

# **Are Discretionary Accruals a Good Measure of Audit Quality?**

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*Numerous studies use discretionary accruals (DA) as a proxy of audit quality; yet, there is no conclusive evidence on whether DA are a good proxy for audit quality. To test whether DA are a good measure of audit quality, we examine the association between DA and five measures of audit quality, namely; the likelihood restatement, *f4* audit, negative internal control report, going concern opinion, and auditor's industry specialization. The results show that while there is an association between DA and each of the first three audit quality measures, such an association is absent in the case of each of the last two. These mixed results indicate that DA are not necessarily a good measure of audit quality.*

## **INTRODUCTION**

Knapp (1991) and Schroeder et al. (1986) indicate that despite the importance of the audit quality concept, it is not explicitly defined by technical standards nor, have researchers arrived at a consensual understanding of its meaning. Francis (2011) explains that audit quality is a complex concept and cannot be reduced to a simple definition; however, he indicates that “audit standards imply that audit quality is achieved by the issuance of the “appropriate audit report on the client’s compliance with Generally Accepted Accounting Principles.” He also states that a good audit is “one in which the auditor complies with auditing standards and issues the correct opinion regarding the client’s financial statements at an appropriate level of audit risk.” He indicates that audit quality is affected by factors included in a framework he has introduced that includes testing procedures, team personnel, audit processes, accounting firms, audit industry, and institutions that affect auditing, such as AICPA, PCAOB, FASB, etc.

DeAngelo (1981) defines audit quality as “the market assessed joint probability that a given auditor will both (a) discover a breach in the client’s accounting system and (b) report the breach.” She indicates that audit quality is positively associated with auditor independence. On the other hand, audit failure is defined as: “issuing an erroneous audit opinion as the result of an underlying failure to comply with the requirements of Generally Accepted Auditing Standards” (Arens et al., 2008). PCAOB Audit Standard No. 7 (AS7) addresses the issue of engagement quality review. The objective of this standard is to provide guidance for those who perform a second-partner review of audit or review engagements quality. This standard provides a definition of an audit deficiency. It states: “A significant engagement deficiency in an audit exists when (1) the engagement team failed to obtain sufficient appropriate evidence in accordance with the standards of the PCAOB, (2) the engagement team reached an inappropriate overall

conclusion on the subject matter of the engagement, (3) the engagement report is not appropriate in the circumstances, or (4) the firm is not independent of its client.” From these definitions, we can identify major characteristics of a high audit quality, namely: issuing an appropriate opinion by an independent firm, while following auditing standards. Since in most cases, data on whether the auditor followed the standards is not readily available, the majority of the audit research articles that address audit quality use discretionary accruals (DA) as a proxy for audit quality, despite the fact that DA may not be the best measure of audit quality. For example, Francis (2011) indicates that “while earnings quality is an important stream of research in financial accounting, it could be argued that earnings-quality metrics are not an appropriate measure of audit quality.” He explains that financial statements of firms with extreme value of earnings quality measures, not necessarily imply that such financial statements are misstated.

In his top 10 wish list for audit research, Nusbaun (2007) identifies “the meaning of improving audit quality” as an important area for future research. He adds that “we need to begin by addressing more fundamental questions: What is quality? What does it mean to bring quality to an audit?” The importance and implication of our paper stem from these questions.

The purpose of this paper is to examine whether DA are really a relevant proxy of audit quality or whether they are used for lack of data on other measures of audit quality. The concern is that DA are used extensively in the accounting and auditing research as a “silver bullet” to measure or serve as a proxy for many things. In addition to audit quality, they are used as a proxy for earnings quality (Bedard et al., 2012), accounting conservatism (Ahmed et al., 2002), auditor conservatism (Ajona et al., 2008), etc. The lack of empirical evidence that supports the robustness of DA as a measure of all these variables, especially audit quality, drives our research question. Our study is the first, to the best of our knowledge, to attempt to address whether DA are a good measure for audit quality.

Chambers and Payne (2011) address whether the quality of accruals, measured by their persistence, relates to an audit quality attribute which is Big N firm independence. Their research does not address directly whether DA is a proxy for audit quality. In this paper, we hypothesize that if DA are a good measure of audit quality, then they should be highly associated with other indicators of audit quality, such as the likelihood of restating the company’s financial statements (Stanley and DeZoort, 2007), performing the audit by one of the Big N firms (Lennox, 1999), the likelihood of issuing a going concern opinion (Carey and Simnett, 2006; Knechel and Vanstraelen, 2007), the level of industry specialization (Balsam et al., 2003), and the efficiency of the internal control.

Data on entities with restatements of financial statements, going concern reports, negative internal control reports, are collected from AUDIT ANALYTICS, and the necessary financial data for these entities are collected from COMPUSTAT over the period, 1995 to 2010. The accruals are estimated using the Modified Jones Model (Dechow et al., 1995). The results of examining the association between DA and these measures are mixed. While the associations between DA and the restatements of financial statements, audit by Big 4 firms, and negative internal control reports are in the expected direction, the association between DA and going concern opinions is insignificant and the association of DA with the industry specialization of the audit firms is in the opposite direction.

## **BACKGROUND AND HYPOTHESES DEVELOPMENT**

Allen and Woodland (2010) find that even though higher education requirements (150 hours) lead to increase in audit fees, it does not affect audit quality as measured by DA. Using a sample of Taiwanese companies, Chen et al. (2008) examine whether audit firm/partner tenure affects earnings quality measured by performance adjusted DA. Contrary to the arguments supporting Sarbanes-Oxley Act’s 5 year partner rotation requirements, Chen et al. (2008) find a negative association between audit firm/partner rotation and DA. However, Chi et al. (2009) criticize this article and indicate that the research sample period used by Chen et al. (2008) is prior to 2003 when partner rotation in Taiwan was voluntary; therefore, the results do not reflect the effect of mandatory auditor rotation on earnings quality. Instead, Chi et al. (2009) examine audit quality after 2004 when partner rotation became mandatory. Using performance-matched abnormal accruals as a proxy for audit quality, they do not find that partner

rotation enhances audit quality. Also, Manry et al. (2008) address the association of audit quality and partner tenure. They use DA as a measure of audit quality and they also provide evidence on the increased audit quality with the length of partner tenure.

