionary accruals subsample. I keep *AbsDA* as the explanatory variable for both subsamples. Results are presented in Table 6, Columns (1) and (2). I find that both large positive and large negative accruals positively predict Part I Findings, consistent with the role of the auditor not being limited to large income increasing accruals.

(Insert Table 6 About Here)

5.2 Additional tests of signed accruals

While the use of unsigned accruals is suitable in absence of a particular directional prediction (e.g., Hribar and Nichols, 2007), signed accruals models are usually more effective when an incentive to manage earnings upwards exists (e.g., Dechow, Sloan and Sweeney, 1995; Dechow, Hutton, Kim and Sloan, 2012). My initial tests of whether accruals are predictive of Part I Findings do not consider any specific incentive, and this could explain the difference in results for signed and unsigned discretionary accruals found in Table 4. Because executives have incentives to manipulate earnings upwards to meet/beat earnings thresholds (Graham et al., 2005; Dechow, Ge and Schrand, 2010), I conduct similar analyses to the ones shown in Table 4, but by restricting the sample to issuers that just met or beat the zero earnings threshold or last years' earnings (*SmallProfit* and *SmallBeat* equal to one, respectively). Results are presented in Columns (3) and (4) of Table 6. I find a positive association between signed accruals and the probability of a Part I Finding for issuers that just met or beat the zero earnings threshold, but no association for those that met or beat last year's earnings. These results suggest that the use of signed accruals is suitable when an incentive variable can be found. They are also consistent with the results presented in Table 4 on *SmallProfit* predicting Part I Findings, but not *SmallBeat*.

5.3 Selection Bias Concerns

One concern of the analyses shown in Table 4 is related with the risk-based selection process of the PCAOB. Because the observations I use are non-randomly chosen, this could result in the potential for coefficient bias in the analyses (Lennox, Francis and Wang, 2012). Consequently, I attempt to control for selection bias using a bivariate probit model with selection. This model is similar to the Heckman (1979) model, but with binary dependent variables in the second stage (Van de Ven and Van Pragg, 1981). The idea of selection models is to use a two-stage regression. In the first stage, I model the probability of selection for inspection of a particular engagement. I then control for this selection in the second stage model. An important aspect of using such a model is to identify exclusion restrictions in the first stage that can convincingly be excluded from the second stage regression (Little, 1985; Lennox et al., 2012).

The first stage model uses as dependent variable *Inspection*, an indicator variable equal to one when an engagement is selected for inspection. I include, as explanatory variables, all the control variables identified in Model (3), as well as all the measures of audit quality that I use in the second stage regression. I also identify two exclusion restrictions. Two categories of issuers were less likely to be selected for inspection for reasons unrelated to risk assessment. I use indicator variables in the first stage regression for when issuers belong to these categories. These exclusion thresholds are likely to have an impact on which engagement is selected for inspection. However, they are unlikely to be related to whether one particular engagement will receive a Part I Finding, conditional on this specific engagement being selected for inspection.[29] Due to the

[29] As often with exclusion variables, it is impossible to fully argue that the exclusion variables will always be unrelated to the dependent variable in the second stage. For example, even in one of the best known choice of an exclusion restriction, Angrist (1990), some concerns can be found about the complete independence of the exclusion variable. In the case of this particular study, a potential concern is related to Audit Firms potentially reverse-engineering the inspection selection process of the PCAOB, and thereby putting less effort in audits of issuers that are inspected less often. In additional untabulated specifications, I also use another restriction variable, based on the proportion of issuers inspected each year by the PCAOB for a given firm. This proportion can be argued to be, at least, partially exogenous, given that it is dependent on whether an audit firm is inspected triennially or annually and

need to preserve the confidentiality of the selection process of which engagements are subject to inspection, I am unable to provide more details on these two exclusion restrictions or to tabulate the first stage regressions. However, the two identified exclusion restrictions load negatively at 1% in the first stage regressions, with t-statistics of approximately -4 and -6, respectively. In terms of economic significance, the categories corresponding to the exclusion restrictions have an average probability to be chosen for inspection that is 1.6% and 2.2% lower, respectively. Given that the average probability of being chosen for inspection is 7.2%, this decrease is important. The overall explanatory power of the first stage model is modest, evidenced by an AUC of 0.63, because the PCAOB uses a wide range of public and non-public information to determine the engagements that will be subject to inspection.