Balsam et al. (2003) extend the research on audit quality and earnings quality. They state that: “because auditor quality is multidimensional and inherently unobservable, there is no single auditor characteristic that can be used to proxy for it,” and that: “Earnings quality is a concept that does not have a common definition in the literature.” They use auditor industry specialization as a proxy of audit quality and two measures of earnings quality, namely, DA and earnings response coefficient. Their findings generally support a positive relation between earnings and audit quality measures. Choi, Kim, Kim, and Zang (2010) examine the effect of office, not firm, size on audit quality measured by unsigned DA; they find that office size has a positive effect on both audit quality and audit fees. Using the magnitude of absolute DA, Choi, Kim, and Zang (2010) study the association between abnormal audit fees and audit quality. They find that the association between the two is asymmetric. That is, for abnormally low audit fees, there is no significant association, but for positive abnormal audit fees, the association is negative. This means that the auditors’ incentive to perform quality audit work is based on the amount of fees received. Becker et al. (1998) do not use DA as a measure of audit quality, but as a measure of earnings management, and use firm size as a proxy for audit quality. They find that non-Big six audit firms’ clients report income-increasing DA more than big-six clients. In addition, they report that non-big six firms allow their clients more accounting flexibility that lead to a higher level of earnings management.

We notice from this brief literature review that some studies examine the association between audit quality and DA as variables independent from each other (e.g., Becker et al., 1998), while other studies use DA as a proxy or a measure of audit quality (e.g., Allen and Woodland, 2010). This inconsistency is another motivation for our study.

### **Restatements of Financial Statements**

Francis (2011) shows that restatements indicate a higher rate of low-quality audits. Also, Gunny and Zhang (2009) indicate that clients of audit firms, which Public Company Accounting Oversight Board (PCAOB) reports as having failed to discover a significant departure from GAAP, are more likely to have a subsequent restatement of earnings. This implies that there is a negative association between restatements and audit quality. Also, Chen and Chi (2009) study the restatements of financial statements and the auditor’s industry expertise. Even though they find no evidence that firm-level experts lower the likelihood of accounting restatements, the results of their study indicate a negative association between signing partner expertise and accounting restatements. Romanus et al. (2008) examine the effect of auditor’s industry specialization on audit quality. They measure audit quality by the likelihood of accounting restatements. They state that: “Restatements provide more direct evidence that the auditor failed to either detect or report an accounting treatment that is inconsistent with GAAP than other common proxies for audit quality such as accrual-based metrics (DeFond and Francis 2005).” All of these studies use accounting restatements as an indicator of audit quality. Therefore, if DA are a proxy for audit quality, they are expected to be associated with the restatements of financial statements. Based on this we examine the following hypothesis:

*H1: There is a significantly positive relationship between the level of DA and the restatements of companies’ financial statement.*

### **Going Concern Opinion**

Another measure of audit quality is issuing a going concern opinion (Carey and Simnett, 2006). Lennox (1999) uses the going concern opinion to measure auditor reporting accuracy. Also, Francis and Yu (2009) test the prediction that larger offices of Big 4 firms have higher quality audits by measuring the likelihood of larger offices issuing more going-concern reports. That is, they measure audit quality by the likelihood of audit firms issuing going concern opinion. Then, if the DA are a good proxy for audit

quality, there should be a lower level of DA when a firm receives a going concern opinion, i.e., a negative association between the DA and the going concern opinion. Thus we stipulate the following hypothesis:

*H2: DA tend to be lower for companies receiving going concern opinions.*

#### **Big 4 Audit Firms**

Lennox (1999) documents that the Big 4 firms issue more accurate audit reports than do the non-Big 4 accounting firms. Arguing that big firms have more to lose in case of litigation, Dye (1993) indicates that these firms will provide higher audit quality. Francis and Yu (2009) find that larger offices of Big 4 firms provide higher quality audits. Knapp (1991) finds that audit committee members perceive auditor size and tenure to have a significant influence on the quality of the audit service. These studies suggest a positive relationship between audit quality and Big 4 audit. Therefore, if DA measure audit quality, Big 4 clients should have significantly lower DA. Hence our third hypothesis is stated as follows:

*H3: DA are lower in companies receiving Big 4 audits.*

#### **Internal Control Efficiency**

Internal control (IC) is defined as a set of policies and procedures that are designed and implemented by the management of an entity to help achieve the entity's goals in terms of reliable financial reporting, efficient operations, and following laws and regulations. Sarbanes-Oxley Act of 2002, section 404, requires management of accelerated filers to issue a statement on the effectiveness of each filer's the IC and the auditors of accelerated filers to obtain an understanding, audit, and issue an opinion on the effectiveness of the IC systems of these entities. We assume that an auditor issuing a negative IC opinion is a sign of a high level of auditor independence, and, therefore if the DA reflect audit quality, they should be low in entities receiving negative IC opinions.

*H4: DA are low in firms after receiving IC negative report.*

#### **Industry Specialization of Audit Firms**

Balsam et al. (2003) find clients of industry specialist auditors have lower DA. Romanus et al. (2008) list several studies that provide evidence that industry specialization appears to enhance the auditors' error detection and mitigate the use of accruals-based earnings management. Jensen and Payne (2005) use industry experience levels (industry expertise) as a proxy for auditor quality in examining the links between audit service procurement, audit quality, and audit fees. We reexamine these findings by testing the following hypothesis:

*H 5: DA are lower in a company which is audited by a firm with a high level of industry specialization.*

### **RESEARCH METHOD AND RESULTS**

A unique feature of this paper is that we relate different audit quality measures to DA; therefore, we collect several data sets on each of these measures, namely: restatements of financial statements, going concern opinions, internal control negative reports, industry specialization of audit firms, and Big 4 audits. To test the first three hypotheses, we collected data from AUDIT ANALYTICS, then we collect samples that have observations on restatements, going concern opinions, and internal control negative reports, then we match them with firms that are free of these attributes based on 4 digit SIC code and size measured by total assets. Data on the matching groups are collected from COMPUSTAT. For testing hypotheses related to the Big 4 audit firms and the industry specialization, data are collected from COMPUSTAT.

The following model is used to examine all five hypotheses:

$$AQF_{it} = \alpha + \beta_1 DA_{it} + \beta_2 \ln\_TA_{it} + \beta_3 ROA_{it} + \beta_4 DTEQ_{it} + \beta_5 MKBK_{it} + \beta_6 IND_{it} + \beta_7 BIG4_{it} + \varepsilon_{it} \quad (1)$$

Where, for each company  $I$  in period  $t$ ,  $AQF_{it}$  is the audit quality factor,  $DA_{it}$  is the discretionary accruals,  $\ln\_TA_{it}$  is the natural log of the total assets to control for the size of the entity,  $ROA_{it}$  is return on assets to control for the profitability,  $DTEQ_{it}$  is debt to equity ratio to control for the leverage,  $MKBK_{it}$  is the market value to book value ratio to control for the growth,  $IND_{it}$  is the industry controlled by the SIC code to control for the company's industry, and  $BIG4_{it}$  is a dummy variable that equal 1 if the auditor is one of the Big 4, and 0 otherwise, to control for the accounting firm size.  $DA_{it}$  are estimated following Dechow et al. (1995), as we use the Modified Jones Model to estimate the  $DA$  as follow:

$$ACC_{it} / TA_{it-1} = \alpha_0 / TA_{it-1} + \alpha_1 (\Delta Revenue_{it} - \Delta AR_{it}) / TA_{it-1} + \alpha_2 PPE_{it} / TA_{it-1} + \varepsilon_{it} \quad (2)$$

where, for each company  $i$  and period  $t$ ,  $ACC_{it}$  is the accruals, measured, in (3), as the change in current assets minus the change in current liabilities, minus the change in cash and cash equivalent, plus the change in short term debt included in the current liability, and minus the depreciation expense;  $TA_{it}$  is the total asset  $it$ ;  $\Delta Revenue_{it}$  is the change in revenue; and  $PPE_{it}$  is the level of gross property, plant, and equipment.

$$ACC_{it} = \Delta CA_{it} - \Delta CL_{it} - \Delta CASH_{it} + \Delta STD_{it} - DEP_{it} \quad (3)$$

### Restatements of Financial Statements

We start with data on all positive and negative restatements from AUDIT ANALYTICS 1995 to 2010. Total number of observations was 11,355 observations. After removing observations missing tickers or other relevant variables we are left with 5,194 observations. After merging these observations with data from COMPUSTAT and removing other missing observations, we have 2,940 observations left. Then we remove observations of firms in the financial services industries (SIC code 6000-6999), with 1,806 usable observations left. We match the firms in this usable set with firms with no financials statement restatements based on the SIC code and size (10% over or under of the total assets). After removing observations without a match, and removing the upper and lower 1% of the variables used in the model, we are left with a total of 3,861 observations. Table 1 shows descriptive statistics of the main variables. Panel A shows the descriptive statistics for all firms in the sample, while Panel B and C show the descriptive statistics for companies with restated financial statements and companies without restated financial statements, respectively. Comparing the  $DA$  levels on average in companies with versus companies without restatements, the results in panel B show that firms with restated financial statements have a mean  $DA$  of 0.02 which is larger than that in Panel C of the companies without restated financial statements, -0.05, which is in the same direction expected under our first hypothesis, H1.

**TABLE 1**  
**DESCRIPTIVE STATISTICS FOR THE RESTATEMENTS**

Panel A - All firms with and without restatements:

Variable	N	Mean	SD	Min	Max
Discretionary Accruals	3861	-0.03	0.19	-1.44	0.97
Current Assets	3861	331.87	847.50	0.00	14509.00
Current Liabilities	3861	216.98	656.53	0.02	8120.35
Cash	3861	110.29	368.74	0.00	10110.00
Short Term Debt	3861	40.77	182.24	0.00	3678.66
Depreciation	3861	4505	133.53	0.00	2199.00
Sales	3861	841.51	2551.85	0.00	51760.00
Net PPE	3861	366.46	1272.52	0.00	16675.69
ROA	3861	-13.02	44.79	-399.22	34.49
Total Assets	3861	958.76	2561.34	0.65	23754.00
Debt to Equity	3861	61.41	139.39	-659.72	1274.42
Market to Book	3861	3.33	5.62	-28.37	54.31

Panel B - Control group (firms with restatements of financial statements):