(Insert Table 7 About Here)

Results of the second stage regression, controlling for selection bias, are shown in Table 7. I find that the results shown in Table 5 are robust to controlling for selection, as evidenced by similar directions and statistically significant coefficients on all output measures of audit quality.

6. Conclusion

This paper assesses the validity of publicly available measures of audit quality in light of an accurate measure of audit process quality based on the PCAOB inspections process. I find that many of the measures widely used in prior literature are positively correlated with audit process quality, especially restatements and whether the issuer meets/beats the zero earnings threshold. However, the validity of a going concern opinion as a measure of audit quality is to be interpreted with caution. I find results consistent with a disclaimer effect hypothesis, linked with

on the PCAOB's resources available for a given year. Results also hold using this exclusion variable. However, because inspections are risk based, it is likely that the PCAOB will choose more risky engagements, on average, when the proportion of audit inspected is lower for a particular firm.

a reduction of liability when the auditor issues such an opinion. This study also provides some guidance to which measure of accruals researchers should be looking at when conducting analyses of audit quality.

I also find that, collectively, measures of audit quality based on publicly available data are only able to explain between 6% and 15% of the Part I Findings. This result is somewhat concerning as it implies that some of the results in prior literature based on one measure of audit quality, on small samples, or that find null results, may be reasonably weak. Overall, this study suggests the need to create a more powerful measure of audit quality that could be made publicly available.

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Appendix A: Variables Definitions

Variable	*Definition*
Dependent Variable:	
Part I Finding	An indicator variable equal to one if the inspection resulted in a Part I finding.
Test Variables:	
DA	The residual of a regression of accruals (deflated by beginning assets) on gross property, plant and equipment (PP&E, deflated by beginning assets), the year-on-year change in revenues (deflated by beginning assets), one over beginning assets, and prior year return on asset (ROA, defined as income before extraordinary items deflated by average assets). Accruals are defined as income before extraordinary items (Compustat IB), less cash flow from operations (Compustat OANCF) excluding extraordinary items and discontinued operations (Compustat XIDOC).
AbsDA	The absolute value of DA.
AbsDD	The absolute value of the residual of a regression of total current accruals deflated by average assets on cash flow from operations deflated by average assets for the current year, the following year, and the prior year, gross PP&E deflated by average assets, and change in revenues deflated by average assets. Total current accruals are defined as change in inventories plus change in account receivable minus change in account payables minus change in income taxes payable plus net change in other assets and liabilities. All variables appearing in the computation of total current accruals are from the cash flow statement.
AbsAccruals	Absolute value of accruals deflated by beginning assets.
AbsAccrualsCFO	Absolute value of accruals deflated by cash flow from operations.
Restatement	An indicator variable equal to one if the financial statements for the year are restated due to accounting or fraud related reasons.
SmallProfit	An indicator variable equal to one if the ROA (income before extraordinary items deflated by beginning assets) is less than 3%.
SmallBeat	An indicator variable equal to one if the year-on-year change in ROA (income before extraordinary items deflated by beginning assets) is less than 1%.
GC	An indicator variable equal to one if the auditor issued a going concern opinion.
GCNoBankruptcy	An indicator variable equal to one if the auditor issued a going concern opinion and the issuer did not declare bankruptcy the following year.
Control Variables:	
ForeignPifo	Absolute value of pretax income from foreign operations (PIFO) divided by the absolute value of pretax income (PI).
Logat	Natural logarithm of the issuer's assets.
Geoseg	Number of geographic segments, from GEOSEG in Compustat SEGMENTS.

Variable	*Definition*
Busseg	Number of business segments, from BUSSEG in Compustat SEGMENTS.
Decye	An indicator variable equal to one if the issuer's fiscal year ends in December.
StdCFOat	Standard deviation of the issuer's cash flows from operations deflated by beginning assets, computed from year t − 3 to year t.
CFOat	Issuer's cash flows from operations deflated by beginning assets.
Leverage	Total debt (short-term plus long-term) divided by the sum of total debt and equity.
BTM	Book-to-market ratio.
Litigation	An indicator variable equal to one if the issuer is in a higher litigation industry (SIC code between 2833 and 2836, 8731 and 8734, 3570 and 3577, 7370 and 7374, 3600 and 3674, or 5200 and 5961).
Big 4	Indicator variable equal to one if the audit firm is a Big 4, and zero otherwise.
Salegrowth	Year-on-year sales growth of the issuer.
Weaknesses	Number of material internal control weaknesses in a fiscal year as reported by Audit Analytics.
HiTech	An indicator variable equal to one when the firm is in a hi-tech industry (three-digit SIC code equal to 272, 283, 355, 357, 360, 361, 362, 363, 364, 365, 366, 367, 369, 381, 382, 386, 481, 484, 489, 573, 596, 621, 679, 733, 737, 738, or 873).
Inspection Variable:	
Inspection	An indicator variable equal to one if the engagement is selected for inspection by the PCAOB.