Variable	N	Mean	SD	Min	Max
Discretionary Accruals	1806	0.02	0.17	-1.32	0.89
Current Assets	1806	312.26	825.27	0.00	9267.00
Current Liabilities	1806	206.53	639.77	0.02	7484.40
Cash	1806	99.55	313.43	0.00	4674.00
Long Term Debt	1806	39.49	180.39	0.00	3678.66
Depreciation	1806	42.92	127.56	0.00	1599.00
Sales	1806	818.71	2624.45	-26.48	51760.00
Net PPE	1806	348.16	1195.21	0.00	16675.69
ROA	1806	-16.56	49.60	-399.22	33.10
Total Assets	1806	925.20	2480.01	0.85	23184.73
Debt to Equity	1806	63.24	152.86	-659.72	1268.24
Market to Book	1806	2.83	5.27	-26.12	52.73

Panel C - Matching group (firms without restatements of financial statements):

Variable	N	Mean	SD	Min	Max
Discretionary Accruals	2055	-0.05	0.19	-1.43	0.58
Current Assets	2055	349.09	915.44	0.00	14509.00
Current Liabilities	2055	226.17	670.94	0.04	8120.35
Cash	2055	119.74	411.10	0.00	10110.00
Long Term Debt	2055	41.91	183.88	0.00	3227.82
Depreciation	2055	46.91	138.56	0.00	2199.00
Sales	2055	869.06	2486.71	0.00	37406.00
Net PPE	2055	382.54	1336.85	0.00	15833.00
ROA	2055	-9.91	39.84	-342.99	34.49
Total Assets	2055	988.24	2630.99	0.65	23754.00
Debt to Equity	2055	59.81	126.27	0.00	1274.42
Market to Book	2055	3.77	5.88	-28.37	54.31

Discretionary Accruals, using Modified Jones Model, are the residual in model (2) run with no intercept, Current Assets are year-end current assets (COMPUSTAT item A4 ), current liabilities are the year-end current liabilities (COMPUSTAT item A5 ), cash is cash and cash equivalent (COMPUSTAT item A1), Long Term Debt is

(COMPUSTAT item A9), Depreciation is depreciation and amortization expense (COMPUSTAT item A14 ), Sales are net sales (COMPUSTAT item A12), Net PPE is net property plant and equipment (COMPUSTAT item A8 ), ROA is return on assets (COMPUSTAT item A237 divided by item A6 multiplied by100 ), Total Assets (COMPUSTAT item A2), Debt to Equity is the long term debt to shareholders equity ratio (COMPUSTAT item 100 x (COMPUSTAT item A9 / (COMPUSTAT item A60 + COMPUSTAT item A130) ), Market to Book ratio of a company's market value to its book value.

**TABLE 2**  
**RESTATEMENTS AND DISCRETIONARY ACCRUALS**

$$\text{RESTAT}_{it} = \alpha + \beta_1 \text{DA}_{it} + \beta_2 \ln\_TA_{it} + \beta_3 \text{ROA}_{it} + \beta_4 \text{DTEQ}_{it} + \beta_5 \text{MKBK}_{it} + \beta_6 \text{IND}_{it} + \beta_7 \text{BIG4}_{it} + \varepsilon_{it}$$

Variable	Parameter Estimate	t-statistic	p-value
Intercept	0.975	25.58	<0.000
DA	0.456	11.78	<0.000
ln_TA	0.040	9.89	<0.000
ROA	-0.001	-6.44	<0.000
DTEQ	0.001	1.56	0.118
MKBK	-0.006	-4.54	<0.000
BIG4	-0.641	-30.19	<0.000
SIC	0.000	1.83	0.069

Adj-R<sup>2</sup> = 24.17%

F-test = 176.76

p < 0.0001

Where RESTAT is a dummy variable that equals 1 if the entity restated its financial statements and zero otherwise, ln\_TA is the natural log of total assets, ROA is return on assets, DTEQ is debt to equity, MKBK is the ratio of market to book value, Big4 is a dummy variable that equals 1 if the audit firm is one of the Big 4, and zero otherwise, and SIC is the 4-digit SIC code.

The results shown in Table 2 show significant and positive coefficient of the DA which supports H1; there is a significant association between DA and audit quality measured by the likelihood of the restatement of the financial statements.

### Going Concern Opinion

We collect data from AUDIT ANALYTICS on companies that received going concern reports. Total number of observations over the period of January 1, 1998 to December 31, 2011 is 35,542 observations. After deleting observations with missing tickers, only 9,968 observations are left. After removing observations on firms that use financial reporting standards other than U.S. GAAP, 9,643 observations are left. Of those, only 493 firms have data in COMPUSTAT database. Most of the missing firms are registered in the over the counter (OTC) market. After getting the COMPUSTAT data on matching companies and removing observations with missing accruals variables, only 721 observations are left. Table 3 shows the descriptive statistics for these companies.

**TABLE 3**  
**DESCRIPTIVE STATISTICS FOR THE GOING CONCERN**

Panel A - All firms with and without going concern reports:

Variable	N	Mean	SD	Min	Max
Discretionary Accruals	721	-0.04	0.55	-4.04	6.20
Current Assets	721	136.95	400.22	0.03	1806.03
Current Liabilities	721	125.42	434.96	0.05	6341.47
Cash	721	46.43	142.03	0.00	1248.00
Short Term Debt	721	49.46	271.96	0	5164.31
Depreciation	721	19.40	75.03	0	1301.10
Sales	721	365.19	1263.16	0	14995.00
Net PPE	721	167.87	628.21	0	7944.46
ROA	721	-161.07	364.93	-4400.00	138.03
Total Assets	721	415.03	1282.05	0.27	12009.63
Debt to Equity	721	46.80	207.38	-1243.56	1206.24
Market to Book	721	2.90	14.20	-78.90	111.66

Panel B - Control group (firms with going concern reports):