Appendix B: Job Requirements for PCAOB Inspection Team Members – Sample of Job Posting from the PCAOB Website

12/18/2014
Audit Regulator, Inspector - Chicago
Division of Registration and Inspections
Full Time, Chicago, IL

Our Mission

The PCAOB is a nonprofit corporation established by Congress to oversee the audits of public companies in order to protect the interests of investors and further the public interest in the preparation of informative, accurate and independent audit reports. The PCAOB also oversees the audits of broker-dealers, including compliance reports filed pursuant to federal securities laws, to promote investor protection.

Responsibilities

As an Inspections Specialist you will have the opportunity to use your skills and experience in auditing to participate in a rigorous program of inspections of registered public accounting firms including:

Inspecting portions of audit workpapers to assess the degree of compliance with the Sarbanes-Oxley Act, the rules of the Board, the Securities and Exchange Commission, and professional standards in connection with the performance of audits, issuance of reports, and related matters involving issuers;
Assessing the firms' quality control structures and the related impact these structures have on audit quality;
Meeting and interviewing firm personnel to (1) understand the firms' quality control structures, (2) understand the audit approach to audit engagements, and (3) further develop and/or identify quality control and/or audit deficiencies;
Gathering and organizing information to support identified inspection issues;
Researching and consulting with others on technical issues;
Communicating findings to firm personnel in meetings and in comment forms; and
Preparing comment forms and assisting with drafting inspection reports.

As an Inspections Specialist, you will also be able to:

Enhance your technical skills through inspection activities and collaboration with highly skilled Inspection teams;
Participate in inspection projects aimed at enhancing the effectiveness of the Inspection program;
Participate in the development and/or facilitation of training courses; and
Participate in the PCAOB's recruiting process.

Qualifications

Current CPA (Certified Public Accountant) license required;
Six to Fifteen years of progressively responsible experience having attained the Senior Manager or Manager level in the audit of companies traded on the U.S. markets;
Bachelor's degree in Accounting; MBA/Master's degree is a plus;
Strong knowledge of PCAOB standards, generally accepted accounting principles and/or international financial reporting standards;
Strong communication skills, both written and oral;
Ability to work independently and as a member of a team;
Ability to travel 20-30% of time (including some non-U.S. travel); and
Fluency in a foreign language is a plus.

Table 1: Sample Statistics

This table presents a year-by-year description of the inspections data sample. Panel A shows the number of inspected engagements in the sample, while Panel B shows the split between Big 4 and non-Big 4 auditors.

Panel A: Inspections by year in the sample

Year	Non Inspected	Inspected	Total Engagements
2003	5,811	370	6,181
2004	5,742	256	5,998
2005	5,627	271	5,898
2006	5,427	360	5,787
2007	5,177	420	5,597
2008	4,997	556	5,553
2009	4,905	465	5,370
2010	4,803	407	5,210
2011	4,663	454	5,117
2012	4,587	438	5,025
Total	**51,739**	**3,997**	**55,736**

Panel B: Split Big 4 non-Big 4

Year	Non Big 4	Big 4	Total
2003	69	301	370
2004	55	201	256
2005	65	206	271
2006	83	277	360
2007	183	237	420
2008	241	315	556
2009	197	268	465
2010	172	235	407
2011	198	256	454
2012	186	252	438
Total	**1,449**	**2,548**	**3,997**

Table 2: Descriptive Statistics

This table presents descriptive statistics for the inspected sample. There are 3,997 observations in the inspected sample, except for the analyses for *AbsDD*, where the sample is reduced to 3,774 due to the requirement to obtain prior and future year cash flow from operations data. See Appendix A for variable definitions.

Variable	Mean	Standard Deviation	25th percentile	50th percentile	75th percentile
Part I Finding	0.27	0.44	0.00	0.00	1.00
GC	0.06	0.23	0.00	0.00	0.00
GCNoBankruptcy	0.06	0.23	0.00	0.00	0.00
AbsDD	0.04	0.06	0.01	0.03	0.05
SmallProfit	0.14	0.35	0.00	0.00	0.00
SmallBeat	0.11	0.32	0.00	0.00	0.00
DA	-0.02	0.22	-0.08	-0.02	0.04
AbsDA	0.12	0.21	0.03	0.06	0.12
AbsAccruals	0.14	0.41	0.03	0.07	0.12
AbsAccrualsCFO	1.70	4.04	0.34	0.63	1.25
Restatement	0.11	0.32	0.00	0.00	0.00
ForeignPifo	0.23	0.43	0.00	0.00	0.28
Logat	6.36	2.42	4.93	6.44	7.97
Geoseg	2.49	2.37	1.00	2.00	4.00
Busseg	2.05	1.68	1.00	1.00	3.00
Decye	0.70	0.46	0.00	1.00	1.00
StdCFOat	0.16	0.71	0.03	0.05	0.10
CFOat	0.04	0.43	0.02	0.09	0.15
Leverage	0.31	0.52	0.03	0.26	0.49
BTM	0.56	1.18	0.26	0.49	0.82
Litigation	0.24	0.43	0.00	0.00	0.00
Big4	0.64	0.48	0.00	1.00	1.00
Salegrowth	0.19	0.72	-0.03	0.08	0.23
Weakness	0.05	0.21	0.00	0.00	0.00
HiTech	0.38	0.49	0.00	0.00	1.00

Table 3: Sample Split Between Part I Findings and no Part I Findings and Correlations

Panel A of this table presents a split of the sample between inspections that received a Part I Finding and those that did not. 2,923 inspections did not result in a Part I Finding, whereas 1,074 inspections did. A t-test (Wilcoxon test) is used to test the differences in means (distribution). Significance levels are * 10%, ** 5% and *** 1%. In Panel B, correlations among the main variables of interest are shown. Spearman correlations are above the diagonal, while Pearson correlations are below. Correlations significant at 5% or better are shown in bold.

Panel A: Sample split between No Part I Finding and Part I Finding

	No Part I Finding		Part I Finding		Tests of Difference			
Variable	**Mean**	**Median**	**Mean**	**Median**	**t-test**		**Wilcoxon**	
GC	0.05	0.00	0.09	0.00	5.66	***	5.64	***
GCNoBankruptcy	0.04	0.00	0.09	0.00	6.06	***	6.03	***
AbsDD	0.04	0.03	0.05	0.02	0.44		-0.56	
SmallProfit	0.13	0.00	0.17	0.00	3.21	***	3.20	***
SmallBeat	0.11	0.00	0.11	0.00	-0.33		-0.33	
DA	-0.02	-0.02	-0.02	-0.02	-0.13		0.70	
AbsDA	0.11	0.06	0.14	0.06	3.86	***	2.08	**
AbsAccruals	0.13	0.06	0.19	0.07	4.21	***	2.09	**
AbsAccrualsCFO	1.57	0.60	2.04	0.71	3.29	***	4.81	***
Restatement	0.10	0.00	0.15	0.00	4.66	***	4.65	***
ForeignPifo	0.23	0.00	0.23	0.00	-0.46		-2.10	**
Logat	6.42	6.48	6.18	6.30	-2.76	***	-1.89	*
Geoseg	2.51	2.00	2.43	2.00	-0.89		-1.66	*
Busseg	2.05	1.00	2.04	1.00	-0.28		-0.43	
Decye	0.70	1.00	0.71	1.00	0.32		0.32	
StdCFOat	0.13	0.05	0.23	0.05	3.75	***	-0.85	
CFOat	0.05	0.09	-0.01	0.08	-4.02	***	-4.47	***
Leverage	0.30	0.25	0.33	0.29	1.58		2.90	***
BTM	0.54	0.47	0.62	0.56	1.93	*	4.97	***
Litigation	0.25	0.00	0.21	0.00	-2.91	***	-2.90	***
Big4	0.67	1.00	0.56	1.00	-6.31	***	-6.28	***
Salegrowth	0.19	0.09	0.19	0.07	0.18		-2.22	**
Weakness	0.05	0.00	0.04	0.00	-0.51		-0.51	
HiTech	0.39	0.00	0.36	0.00	-1.52		-1.52	