Variable	N	Mean	SD	Min	Max
Discretionary Accruals	493	-0.05	0.50	-4.04	5.04
Current Assets	493	138.46	386.52	0.03	3239.00
Current Liabilities	493	140.89	453.87	0.05	6341.47
Cash	493	47.21	145.46	0.00	1248.00
Short Term Debt	493	64.65	324.46	0	5164.31
Depreciation	493	19.90	77.59	0	1301.10
Sales	493	374.54	1247.56	0.00	14995.00
Net PPE	493	171.47	621.92	0	6933.80
ROA	493	-89.96	149.56	-13.11.45	32.30
Total Assets	493	413.60	1255.17	0.27	12009.55
Debt to Equity	493	47.75	235.84	-1234.56	1206.24
Market to Book	493	2.91	14.92	-.69.75	111.66

Panel C - Matching group (firms without going concern reports):

Variable	N	Mean	SD	Min	Max
Discretionary Accruals	228	0.02	0.65	-3.80	6.20
Current Assets	228	123.62	403.62	0.21	4806.03
Current Liabilities	228	85.73	367.47	0.17	4944.03
Cash	228	40.81	130.56	0	1232.55
Long Term Debt	228	17.31	78.29	0	772.26
Depreciation	228	17.17	61.23	0.02	565.44
Sales	228	321.68	1113.61	0.00	12780.70
Net PPE	228	164.60	642.95	0.00	8021.27
ROA	228	-40.66	104.88	-1228.59	24.34
Total Assets	228	395.81	1254.14	0.65	10322.13
Debt to Equity	228	49.97	138.74	-472.45	831.56
Market to Book	228	2.22	12.98	-114.79	65.25

Discretionary Accruals, using Modified Jones Model, are the residual in model (2) run with no intercept, Current Assets are year-end current assets (COMPUSTAT item A4 ), current liabilities are the year-end current liabilities (COMPUSTAT item A5 ), cash is cash and cash equivalent (COMPUSTAT item A1), Long Term Debt is



(COMPUSTAT item A9), Depreciation is depreciation and amortization expense (COMPUSTAT item A14 ), Sales are net sales (COMPUSTAT item A12), Net PPE is net property plant and equipment (COMPUSTAT item A8 ), ROA is return on assets (COMPUSTAT item A237 divided by item A6 multiplied by100), Total Assets (COMPUSTAT item A2), Debt to Equity is the long term debt to shareholders equity ratio (COMPUSTAT item 100 x (COMPUSTAT item A9 / (COMPUSTAT item A60 + COMPUSTAT item A130) ), Market to Book is the ration of a company's market to it book value.

The results in Panels B and C show that the DA level is higher in firms receiving going concern opinion compared to those that did not receive it, which seems to support our hypothesis H2.

**TABLE 4**  
**GOING CONCERN AND DISCRETIONARY ACCRUALS**

$$GC_{it} = \alpha + \beta_1 DA_{it} + \beta_2 \ln\_TA_{it} + \beta_3 ROA_{it} + \beta_4 DTEQ_{it} + \beta_5 MKBK_{it} + \beta_6 IND_{it} + \beta_7 BIG4_{it} + \varepsilon_{it}$$

Variable	Parameter Estimate	t-statistic	p-value
Intercept	0.641	25.54	<0.000
DA	-0.043	-1.20	0.230
ln_TA	0.003	0.29	0.774
ROA	-0.001	-3.62	<0.001
DTEQ	0.001	0.69	0.487
MKBK	-0.001	-0.45	0.652
BIG4	-0.009	0.21	0.833
SIC	-0.000	-0.48	0.632

Adj-R<sup>2</sup> = 1.6%

F-test = 2.75 p = 0.009

GC is a dummy variable that equals one if the entity received a going concern report and zero otherwise, ln\_TA is the natural log of total assets, ROA is return on assets, DTEQ is debt to equity, MKBK is the ratio of market to book value, Big4 is a dummy variable that equals 1 if the audit firm is one of the Big 4, and zero otherwise, and SIC is the 4-digit SIC code.

In Table 4, the coefficient of the DA is negative. Even though the sign of the DA coefficient is in the expected direction, the coefficient is insignificant. Therefore, the results do not appear to provide support for our hypothesis H2.

#### Big 4 Audit Firms

In his study of the effect of audit quality on the pricing of DA, Krishnan (2003) uses Big 6, as an indicator of high audit quality. He finds that value relevance of DA is greater for firms audited by Big 6 firms. To test H4, we collect data from COMPUSTAT on all active firms from January 1, 1998 to December 31, 2011. Total number of observations is 134,400. After removing observations with missing variables, 52,193 observations are left, and after removing the upper and lower 1% of variables used in the model, 47,092 observations left. Of these observations, 32,603 are Big 4 audit firms and 14,489 are for companies audited by non-Big 4 audit firms. Table 5 shows descriptive statistics for both groups of companies audited by Big 4 and non-Big 4 audit firms. Results in Panel B and Panel C show that companies audited by Big 4 firms are large in terms of their assets, sales, and PPE. Also they are more profitable on average, and have higher growth potentials as measured by the market to book ratio. In addition, the results show that they have lower levels of DA.