Panel B: Correlations among the main variables of interest

	Part I Finding	GC	GCNoBankruptcy	AbsDD	SmallProfit	SmallBeat	DA	AbsDA	Abs Accruals	Abs Accruals CFO	Restatement
Part I Finding		**0.09**	**0.10**	-0.01	**0.05**	-0.01	0.01	**0.03**	**0.03**	**0.08**	**0.07**
GC	**0.09**		**0.97**	**0.19**	**-0.08**	**-0.08**	**0.03**	**0.23**	**0.24**	**0.14**	0.01
GCNoBankruptcy	**0.10**	**0.97**		**0.19**	**-0.08**	**-0.08**	**0.03**	**0.23**	**0.24**	**0.14**	0.01
AbsDD	0.01	**0.35**	**0.34**	**1.00**	**-0.11**	**-0.13**	0.01	**0.35**	**0.24**	**0.09**	**0.04**
SmallProfit	**0.05**	**-0.08**	**-0.08**	**-0.09**		**0.10**	**0.05**	**-0.16**	**-0.14**	**0.11**	**0.02**
SmallBeat	-0.01	**-0.08**	**-0.08**	**-0.09**	**0.10**		0.02	**-0.15**	**-0.17**	**-0.09**	-0.04
DA	0.00	**-0.04**	**-0.04**	**-0.04**	0.02	0.00		**-0.22**	**-0.29**	**-0.10**	0.03
AbsDA	**0.06**	**0.39**	**0.39**	**0.48**	**-0.12**	**-0.10**	**-0.22**		**0.44**	**0.19**	0.01
AbsAccruals	**0.07**	**0.42**	**0.43**	**0.43**	**-0.08**	**-0.08**	**-0.53**	**0.71**		**0.62**	0.02
AbsAccrualsCFO	**0.05**	**0.16**	**0.16**	**0.08**	**-0.08**	**-0.08**	**-0.17**	**0.20**	**0.21**		0.03
Restatement	**0.07**	0.01	0.01	**0.04**	0.02	-0.04	**0.03**	0.00	-0.01	0.02	

Table 4: Results of the Part I Findings Prediction Model

This table presents the results of Model (3). The dependent variable, Part I Finding, equals one if the inspection results in the issuance of a Part I Finding. Each column shows the regression results for a different measure of audit quality, *Measure of Audit Quality*, shown at the top of each column. Panel A presents the regression results for accruals-based measures of audit quality, while Panel B presents the regression results for the other measures of audit quality. Variable definitions are provided in Appendix A. The z-statistic (in parenthesis) is below the coefficient. Standard-errors are clustered at the issuer-level. Significance levels are * 10%, ** 5% and *** 1%.

Panel A: Accruals-based measures of audit quality

Dependent variable: Part I Finding	**DA**	**AbsDA**	**AbsDD**	**AbsAccruals**	**AbsAccrualsCFO**
Measure of Audit Quality	-0.077	0.530***	-0.657	0.276***	0.023***
	[-0.422]	[2.671]	[-0.962]	[2.633]	[2.792]
ForeignPifo	0.019	0.025	0.008	0.021	0.022
	[0.199]	[0.272]	[0.081]	[0.229]	[0.235]
Logat	0.027	0.038*	0.028	0.034	0.033
	[1.170]	[1.674]	[1.209]	[1.517]	[1.433]
Geoseg	0.012	0.012	0.013	0.013	0.012
	[0.694]	[0.684]	[0.742]	[0.760]	[0.672]
Busseg	-0.003	-0.002	-0.007	-0.002	-0.002
	[-0.118]	[-0.099]	[-0.305]	[-0.086]	[-0.101]
Decye	0.001	-0.005	0.017	-0.007	-0.005
	[0.010]	[-0.064]	[0.196]	[-0.086]	[-0.056]
StdCFOat	0.083	0.068	0.064	0.065	0.088
	[1.317]	[1.125]	[0.898]	[1.014]	[1.428]
CFOat	-0.238**	-0.177*	-0.288***	-0.142	-0.230**
	[-2.407]	[-1.791]	[-2.583]	[-1.373]	[-2.347]
Leverage	0.149*	0.176**	0.120	0.170**	0.135*
	[1.833]	[2.168]	[1.358]	[2.115]	[1.672]
BTM	0.066*	0.076**	0.076*	0.079**	0.064*
	[1.768]	[2.056]	[1.795]	[2.127]	[1.821]
Litigation	-0.212**	-0.211**	-0.222**	-0.215**	-0.209**
	[-2.113]	[-2.094]	[-2.153]	[-2.139]	[-2.085]
Big4	-0.510***	-0.513***	-0.505***	-0.515***	-0.510***
	[-5.312]	[-5.322]	[-5.089]	[-5.344]	[-5.317]
Salegrowth	-0.029	-0.044	-0.002	-0.036	-0.028
	[-0.539]	[-0.833]	[-0.032]	[-0.680]	[-0.532]
Weakness	-0.085	-0.072	-0.047	-0.073	-0.097
	[-0.491]	[-0.417]	[-0.267]	[-0.421]	[-0.560]
HiTech	-0.046	-0.054	-0.038	-0.041	-0.052
	[-0.516]	[-0.612]	[-0.420]	[-0.464]	[-0.585]
Constant	-0.903***	-1.044***	-0.898***	-1.004***	-0.970***
	[-6.305]	[-6.890]	[-5.684]	[-6.822]	[-6.734]
Observations	3,997	3,997	3,774	3,997	3,997
Pseudo R-squared	0.0153	0.0168	0.0146	0.0168	0.0168
AUC	0.586	0.590	0.585	0.590	0.589