**TABLE 5**  
**DESCRIPTIVE STATISTICS FOR BIG 4 DATA**

Panel A - All companies audited by Big 4 audit firms and non-Big 4 audit firms:

Variable	N	Mean	SD	Min	Max
Discretionary Accruals	47092	-0.01	0.22	-2.26	2.59
Current assets	47092	808.03	2389.84	0.00	42778.03
Current Liabilities	47092	571.95	1819.86	0.00	31538.00
Cash	47092	247.90	960.04	-0.16	31600.00
Short Term Debt	47092	109.62	487.41	-882.00	11251.27
Depreciation	47092	107.99	353.93	0.00	7951.61
Sales	47092	2054.57	6324.70	0.00	137634.00
Net PPE	47092	895.32	3047.42	0.00	51444.79
ROA	47092	-22.58	106.81	-1723.34	36.22
Total Assets	47092	2414.85	6650.65	0.06	61519.25
Debt to equity	47092	48.42	117.98	-644.64	945.22
Market to Book	47092	2.89	5.94	-44.38	61.92

Panel B - Control group (Companies audited by Big 4 audit firms):

Variable	N	Mean	SD	Min	Max
Discretionary Accruals	32603	-0.01	0.15	-2.26	2.16
Current Assets	32603	1123.93	2777.25	0.00	42778.03
Current Liabilities	32603	800.16	2123.51	0.00	31538.00
Cash	32603	342.94	1123.81	-0.16	31600.00
Short Term Debt	32603	152.25	572.23	-882.00	11251.27
Depreciation	32603	150.73	412.58	0.00	7951.61
SALE	32603	2878.27	7402.85	0.00	137634.00
Net PPE	32603	1258.00	3579.97	0.00	51444.79
ROA	32603	-6.05	49.88	-1706.42	36.15
Total assets	32603	3381.00	7727.09	0.07	61519.25
Debt to equity	32603	58.23	114.15	-644.64	945.22
Market to Book	32603	3.06	4.97	-43.98	61.78

Panel C - Matching group (Companies audited by non-Big 4 audit firms):

Variable	N	Mean	SD	Min	Max
Discretionary Accruals	14489	-0.02	0.32	-2.25	2.59
Current Assets	14489	97.18	690.90	0.00	24531.99
Current Liabilities	14489	58.43	486.49	0.00	19707.04
Cash	14489	34.05	296.23	-0.01	13408.17
Short Term Debt	14489	13.71	148.50	-0.00	5656.00
Depreciation	14489	11.82	103.76	0.00	4023.60
Sales	14489	201.09	1318.02	0.00	49576.43
Net PPE	14489	79.21	618.96	0.00	28983.36
ROA	14489	-59.788	171.70	-1723.34	36.22
Total assets	14489	240.83	1606.21	0.06	48440.07
Debt to Equity	14489	26.35	123.38	-643.43	941.90
Market to Book	14489	2.45	7.68	-44.38	61.92

Discretionary Accruals, using Modified Jones Model, are the residual in model (2) run with no intercept, Current Assets are year-end current assets (COMPUSTAT item A4 ), current liabilities are the year-end current liabilities (COMPUSTAT item A5 ), cash is cash and cash equivalent (COMPUSTAT item A1), Long Term Debt is

(COMPUSTAT item A9), Depreciation is depreciation and amortization expense (COMPUSTAT item A14 ), Sales are net sales (COMPUSTAT item A12), Net PPE is net property plant and equipment (COMPUSTAT item A8 ), ROA is return on assets (COMPUSTAT items (COMPUSTAT item A237 divided by item A6 multiplied by100), Total Assets (COMPUSTAT item A2), Debt to Equity is the long term debt to shareholders equity ratio (COMPUSTAT item 100 x (COMPUSTAT item A9 / (COMPUSTAT item A60 + COMPUSTAT item A130) ), Market to Book is company's market value to its book value.

As predicted, Table 6 shows that the DA coefficient is significantly negative, which means that the DA levels are lower in companies audited by the Big 4; these results support our hypothesis H3.

**TABLE 6**  
**BIG 4 AND DISCRETIONARY ACCRUALS**

$$\text{BIG4}_{it} = \alpha + \beta_1 \text{DA}_{it} + \beta_2 \ln\_TA_{it} + \beta_3 \text{ROA}_{it} + \beta_4 \text{DTEQ}_{it} + \beta_5 \text{MKBK}_{it} + \beta_6 \text{IND}_{it} + \varepsilon_{it}$$

Variable	Parameter		
	Estimate	t-statistic	p-value
Intercept	0.129	21.26	<0.000
DA	-0.059	-7.38	<0.000
ln_TA	0.104	139.94	<0.000
ROA	-0.001	-1.55	0.120
DTEQ	0.000	-7.81	<0.000
MKBK	-0.003	10.79	<0.000
SIC	0.000	2.06	0.040
Adj-R <sup>2</sup> = 33.99%	F-test = 4043.13	p <.0001	

Big4 is a dummy variable that equals one if the audit firms is one of the Big 4 firms and zero otherwise, ln\_TA is the natural log of total assets, ROA is return on assets, DTEQ is debt to equity, MKBK is the ratio of market to book value, and SIC is the 4-digit SIC code.

### Internal Control Weaknesses

From AUDIT ANALYTICS, we collect 2,373 observations with negative internal control reports, over the period 2004 to 2011. Of these observations, only 1,525 companies have tickers, 993 of those companies are listed in the COMPUSTAT with available data. We pick a matching sample based on the same 4 digit SIC code and a total assets within 10% higher or lower. The matching sample contains 537 observations. The descriptive statistics for the control, matching, and total sample are shown in Table 7. Results in Panel B and C show that firms receiving qualified internal control reports have lower levels of DA. While both groups of companies are similar in term total sales and total assets, there is a difference in the about of DA. Panel B shows that the DA are lower in companies receiving IC qualified report, compared to companies receiving unqualified IC report, these results are in line with our hypothesis H 4.

**TABLE 7**  
**DESCRIPTIVE STATISTICS FOR THE INTERNAL CONTROL WEAKNESS DATA**

Panel A - All Observations with and without internal control weaknesses reports:

Variable	N	Mean	SD	Min	Max
Discretionary Accruals	1530	-0.01	0.12	-0.54	0.79
Current assets	1530	571.57	1261.27	1.48	21956.00
Current Liabilities	1530	355.22	897.25	0.46	9299.00
Cash	1530	213.24	606.67	0.00	15386.00
Short Term Debt	1530	60.98	251.95	0.00	5164.31
Depreciation	1530	66.02	65.19	0.04	1505.43
Sales	1530	1265.65	3468.49	0.00	60553.00
Net PPE	1530	483.86	1362.37	0.25	15011.00
ROA	1530	-1.99	18.33	-111.91	27.61
Total Assets	1530	1495.59	3218.00	16.93	28498.00
Debt to Equity	1530	51.59	103.28	-423.92	1218.31
Market to Book	1530	2.91	3.40	-14.09	34.13

Panel B - Control group (Observations with internal control weaknesses reports):

Variable	N	Mean	SD	Min	Max
Discretionary Accruals	993	-0.01	0.10	-0.54	0.66
Current Assets	993	557.99	1122.22	1.48	14518.00
Current Liabilities	993	360.62	873.30	0.46	8834.00
Cash	993	188.82	401.84	0.00	3805.84
Short Term Debt	993	65.99	275.99	0.00	5164.31
Depreciation	993	66.42	162.01	0.06	1448.16
Sales	993	1274.25	3409.55	0.00	60553.00
Net PPE	993	464.61	1199.26	0.69	13767.79
ROA	993	-2.11	17.28	-110.25	27.61
Total Assets	993	1495.52	3107.67	16.93	27379.73
Debt to Equity	993	54.87	105.69	-280.68	956.05
Market to Book	993	2.70	3.14	-11.02	32.11

Panel C - Matching group (Observations without internal control weaknesses reports):

Variable	N	Mean	SD	Min	Max
Discretionary Accruals	537	0.01	0.15	0.52	0.799
Current Assets	537	596.70	1485.33	3.44	21956.00
Current Liabilities	537	345.23	940.66	.28	9299.00
Cash	537	258.39	864.81	0.00	15386.00
Short Term Debt	537	51.70	199.94	0.00	2734.29
Depreciation	537	65.27	171.06	0.04	1505.43
Sales	537	1249.73	3578.09	0.00	58596.00
Net PPE	537	19.48	1622.00	0.25	15011.00
ROA	537	-1.78	20.15	-111.91	27.24
Total Assets	537	1495.72	3415.61	17.11	28498.00
Debt to Equity	537	45.52	98.4	-423.92	1218.31
Market to Book	537	3.30	3.81	-14.09	34.13

Discretionary Accruals, using Modified Jones Model, are the residual in model (2) run with no intercept, Current Assets are year-end current assets (COMPUSTAT item A4 ), current liabilities are the year-end current liabilities (COMPUSTAT item A5 ), cash is cash and cash equivalent (COMPUSTAT item A1), Long Term Debt is

(COMPUSTAT item A9), Depreciation is depreciation and amortization expense (COMPUSTAT item A14 ), Sales are net sales (COMPUSTAT item A12), Net PPE is net property plant and equipment (COMPUSTAT item A8 ), ROA is return on assets (COMPUSTAT items (COMPUSTAT item A237 divided by item A6 multiplied by100), Total Assets (COMPUSTAT item A2), Debt to Equity is the long term debt to shareholders equity ratio (COMPUSTAT item 100 x (COMPUSTAT item A9 / (COMPUSTAT item A60 + COMPUSTAT item A130) ), Market to Book is company's market value to its book value.

The results in Table 8 show positive and significant coefficient of the DA, which indicates that DA are higher for companies receiving unqualified internal control reports, and low for companies receiving a qualified internal control report. These results are consistent with our hypothesis H4.

**TABLE 8**  
**INTERNAL CONTROL AND DISCRETIONARY ACCRUALS**

$$IC_{it} = \alpha + \beta_1 DA_{it} + \beta_2 \ln\_TA_{it} + \beta_3 ROA_{it} + \beta_4 DTEQ_{it} + \beta_5 MKBK_{it} + \beta_6 IND_{it} + \beta_7 BIG4_{it} + \varepsilon_{it}$$

Variable	Parameter	Estimate	t-statistic	p-value
Intercept		0.309	4.66	<0.000
DA		0.294	2.87	0.004
ln_TA		-0.003	-0.27	0.789
ROA		-0.001	-0.18	0.860
DTEQ		-0.001	-1.91	0.057
MKBK		0.012	3.37	0.001
BIG4		0.029	0.92	0.359
SIC		0.000	0.53	0.599
Adj-R <sup>2</sup> = 0.011	F-test = 3.41			p = 0.0013

Where IC is a dummy variable that equals 0 in case of finding internal control weaknesses, and 1 otherwise, ln\_TA is the natural log of total assets, ROA is return on assets, DTEQ is debt to equity, MKBK is the ratio of market to book value, Big4 is a dummy variable that equals 1 if the audit firm is one of the Big 4, and zero otherwise, and SIC is the 4-digit SIC code.

### Industry Specialization

Our Analysis here is similar to that followed by Jensen and Payne (2005), Deis and Giroux (1992), and O'Keefe et al. (1994); industry expertise is measured using the number of clients in the same industry audited by a particular auditor. An audit firm will be considered a leader if it is associated with the largest number of audits in a particular industry.

Data are collected from COMPUSTAT over the period 1998 to 2001. Total number of observations is 134,400. Observations with missing variables, observations with auditors other than Big 4, observations from the banking and financial services, and observations at the upper and lower 1% are deleted. Only 31,688 observations remain. Results in Panels B and C of Table 9 show that there is no difference on average between the two groups of companies whether audited by industry leader or not in terms of their DA. DA in both Panels are at -0.01 level.