Panel B: Other measures of audit quality

Dependent variable: Part I Finding	SmallProfit	SmallBeat	GC	GCNoBankruptcy	Restatement
Measure of Audit Quality	0.317***	-0.031	0.706***	0.786***	0.528***
	[3.074]	[-0.273]	[3.865]	[4.229]	[4.890]
ForeignPifo	-0.011	0.018	0.025	0.026	0.020
	[-0.117]	[0.194]	[0.263]	[0.276]	[0.217]
Logat	0.020	0.028	0.049**	0.051**	0.031
	[0.890]	[1.233]	[2.140]	[2.229]	[1.371]
Geoseg	0.016	0.012	0.012	0.012	0.013
	[0.947]	[0.681]	[0.685]	[0.693]	[0.741]
Busseg	-0.005	-0.003	-0.004	-0.004	-0.003
	[-0.203]	[-0.116]	[-0.161]	[-0.163]	[-0.129]
Decye	0.000	0.002	-0.010	-0.011	0.004
	[0.003]	[0.021]	[-0.120]	[-0.130]	[0.055]
StdCFOat	0.089	0.086	0.060	0.055	0.090
	[1.434]	[1.373]	[1.009]	[0.919]	[1.452]
CFOat	-0.225**	-0.237**	-0.138	-0.137	-0.233**
	[-2.287]	[-2.392]	[-1.399]	[-1.408]	[-2.342]
Leverage	0.143*	0.147*	0.132*	0.134*	0.135*
	[1.772]	[1.818]	[1.723]	[1.752]	[1.661]
BTM	0.056	0.064*	0.086**	0.085**	0.063*
	[1.518]	[1.729]	[2.401]	[2.373]	[1.680]
Litigation	-0.203**	-0.211**	-0.215**	-0.219**	-0.233**
	[-2.025]	[-2.107]	[-2.144]	[-2.178]	[-2.326]
Big4	-0.505***	-0.511***	-0.507***	-0.507***	-0.530***
	[-5.273]	[-5.334]	[-5.227]	[-5.223]	[-5.522]
Salegrowth	-0.023	-0.030	-0.039	-0.040	-0.036
	[-0.421]	[-0.567]	[-0.742]	[-0.748]	[-0.673]
Weakness	-0.088	-0.085	-0.084	-0.076	-0.133
	[-0.506]	[-0.491]	[-0.490]	[-0.448]	[-0.777]
HiTech	-0.042	-0.046	-0.026	-0.025	-0.042
	[-0.475]	[-0.515]	[-0.287]	[-0.283]	[-0.476]
Constant	-0.910***	-0.906***	-1.094***	-1.109***	-0.977***
	[-6.359]	[-6.321]	[-7.482]	[-7.548]	[-6.744]
Observations	3,997	3,997	3,997	3,997	3,997
Pseudo R-squared	0.0173	0.0152	0.0188	0.0195	0.0203
AUC	0.592	0.586	0.597	0.599	0.595

Table 5: Results of the "Kitchen Sink" Prediction Model

This table presents the results of Model (3) when using "kitchen sink" regressions, including all the variables that were predictive of Part I Findings in Table 4. Variable definitions are provided in Appendix A. Standard-errors are clustered at the issuer-level. The z-statistic (in parenthesis) is below the coefficient. Significance levels are * 10%, ** 5% and *** 1%.

Dependent variable: Part I Finding	**(1)**	**(2)**	**(3)**	**(4)**
AbsDA		0.456**	0.391**	
		[2.331]	[1.981]	
AbsAccruals				0.185*
				[1.779]
AbsAccrualsCFO			0.018**	0.018**
			[2.123]	[2.123]
Restatement		0.523***	0.521***	0.524***
		[4.822]	[4.799]	[4.826]
SmallProfit		0.324***	0.336***	0.329***
		[3.140]	[3.250]	[3.184]
GCNoBankruptcy		0.740***	0.708***	0.706***
		[3.963]	[3.790]	[3.752]
ForeignPifo	0.018	0.004	0.005	0.002
	[0.196]	[0.042]	[0.053]	[0.022]
Logat	0.027	0.056**	0.058**	0.055**
	[1.195]	[2.434]	[2.499]	[2.370]
Geoseg	0.012	0.017	0.017	0.018
	[0.697]	[0.989]	[0.980]	[1.026]
Busseg	-0.003	-0.005	-0.005	-0.005
	[-0.125]	[-0.226]	[-0.209]	[-0.200]
Decye	0.001	-0.013	-0.016	-0.017
	[0.016]	[-0.159]	[-0.199]	[-0.207]
StdCFOat	0.086	0.048	0.053	0.052
	[1.375]	[0.834]	[0.926]	[0.879]
CFOat	-0.236**	-0.078	-0.085	-0.063
	[-2.389]	[-0.788]	[-0.857]	[-0.605]
Leverage	0.148*	0.144*	0.131*	0.124
	[1.820]	[1.857]	[1.696]	[1.626]
BTM	0.064*	0.086**	0.084**	0.084**
	[1.726]	[2.365]	[2.377]	[2.400]
Litigation	-0.211**	-0.231**	-0.229**	-0.232**
	[-2.104]	[-2.290]	[-2.272]	[-2.307]
Big4	-0.509***	-0.527***	-0.527***	-0.528***
	[-5.311]	[-5.407]	[-5.409]	[-5.426]
Salegrowth	-0.030	-0.047	-0.043	-0.038
	[-0.564]	[-0.927]	[-0.851]	[-0.734]
Weakness	-0.084	-0.118	-0.130	-0.131
	[-0.486]	[-0.698]	[-0.760]	[-0.768]
HiTech	-0.045	-0.028	-0.033	-0.024
	[-0.509]	[-0.316]	[-0.369]	[-0.268]
Constant	-0.905***	-1.297***	-1.324***	-1.286***
	[-6.314]	[-8.350]	[-8.495]	[-8.462]
Observations	3,997	3,997	3,997	3,997
Pseudo R-squared	0.0152	0.0277	0.0286	0.0284
AUC	0.5856	0.6121	0.6133	0.6131

Table 6: Robustness Tests on Discretionary Accruals

This table provides robustness tests on the discretionary accruals analysis. The sample is partitioned between positive and negative discretionary accruals in the first two columns, respectively. In the third column, the sample is restricted to issuers that report small profits (*SmallProfit* equal to one), and small profit increases (*SmallBeat* equal to one) in the fourth. Variable definitions are provided in Appendix A. Standard-errors are clustered at the issuer-level. The z-statistic (in parenthesis) is below the coefficient. Significance levels are * 10%, ** 5% and *** 1%.