**TABLE 9**  
**DESCRIPTIVE STATISTICS FOR THE INDUSTRY SPECIALIZATION DATA**

Panel A - All companies audited

Variable	N	Mean	SD	Min	Max
Discretionary Accruals	31688	-0.01	0.15	-2.28	2.15
Current Assets	31688	1118.17	2756.95	0.00	42778.03
Current Liabilities	31688	793.02	2100.38	0.00	31538.00
Cash	31688	333.67	1075.98	-0.16	31600.00
Short Term Debt	31688	153.86	577.02	-882.00	11251.27
Depreciation	31688	153.60	417.60	0.00	7951.61
Sales	31688	2879.24	7361.85	-0.87	137634.00
Net PPE	31688	1288.51	3625.10	0.00	51444.79
ROA	31688	-6.02	48.90	-1706.42	35.73
Total Assets	31688	3375.06	7686.45	0.07	61097.44
Debt to Equity	31688	58.66	114.51	-644.64	940.98
Market to book	31688	3.08	4.94	-43.98	61.78

Panel B – Companies audited by a leader

Variable	N	Mean	SD	Min	Max
Discretionary Accruals	10263	-0.01	0.16	-2.28	2.10
Current Assets	10263	1137.22	2786.95	0.00	42778.03
Current Liabilities	10263	791.94	2039.03	0.00	28332.12
Cash	10263	345.44	1123.19	0.00	26235.00
Short Term Debt	10263	153.12	553.51	-882.00	10600.00
Depreciation	10263	151.07	375.94	0.00	5177.00
Sales	10263	2896.10	7173.12	-0.87	99512.40
Net PPE	10263	1396.05	3829.27	0.00	48043.24
ROA	10263	-7.42	53.04	-1706.42	35.54
Total Assets	10263	3506.34	7706.22	0.21	60966.00
Debt to equity	10263	59.60	115.00	-620.07	938.05
Market to book	10263	3.05	4.94	-43.98	61.63

Panel C – Companies audited by a non-leader

Variable	N	Mean	SD	Min	Max
Discretionary Accruals	21425	-0.01	0.14	-1.91	2.15
Current Assets	21425	1109.04	2742.48	0.00	39637.00
Current Liabilities	21425	793.55	2129.19	0.00	31538.00
Cash	21425	328.04	1052.60	-0.16	31600.00
Short Term Debt	21425	154.20	587.96	0.00	11251.27
Depreciation	21425	154.81	436.14	0.00	7951.61
Sales	21425	2871.17	7450.72	-0.23	137634.00
Net PPE	21425	1237.00	3522.04	0.00	51444.79
ROA	21425	-5.35	46.78	-1561.29	35.73
Total Assets	21425	3312.18	7676.35	0.072	61097.44
Debt to equity	21425	58.22	114.28	-644.63	940.98
Market to book	21425	3.09	4.94	-43.83	61.78

Discretionary Accruals, using Modified Jones Model, are the residual in model (2) run with no intercept, Current Assets are year-end current assets (COMPUSTAT item A4 ), current liabilities are the year-end current liabilities (COMPUSTAT item A5 ), cash is cash and cash equivalent (COMPUSTAT item A1), Long Term Debt is

(COMPUSTAT item A9), Depreciation is depreciation and amortization expense (COMPUSTAT item A14 ), Sales are net sales (COMPUSTAT item A12), Net PPE is net property plant and equipment (COMPUSTAT item A8 ), ROA is return on assets (COMPUSTAT items (COMPUSTAT item A237 divided by item A6 multiplied by100), Total Assets (COMPUSTAT item A2), Debt to Equity is the long term debt to shareholders equity ratio (COMPUSTAT item 100 x (COMPUSTAT item A9 / (COMPUSTAT item A60 + COMPUSTAT item A130) ), Market to Book is company's market value to its book value.

**TABLE 10**  
**INDUSTRY SPECIALIZATION AND DISCRETIONARY ACCRUALS**

$$\text{Lead}_{it} = \alpha + \beta_1 \text{DA}_{it} + \beta_2 \ln\_TA_{it} + \beta_3 \text{ROA}_{it} + \beta_4 \text{DTEQ}_{it} + \beta_5 \text{MKBK}_{it} + \varepsilon_{it}$$

Variable	Parameter	Estimate	t-statistic	p-value
	Intercept	0.278	30.73	<0.0001
	DA	0.037	2.07	0.039
	ln_TA	0.007	5.30	<0.000
	ROA	-0.001	-5.46	<0.000
	DTEQ	0.0001	0.02	0.984
	MKBK	-0.0001	-0.23	0.817
Adj-R <sup>2</sup> = 0.13%		F-test = 9.38 p <.0001		

LEAD equals 1 if the auditor is a leader in the industry, 0 otherwise, ln\_TA is the natural log of total assets, ROA is return on assets, DTEQ is debt to equity, MKBK is the ratio of market to book value, Big4 is a dummy variable that equals 1 if the firms is one of the Big 4, and zero otherwise, and SIC is the 4-digit SIC code.

The positive and significant coefficient on the DA shows that DA are higher in audit performed by industry specialist or leader, which does not support to our hypothesis H5.

## CONCLUSIONS

This study assesses the validity of the notion that DA are a good proxy of audit quality. Many studies use DA as an indicator of audit quality under the assumption that financial statements are the products of both the company's management and the company's external auditors. We use several factors that have been identified by prior research as indicators of good audit quality and measure their association with DA to validate whether DA are a good measure of audit quality. The results are mixed. While the associations of DA with restatements of financial statements, Big 4 audits, and issuing negative internal control report, are significant and in the expected directions, we do not find a significant relationship between DA and issuing a going concern report. In addition, the association of the DA and the industry specialization of the audit firms is in a direction opposite to what we have hypothesized. These results indicate that caution should be used when using DA as a measure of audit quality.

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