Dependent variable: Part I Finding	**Positive Accruals subsample**	**Negative Accruals subsample**	**SmallProfit subsample**	**SmallBeat subsample**
AbsDA	0.744**	0.424*		
	[2.158]	[1.719]		
DA			3.504***	0.321
			[2.694]	[0.203]
ForeignPifo	-0.155	0.118	-0.173	-0.305
	[-0.999]	[0.988]	[-1.012]	[-0.900]
Logat	0.032	0.039	0.173***	0.301***
	[0.952]	[1.253]	[3.058]	[4.260]
Geoseg	-0.025	0.036	0.050	0.028
	[-0.936]	[1.556]	[1.133]	[0.466]
Busseg	0.015	-0.013	-0.022	-0.092
	[0.407]	[-0.429]	[-0.409]	[-1.475]
Decye	0.083	-0.066	0.074	-0.076
	[0.652]	[-0.620]	[0.336]	[-0.279]
StdCFOat	0.047	0.081	-0.775	-1.897
	[0.454]	[1.059]	[-0.936]	[-1.027]
CFOat	-0.158	-0.166	0.263	0.390
	[-1.020]	[-1.159]	[0.220]	[0.299]
Leverage	0.098	0.240**	-0.327	0.121
	[0.722]	[2.403]	[-0.907]	[0.244]
BTM	0.143**	0.042	0.086	0.288
	[1.977]	[0.961]	[0.772]	[1.351]
Litigation	-0.191	-0.233*	-0.197	-0.754**
	[-1.252]	[-1.767]	[-0.713]	[-2.187]
Big4	-0.330**	-0.633***	-0.618**	-1.607***
	[-2.200]	[-5.085]	[-2.363]	[-4.652]
Salegrowth	-0.103	0.038	0.126	-0.087
	[-1.613]	[0.439]	[0.488]	[-0.305]
Weakness	0.047	-0.162	0.208	0.218
	[0.167]	[-0.741]	[0.477]	[0.398]
HiTech	-0.014	-0.098	0.305	0.301
	[-0.102]	[-0.851]	[1.314]	[1.040]
Constant	-1.153***	-0.966***	-1.607***	-2.108***
	[-4.890]	[-4.721]	[-3.726]	[-3.589]
Observations	1,588	2,409	575	450
Pseudo R-squared	0.0176	0.0220	0.0340	0.0862
AUC	0.5979	0.6002	0.6237	0.7034

Table 7: Selection Model

This table shows the second stage regression of a bivariate probit with selection model, with *Part I Finding* as the dependent variable. The first stage regression is not reported to preserve confidentiality. Standard errors are clustered at the firm level. The z-statistic (in parenthesis) is below the coefficient. Significance levels are * 10%, ** 5% and *** 1%.

Dependent Variable: Part I Finding	**(1)**	**(2)**	**(3)**
AbsDA	0.262**	0.226**	
	[2.33]	[2.01]	
AbsAccruals			0.124**
			[2.09]
AbsAccrualsCFO		0.010*	0.010*
		[1.96]	[1.88]
Restatement	0.340***	0.339***	0.341***
	[5.50]	[5.46]	[5.50]
SmallProfit	0.158**	0.165***	0.161**
	[2.33]	[2.42]	[2.37]
GC No Bankruptcy	0.463***	0.445***	0.439***
	[4.28]	[4.12]	[4.02]
ForeignPifo	0.037	0.037	0.036
	[0.65]	[0.65]	[0.63]
Logat	0.050***	0.051***	0.049***
	[3.20]	[3.23]	[3.15]
Geoseg	0.019*	0.019*	0.020*
	[1.71]	[1.69]	[1.76]
Busseg	0.008	0.008	0.008
	[0.52]	[0.52]	[0.54]
Decye	-0.012	-0.014	-0.014
	[-0.26]	[-0.30]	[-0.31]
StdCFOat	0.030	0.033	0.031
	[0.91]	[0.99]	[0.90]
CFOat	-0.021	-0.026	-0.009
	[-0.34]	[-0.41]	[-0.14]
Leverage	0.073	0.067	0.065
	[1.61]	[1.49]	[1.47]
BTM	0.047**	0.046**	0.048**
	[2.27]	[2.29]	[2.37]
Litigation	-0.102	-0.102	-0.103
	[-1.57]	[-1.56]	[-1.59]
Big4	-0.319***	-0.319***	-0.320***
	[-5.63]	[-5.64]	[-5.65]
Salegrowth	-0.025	-0.022	-0.020
	[-0.87]	[-0.79]	[-0.69]
Weakness	0.005	-0.002	-0.001
	[0.05]	[-0.02]	[-0.01]
HiTech	-0.005	-0.007	-0.002
	[-0.09]	[-0.15]	[-0.04]
Constant	-1.671***	-1.672***	-1.662***
	[-2.82]	[-2.80]	[-2.84]
Observations	3,997	3,997	3,997
Chi-Square	117.82***	121.07***	122.44***
R-square	0.031	0.032	0.031